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VOL. XXVIII — December, 1919 — No. 3

Table of Contents

Short Talks by the Editor

Home Planning Ideas Change

HOME builders have radically changed their ideas about houses during the last year or two. Instead of the large house with many rooms, they have gone to the opposite extreme, perhaps, and now want homes that contain only as many rooms as are absolutely necessary. In cities, especially, the advent of the space-saving bed has brought about an insistent demand that most rooms do double duty—living rooms in the daytime and bedrooms at night.

Out Goes the Old-Fashioned Bed. It's a Space Waster.

Economy and convenience are the reasons such homes are in demand. Smaller houses, which of course cost less to build, provide the accommodations formerly found in larger houses. The saving in the size of the lot required as a site for these homes, and in the dimensions of the houses themselves has made a great impression on home builders, and they have been quick to take advantage of the opportunity.

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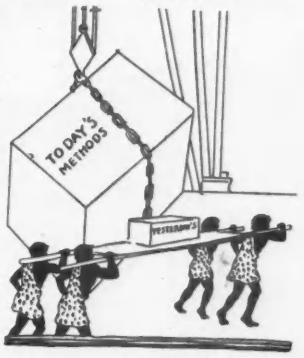
Progress in Building Profession

LIKE most other professions, that of building is constantly progressing. The methods of today will be improved upon tomorrow. New ways of doing things, improved tools to work with, and materials that are more efficient and are more easily applied are being discovered continuously. As a consequence members of the building industry are doing their work of erecting buildings more easily, and are building better structures.



The Power of a Thousand Men Is Contained in the Modern Hoist.

The leaders in the industry are the men who are quick to take advantage of the new ways of doing things, and to use the materials and tools that are devised for their convenience. To many, something that is new is no good, for the simple reason that they are not accustomed to it. But to those who are successful a new method, or tool, or material is a challenge. They want to know whether or not the new thing is good; if it is good they adopt it; if it isn't good they discard it. They have what is called an open mind, a mind that is willing and eager to learn.

It is really surprising how ignorant some members of the building industry are of tools and materials that have been in general use for years. These men are not numerous, however, and the very fact that they make inquiry shows that lack of opportunity to learn is the reason they are not familiar with all phases of their business.

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Circulation 50,000 Copies

THE AMERICAN BUILDER this month reaches the greatest circulation in its history or in the history of any other building, contracting or architectural publication.

Fifty thousand copies to regular paid subscribers (including news stand sales).

This is more than the combined circulation of all other building, contracting and architectural publications put together. It gives the AMERICAN BUILDER the dominating position in the great building industry of today, where we can state with all confidence, "The AMERICAN BUILDER Covers the Entire Building Field."

Just a year ago the war-time restrictions on building were removed, and the industry forged ahead. Likewise the war-time restrictions on the use of printing paper were removed; so we were permitted to go ahead also, keeping pace with the building industry.

It is interesting and significant that the AMERICAN BUILDER circulation has increased just 100 per cent in this past year, since the armistice was signed.

This has been a natural growth, not forced in any way. Having the advantage of being already the largest and best known publication in its field, the AMERICAN BUILDER naturally benefited more than any other by the return of building activity.

Fifty thousand contractors, builders, lumber dealers, and architects are a sizeable and influential army—they are the picked men of the industry—those of greatest influence and enterprise. Their good-will is worth striving hard to gain and to hold. Our Editors believe this, and so do the representative advertisers who use the AMERICAN BUILDER.

Co-operate with Y. M. C. A. on "Own Your Own Home Day"

EVERY ASSOCIATION IN THE COUNTRY WILL URGE HOME BUILDING ON JANUARY 20. MEMBERS OF THE BUILDING INDUSTRY CAN HELP

BEGINNING Saturday, Jan. 17, the Y. M. C. A. will conduct a National Thrift Week in every community where it has a local association.

The fourth day, Tuesday, Jan. 20, has been set aside as "Own Your Own Home Day." On this date the advantages of owning a home will be emphasized in many ways—by local newspaper articles; by addresses at the Y. M. C. A. auditoriums, by enlisting the chambers of commerce, churches and other civic and religious organizations in bringing the people to a realization of the joys and financial gain of building and owning a home.

Here is a wonderful opportunity for members of the building industry to co-operate in a movement that will bring business in the near future. Few men in a commercial enterprise have had such wholehearted support as has been given to contractors, building material dealers, architects and the others engaged in the business of supplying the country's building needs during the last twelve months. And the good work goes on.

On "Own Your Own Home Day" there are a number of things that those interested in promoting building can do to help the Y. M. C. A. make this day a great success. In the lobbies of the association buildings displays that will create a desire for a home can be arranged. Frame a sheet of wall board, set it on standards, and on the board fasten securely the home building designs that appear each month in the two-color section of the AMERICAN BULDER. Get displayed conspicuously thruout the city posters urging that everyone build his own home. Call attention to the significance of the day in advertisements in the local newspapers. This will be no trouble, as the attention of every business man, newspaper and other public spirited citizen will be centered on this idea, and will support it.

Anything and everything that is done on Tuesday, Jan. 20, to make "Own Your Own Home Day" a big success will be appreciated by those public spirited men who are promoting thrift week. And at the same time they will be doing something no member or group of members of the building industry alone could accomplish.

While "Own Your Own Home Day" is still more than a month away, right now is the time to begin to do your part in making this movement a success. Homes are needed; and homes must be built. The quicker they are built, the better for every man interested in building.

Program for Thrift Week

On Saturday, Jan. 17, "National Thrift Day or Bank Day," the emphasis will be on the service a bank renders a community.

"Share with Others Day," Jan. 18, on the importance of sharing a part of one's income with others.

"National Life Insurance Day," Jan. 19, on the need of protecting one's family with life insurance.

"Own Your Own Home Day," Jan. 20, on the advantages of owning one's own home.

"Make a Will Day," Jan. 21, on the desirability of making a will and thus making a surer provision for the future of one's loved ones.

"Thrift In Industry Day," Jan. 22, on the economic value of factory thrift and of co-operation between employers and employes.

"Family Budget Day," Jan. 23, on the need of making an estimate and keeping a record of expenditures.

"Pay Your Bills Day," Jan. 24, on one's moral obligation to pay debts promptly.

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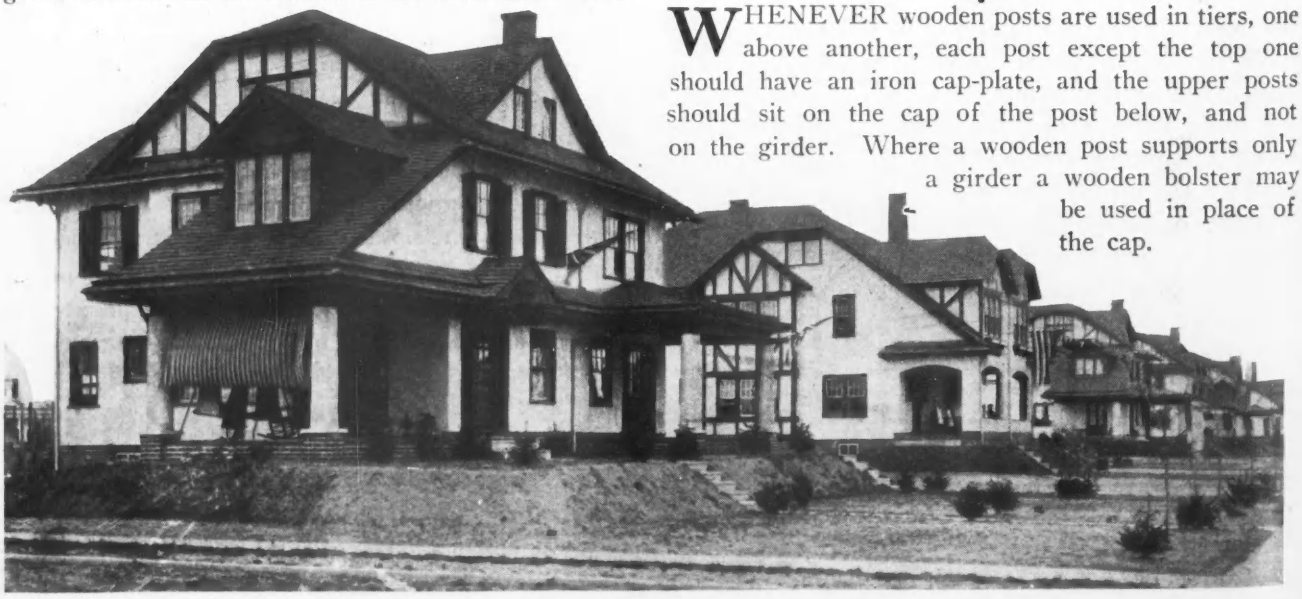
WHENEVER wooden posts are used in tiers, one above another, each post except the top one should have an iron cap-plate, and the upper posts should sit on the cap of the post below, and not on the girder. Where a wooden post supports only a girder a wooden bolster may be used in place of the cap.



Home Building Inspires Building. Here Is a Street of Homes—Real Homes. It Is to Create a Greater Interest in Home Building That the Leading Commercial and Social Organizations of the Country Are Backing "Own Your Own Home Day," January 20.

National Thrift Week, Which Begins January 17 and Extends Thru January 24, Will Be Generally Observed Thruout the United States. Tuesday, January 20, Is "Own Your Own Home Day." On That Day Every Member of the Building Industry Should Do His Part to Demonstrate to the People the Value of Building a Home. There Will Be a Concentrated Drive on January 20 by the Y. M. C. A., Local Chambers of Commerce, the Churches, Schools and Newspapers to Promote Home Building. Do Your Part and Home Building in Your Community Will Be Given a Boost.

Careless Estimating Costly to Contractors

MANY ITEMS OF "GENERAL EXPENSE" OFTEN OVERLOOKED—WHAT THEY ARE

By George M. Petersen, Estimator

EDITOR'S NOTE—*This is the first of two installments of an article on general expense items in estimating. The second installment will appear in an early issue.*

THE item of General Expense is, like the poor, always with us. It is an item that no successful contractor can overlook, avoid or dodge. It is the main reason why many contractors do not make good. Failure to take this item into consideration when making estimates usually means that the profit on the job is taken to pay the general expense item which should have been estimated along with the rest of the material and labor on the job.

Some years ago the writer happened upon the folfolwing extract and has had it in his price-book ever since, altho he failed to make a note of the author's name:

"The problem for estimators is how to make the ciosest estimate possible from the KNOWN facts. The most careful rules and the most elaborate 'systems,' if followed, would not reduce the art of estimating to an exact science. It is impossible to state, with absolute accuracy, what a job has cost after it is completed, so how much more difficult, then, to forecast the cost before entering upon the work. It is utterly impossible to make an infalibly accurate estimate of the cost of anything, and much must be left to the intelligence, the information, the judgment, the aptitude and the experience of the estimator."

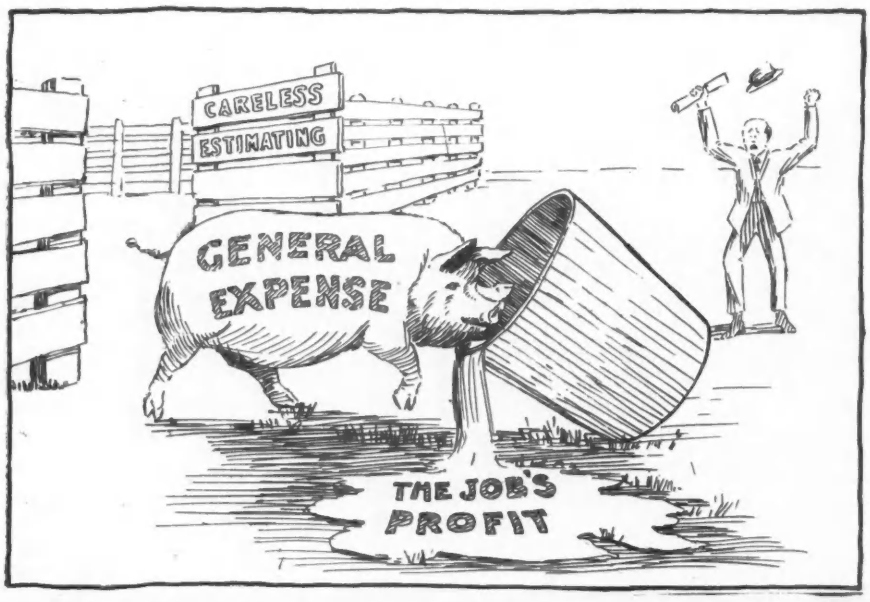
There are many otherwise good estimators who will not seriously consider that item of General Expense at all or who will simply set it at an arbitrary sum. There are others who insist upon claiming it as part of the Overhead Expense, whereas it is as much of an individual item as is the concrete, the stone, the lumber and other structural items.

Experienced Estimators Never Far Apart on Cost

When bids are taken from every contractor who cares to figure the job it is not an uncommon occurrence to see as much as 20 per cent difference between the high and the low bidders, but when bids are received only from a selected list of contractors who are capable of figuring correctly and of executing the job properly it is often a difference of only one or two per cent which will give the project to the successful bidder.

This may be explained by the fact that some contractors will "take a chance," figure what they can actually see and then lump in a few per cent of the estimated cost for General Expense, Overhead and Profit. They will also neglect numerous small items which will, in the aggregate, amount to several hundred dollars and other incidentals which an experienced estimator would know to be necessary to the work, so that the capable, efficient contractor who actually estimated the job will be a great deal higher than those who took a chance.

Chances do not pay dividends, neither do they make friends for the man who takes them. No matter how honest a man may be, no matter how he tries to make good on a job upon which he is losing money, he is bound, unconsciously perhaps, to slight little things which will mean the difference between a satisfactory job and an unsatisfactory one. We have to take enough chances at best without taking them upon such items as General Expense and Overhead.



Old General Expense Is What Eats Up the Profits of the Present-Day Contractor, Unless He Carefully Figures in All the Items When Making an Estimate on the Cost of a Building.

Items to Consider in Figuring General Expense

The following is a list of items which the writer checks over on every job when he arrives at the item of General Expense:

Board
Bond
Cartage of Materials
Cleaning out Building
Cleaning Exterior of Bldg.
Depreciation of Plant
Engineering Expense
Fire Insurance
Freight on Materials
Liability Insurance
Permits
Protection of Work
Protection of Other Property
Protection of Streets and Sidewalks
Temporary Buildings
Staging and Scaffolding
Storage of Supplies and Materials
Telephone

Temporary Closing and Heating of Bldg.
Temporary Lighting
Temporary Office
Timekeeper
Water for Building Use
Watchman
Miscellaneous
Interest on Investment in Plant

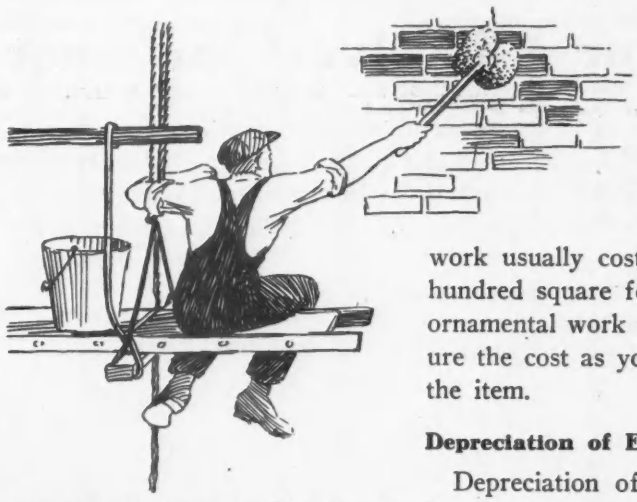
The above mentioned items are all very real and are of sufficient importance to be taken into consideration, upon every job, no matter the size.

Board for the Workmen

This item is very often overlooked on an out-of-town job and is given no thought until the mechanics refuse to go on the job unless the contractor pays the difference between the city rate and the rate demanded by the boarding houses in the vicinity of the work. Again, it is often necessary for the contractor to furnish bunkhouses and board to the mechanics, laborers and other employees on the site of the work and make a reasonable charge for them. The conditions should be carefully investigated and thoroly analyzed before passing this item by.

Faithful Performance Bond

The bond is another item which is all too often lumped into Overhead, altho it is really an item of General Expense. Practically all large jobs require a bond for the faithful performance of the work, and this bond usually costs in the neighborhood of one and one-half per cent of the total amount of the contract. It is an item of financial importance and should never be overlooked or neglected. The contractor is entitled to his profit upon the amount involved and should figure it in.



Cleaning Up Brickwork May Seem a Small Item, But It Is One of the Many That Must Be Considered and Is Considered by the Successful Contractor.

Cost of Hauling Materials

Cartage of materials often runs into a worth-while amount and should either be figured with the cost of materials or should be completely covered under the General Expense item. On some rural work the cost of carting materials will often run up into the thousands of dollars because of the distance from the railroad to the site of the project. The conditions of the roads also affect this item in no small degree and all of these things should be very carefully considered.

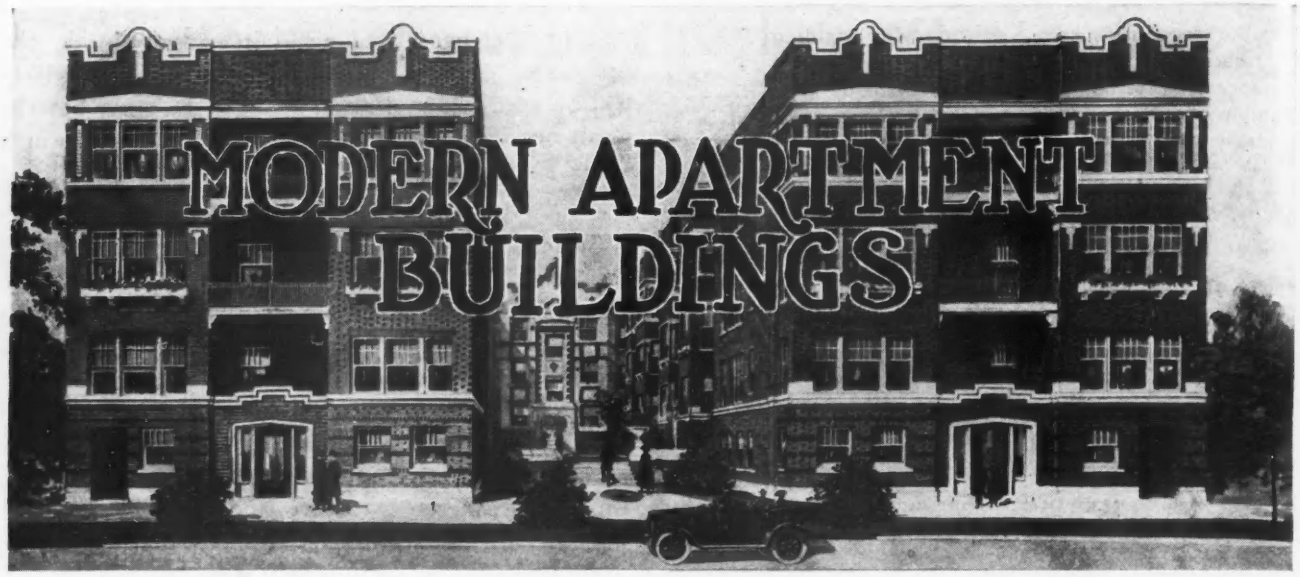
Cleaning out the building is an item that fully 99 per cent of contractors neglect entirely, maintaining that it is done in spare moments and "costs nothing." There is not one solitary item on any construction job which "costs nothing," as every minute must be productive of actual work toward the completion of the project or the time is lost. Actual cost figures kept by the writer for several years show that the average cost of keeping a building fairly clean during the process of erection amount to about $200 per $100,000 of cost. It is a small item, to be sure, but the small ones add up until they become a really worth while sum in the end.

Cleaning Masonry Walls

Cleaning the exterior of the building is another item which is often overlooked by many, while others add a fixed sum per thousand to the cost of laying brick and others use a square foot price. The writer prefers to use a combination of both; a square foot price for cleaning stone work and a price per thousand for cleaning brick. As nearly as he can arrive at the cost of this work it is about 50 cents per thousand for face brick, rough texture, and about 25 cents per thousand for pressed brick. This cost may seem high, and will be high, under favorable conditions, as there are many cases where the brick have been thoroly cleaned for as low as 25 cents per thousand for face and 10 cents per thousand for pressed. Stone work usually costs from 20 to 30 cents per hundred square feet of surface, including all ornamental work with the flat surfaces. Figure the cost as you will, but do not overlook the item.

Depreciation of Equipment Important Item

Depreciation of plant is something which is as confusing as the old argument of "Overhead." There are so many ways to figure the depreciation that many contractors lump it in as a set item. The most satisfactory manner of handling this subject, to the writer's way of thinking, is to estimate the life of the various articles of equipment to be used and then divide its cost into a yearly charge. For instance, a concrete mixer is purchased at a cost of $2,000. We will say that the "life" of this machine is seven years and that the cost per year is $286. Now this $286 must be divided into the business for each year so that at the end of the seven-year period we have enough in our sinking fund to purchase another mixer, even tho the old one is still capable of running its eight hours a day. The amount to be charged up to each job is a percentage of the volume of work which it is expected to do with the machine each year. If the first job of the season will require the service of the mixer for six months the matter is very simple as the sum of $143 will be charged up on that particular work. Ordinarily, however, it is advisable to divide the yearly charge into the amount of the anticipated work and use a certain percentage on the cost of the work. Each machine, hoist and engine should be figured separately and then the total set down under the item.



Design for a Twelve-Apartment Building

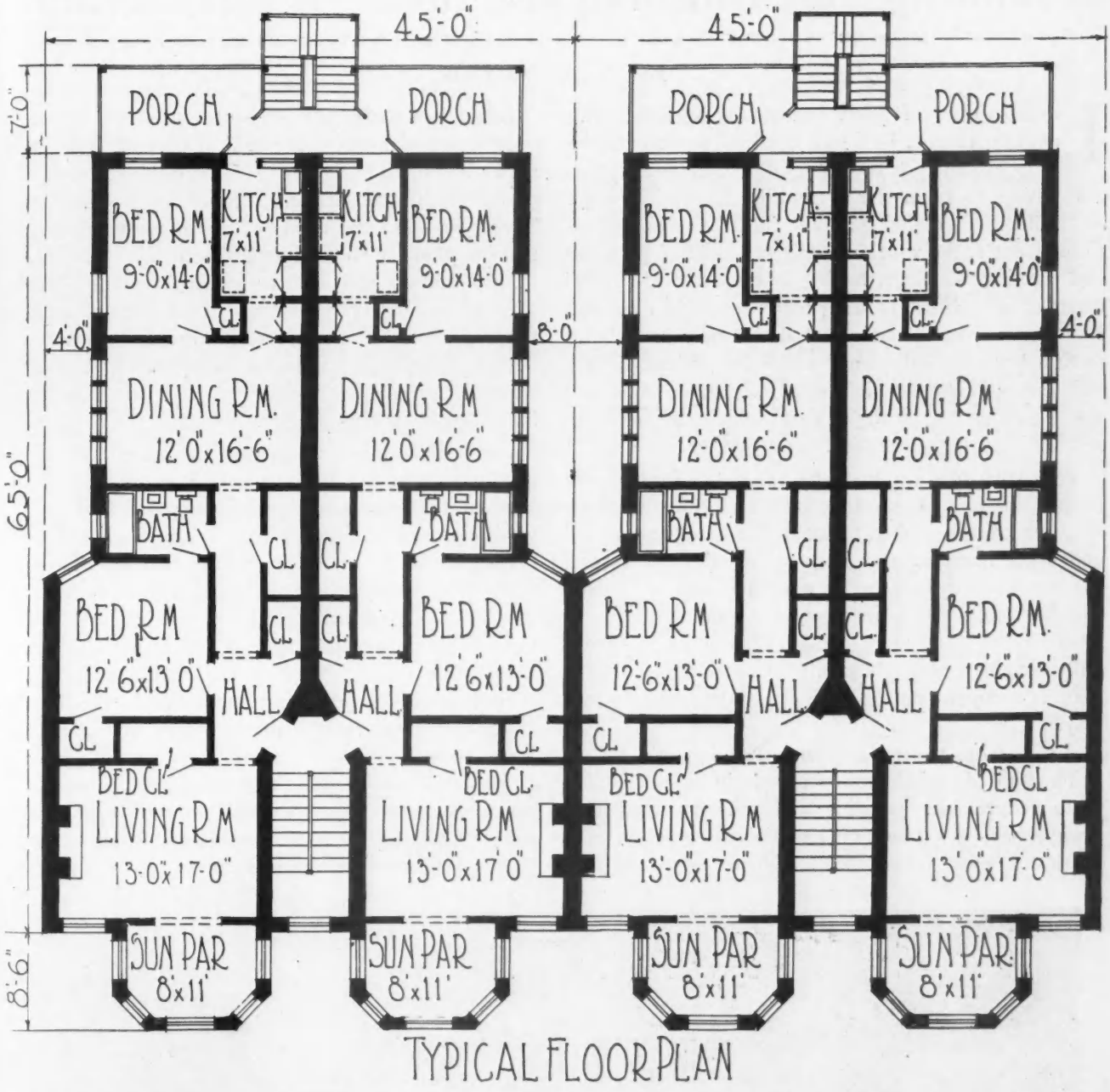
DOUBLE BUILDING, EACH CONTAINING SIX FIVE-ROOM APARTMENTS, IS GOOD INVESTMENT

NO class of city property gives the owner a better return on his investment than an apartment building. And the larger the building, the more profitable, as there is a considerable saving in construction cost and operating expense.

The design shown here is one that is favored by builders. It is 90 by 80 feet 6 inches, consequently suitable for a lot with 100 feet frontage. It is a double building, each containing six five-room apartments.

The perspective shows what an attractive building

Double Building Containing Twelve Five-Room Apartments. This Apartment Building Is Designed for a 100-Foot Lot, Being 90 by 80 feet 6 Inches in Dimensions. It Is of Standard Brick Construction with Face Brick Exterior and Terra Cotta Trim. Economy in Construction Cost and Operating Expense Are Found in This Type of Apartment Building.



Typical Floor Plan of Twelve-Apartment Building. Each Apartment Has Five Rooms, Bath and Sun Parlor, and a Space-Saving Bed in the Living Room.

this is, with its face brick exterior, terra cotta trim and irregular roof line. The floor plans show the lay-out of the apartments. Each contains living and dining rooms, kitchen, two bedrooms and bath, besides a sun parlor, providing sufficient accomodations for the average family. A space-saving bed in each living room gives an additional bedroom.

The building is of standard brick construction, a party wall dividing the two buildings, or rather making the two into one building. Light and ventilation for the rear rooms are provided by the jog in the rear half of the buildings.

In cost, both of construction and equipment, and in operating expense this is an economical building. One boiler supplies the heat for the double building; the services of only one janitor are required. At the same time as much or more revenue is secured from a building of this type as from a detached apartment building.

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TERRA-COTTA, whether plain or ornamental, usually is made of hollow blocks formed with webs inside, so as to give extra strength and keep the work true while drying. This is necessitated because good, well-burned terra-cotta cannot safely be made more than about 1½ inches in thickness, altho, when required to bond with brickwork, it must be at least 4 inches thick. If extra strength is needed, these hollow spaces are filled with concrete or brickwork, which greatly increases the crushing strength of terra-cotta, altho alone it is able to bear a very heavy weight. A solid block of terra-cotta of one foot cube has borne a crushing strain of 500 tons and over.

Planning and Building the Modern Restaurant

THE BUILDING MUST BE PROPERLY CONSTRUCTED AND EQUIPPED TO MAKE THIS BUSINESS SUCCESSFUL

By G. A. Nichols

IN these days of swift and strong business competition the need of one hundred per cent operating efficiency is becoming more and more apparent. This is so, no matter in what line the business may be. Builders are realizing it more fully than ever before. Consequently, the wise and sane principle of planning and erecting buildings, having in mind the individual needs of a business, is being more generally followed. In other words, the universal desire now is to build to fit a business rather than make the business fit the building. This is a decidedly refreshing condition that is going to result in great efficiency and correspondingly higher profit for all concerned.

The owner of a building which is let out for business purposes is in a situation not unlike that of the manufacturer or the jobber. Unless the retailer can sell goods the manufacturer is handicapped.. Therefore, the manufacturer deems it good business to devote time and money to building up the retailer to a point where he can sell more goods. The building owner will profit by making his building of such a character that its occupant can do business in the most efficient way.

Construct Building to Suit Tenant's Needs

The big fight of almost everybody in business today is to reduce his operating and selling costs. This always has been more or less the case, but is now more than ever so because of high prices.

Never has there been such a demand for scientific accuracy in operation—the kind of accuracy that eliminates lost motion, that saves time, that increases employes' working efficiency. If a building is constructed having in mind the needs of an individual business, that business can be conducted therein with a minimum of lost motion and a correspondingly greater profit. This means bigger returns for the owner as well as the occupant. If, therefore, the building owner will devote thought and attention to promoting the occupant's prosperity in this manner, he naturally will get his share in that prosperity.

Nowhere is this more true than in the case of the restaurant, the lunchroom or the cafeteria. In these lines of business operating efficiency is of absolutely vital importance. The operator's profits depend upon his ability to serve the maximum number of people in the quickest time and with the smallest outlay that may be compatible with good business judgment. This means that the equipment must be laid out on entirely modern lines with every provision for saving steps, saving time and conserving material. In the modern restaurant or cafeteria the problem of eliminating waste is worked down to a point of scientific accuracy. In no other business is the truth of the proverb, "A penny saved is a penny earned" so vividly and forcefully illustrated. Also, it would be difficult to find a line of business where profits can so quickly take their

Unless Scientific Layout Is Followed in the Cafeteria the Profits Are Jeopardized. The Installation Pictured Here Clearly Illustrates the Precision with Which the Equipment Should Be Arranged.

flight because of this same waste.

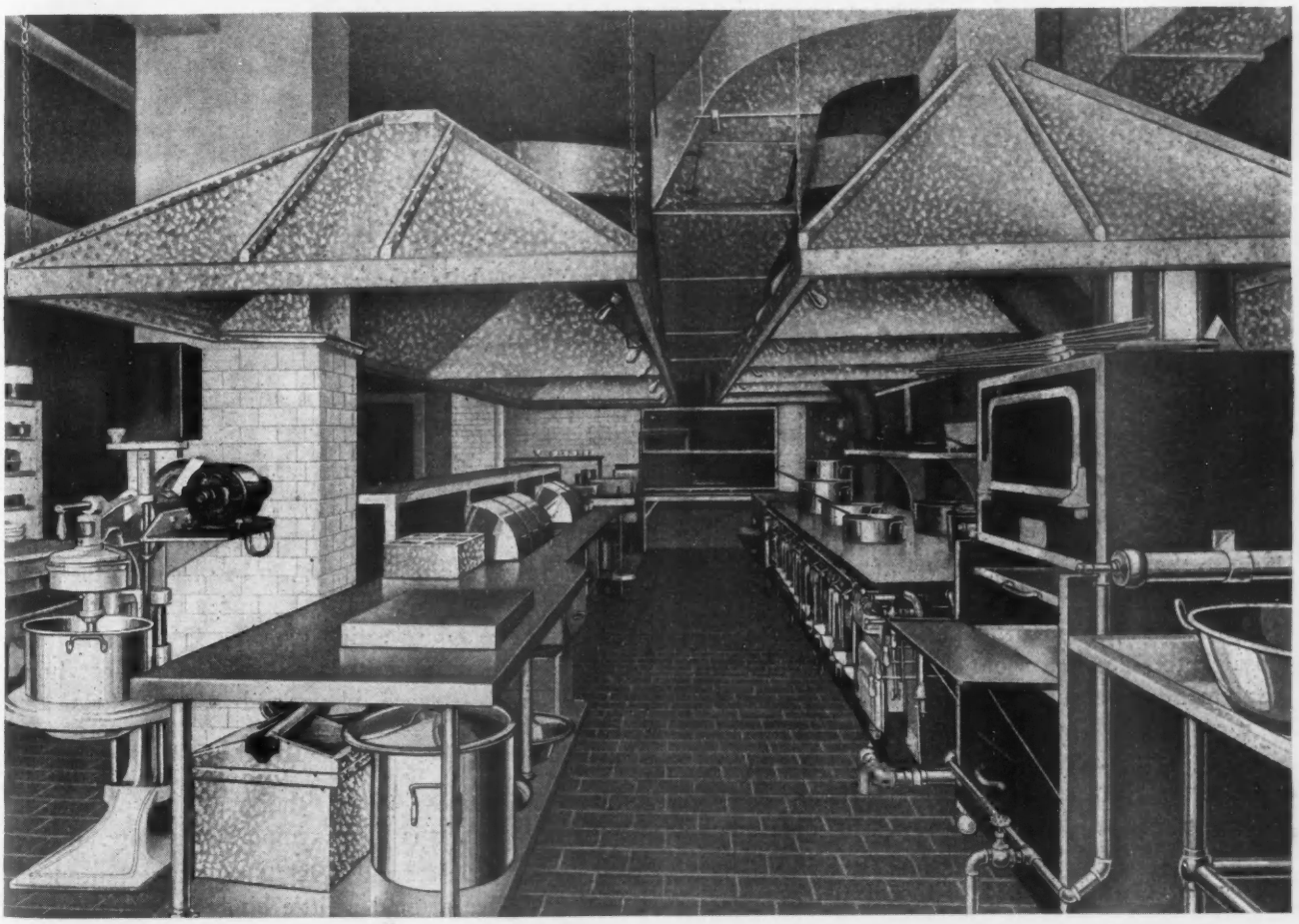
This means that the builder has presented to him today a worth-while oportunity of so directing his building activities that the restaurant business may be promoted and his own returns thereby increased.

Popular-Priced Lunchrooms Increasing in Numbers

The growth in the number of popular-priced lunchrooms and cafeterias during the last few years has been phenomenal. This has been in keeping with the ever-growing necessity of fighting hard against constantly rising prices. Many people would rather market, now that so many have been vacated thru the coming of prohibition. The expert did not say that rooms were not available. He said there was a great scarcity of suitable rooms, meaning thereby rooms that had been planned for restaurant or cafeteria purposes.

Efficient Restaurant Equipment Necessary

The reason for all this is that nobody realizes better than the restaurant or cafeteria man that the facilities and operating plans of yesterday will not go today. He has the strongest kind of competition to meet, thus



A Section of a Large Lunch Room Kitchen. Note That the Layout of the Equipment Reduces Lost Motion on the Part of Employes to a Minimum. This Installation Was Handled by Kitchen Experts.

forego the comforts and conveniences of first-class hotel dining room service and take the smaller prices for food in the cafeteria or lunchroom. The lunchroom never before was so popular and its popularity and achievements are growing at an impressive rate of speed.

An expert connected with the country's foremost complete outfitting house having as its business the equipment of hotels, restaurants and similar institutions, told the writer the other day that there is right now an unprecedented demand for suitable room in which to coduct restaurants and cafeterias. This will be interesting news to those who have been saying that business buildings and rooms were a drug on the compelling him to follow closely the requirements of quality, appearance, service and a saving of time and material. Under these circumstances he naturally must have a room built along modern lines having in view the needs of his business according to the modern conception. It stands to reason that a room of this kind which can be utilized with little or no remodeling can command a relatively higher rent than the other kind.

The best authorities are agreed that to secure the proper results the layout for a restaurant or cafeteria should positively be planned when the building is being designed. Builders would do well, therefore, to get in touch with the restaurant and cafeteria experts who

The Horseshoe or U-Type Lunchroom Pictured Here Is Without Doubt the Most Efficient Type. It Serves More People in a Given Time Than Any Other Kind and at a Minimum Expense.

will be glad to co-operate because such co-operation will be mutually profitable.

The modern eating place—and this applies particularly to the kitchen—is a marvel of scientific efficiency—a highly specialized organization that has developed out of a generation of experience. It is no longer possible to place in a room some miscellaneous kitchen equipment and service facilities and call it a restaurant or a cafeteria. The whole operation has to be planned step by step—from the receiving of the food to the service to the customer. Proper equipment is of course a prime necessity for proper operation—but its whole effect may be counteracted by faulty installation in a room not suited to the needs.

Kitchen Cabinet Idea Applied to Public Service Kitchens

Perhaps everybody who reads these words has seen a kitchen cabinet. These are built on the plan of having a multitude of articles within reach, thus saving the time of the housewife or the maid and enabling her to do more work, more quickly and more resultfully. Where the housewife used to have to walk miles every day around a big kitchen she now has everything within easy reach. The same principle is applied in a broad way in the public service kitchen.

It is not so difficult to install service equipment in a room that is not especially built for restaurant purposes, but when it comes to the kitchen part of the proposition then real trouble is likely to be encountered.

In the restaurant kitchen if in no other place efficiency must rule. If the kitchen machinery does not move forward with precision, accuracy and speed, then the whole proposition is slowed up.

The equipment is so complex that it cannot work to its full capacity unless it can be placed in the proper setting. Whenever plans are under consideration for buildings to house eating places it is advisable to call into consultation one of the great equipment houses, which will prepare plans and specifications at no charge.

Verily today is the day of the specialist in every line of business. And the specially planned and erected building is just as important as any.

Give a little careful thought to this restaurant matter. Inquire around a little bit before you definitely commit yourself as to the plans of the building you are going to erect. What you find out probably will surprise as well as gratify you. There is real profit here for those who will go at the thing right.

There is no denying the fact that the country is woefully undersupplied with eating places—especially of a modern character, and the opportunity for starting new restaurants, cafeterias, lunchrooms and the like was never so great as it is today.

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GRANITE will explode and fly to pieces or disintegrate into sand when exposed to flames.

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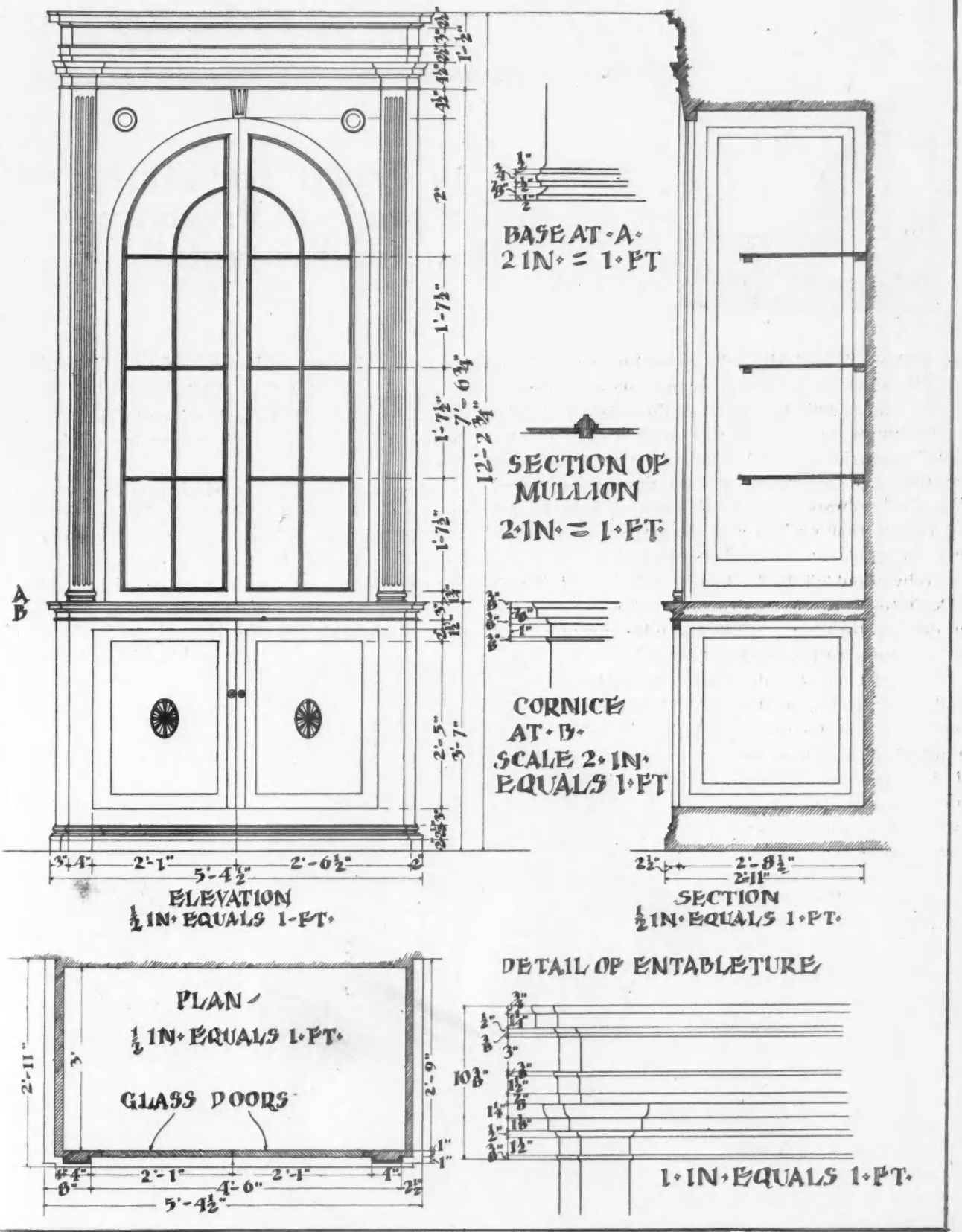
LIMESTONES and marbles are usually ruined if not totally destroyed by an ordinary fire. They are the least desirable of all stones to use in a fireproof building, and the granites come next.



COLONIAL BUILT-IN CHINA CLOSET

Designed and Drawn by S. Chester Danforth, Architectural Draftsman.

Fred Beard says:

"There is Profit for Builders in Helping to Promote Housing Projects"

"FRANK STARK, the general manager of the automobile factory, stopped me on the street today and inquired about the prospect of there being houses for rent in this town within a short time," remarked Sam Williams, the contractor, as he took his accustomed seat in the rear of Fred Beard's hardware store. "He seemed keen to get all the information he could about the present building, and plans for future home building."

"Why shouldn't he be keen?" asked Fred Beard. "Don't you know, Sam, that lack of homes is making it difficult for Stark and every other manufacturer in this town to get good workmen?"

"Well, I knew that there was a shortage of skilled mechanics, but I never laid that shortage to lack of homes particularly. Come to think about it, it must be a task to get men of family to come here to take jobs when there are no houses for them to rent."

"A man was in my place today and offered me or anyone else a reward of $25 for a tip on where he could rent a place," interposed Ed. Maple, the lumber dealer. "He said he had a fine position offered him here, but he couldn't take it unless he could find a home for his family," Maple continued. "I didn't know of a thing. Too bad, too; the fellow looked like he would make a good addition to this town."

Shortage of Homes Costly to Manufacturers

"That's one of the most costly things the present-day manufacturers are up against—a shortage of homes," said Fred Beard.

"Costly?" queried Sam Williams. "What do you mean by that, Fred? How does it cost a manufacturer money—this scarcity of places for his employes to live?"

"There are two ways in which it costs a manufacturer money," replied Fred Beard. "In the first place it costs him money because he cannot get the men he needs to operate his factory at full speed, because there are no homes for the men he might induce to come here. In the second place, unless a man can get a comfortable place for himself and family in this town, he will go somewhere else—a place where he can get a house. Every time an employee deserts one job and takes another, it costs the manufacturer anywhere from $100 to $500. That's what the efficiency experts call 'labor turnover.' It takes a week or two, or even longer, to break a skilled mechanic into the ways of doing things in every new place he goes. During the war, when manufacturers were bidding against each other for men, this labor turnover was tremendous. In some places as many as three times the total force were employed in a single factory in one year.

"Frank Stark Stopped Me on the Street Today," Began Sam Williams.

Employers Going Into Housing Projects

"The very fact that Frank Stark stopped you and asked you about the prospect for homes here,

Sam, shows that employers are beginning to realize that they have an interest in their men beyond the amount of work they turn out in a day, and what they have to pay them in wages. They know now that contented workmen are an asset to their factories. And to be contented a man, if he is any good, wants and must have a decent place for his family to live in.

"That's why the most successful manufacturers are seeing to it that there are good, modern homes in the neighborhood of their factories. If investment builders do not supply the houses, the companies do. It seems peculiar to think that home building, home selling and home renting are a part of the business of a manufacturing company, but it is true, nevertheless.

"It appears to me that our own auto factory is about ripe for a housing project, judging from the interest Stark is taking in home building. And there is no good reason why the company shouldn't build some houses. The plant is located within the city limits, where there is city water, electric current and sewers. Near it is a tract of vacant property; just the place for homes for its men, as they would be within easy walking distance of the plant. The houses would be in great demand, as now the employes, especially those who have come here during the last year or so, would welcome a chance to live in the same neighborhood with the men they work with during the day.

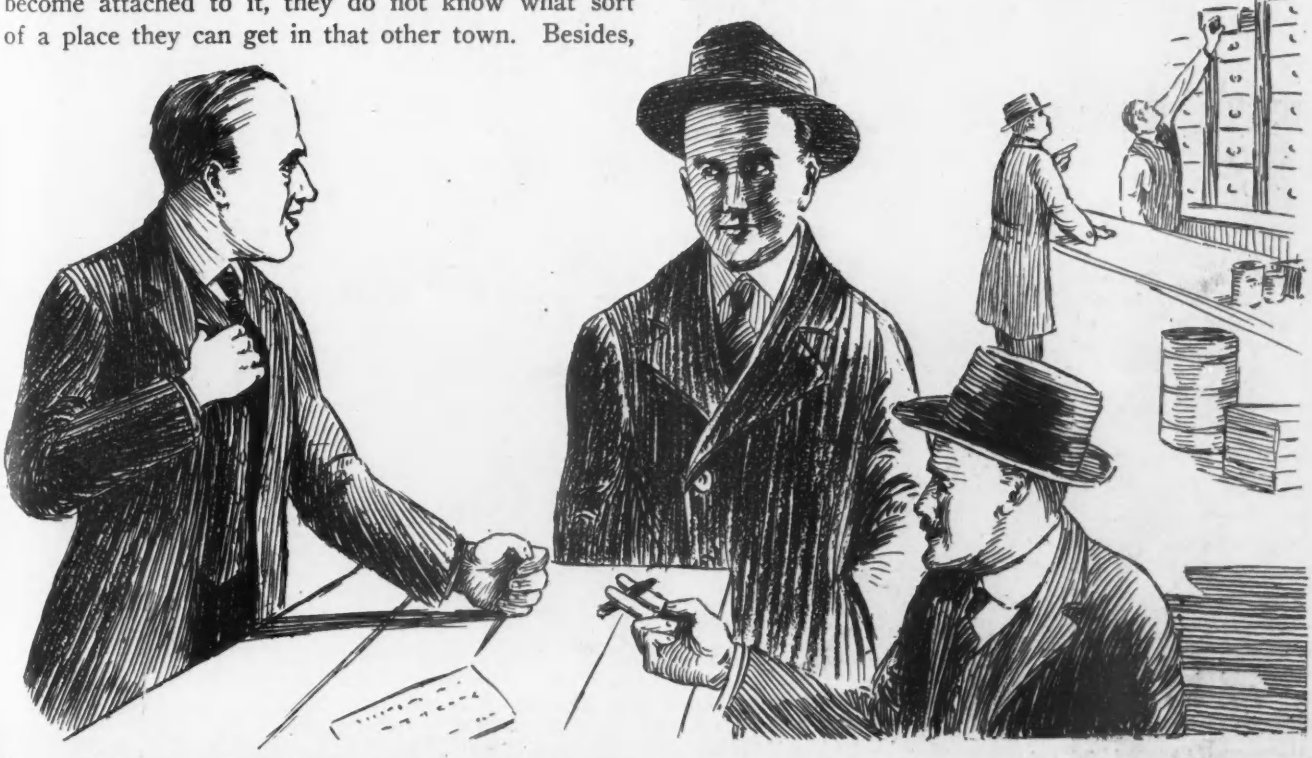
Home Owning Stabilizes Labor

"Home owning, you men know, stabilizes labor. A man who owns his home does not often move. It takes considerable inducement to get him to sell out and move into a new town. His family has friends here, they have lived in their own house and have become attached to it, they do not know what sort of a place they can get in that other town. Besides, a man who owns his home unconsciously becomes an important part of the life of his city. He takes an interest in its affairs, because he is a stockholder in the corporation. Such a man does not want to leave his position, neither does his employer want to lose him.

"These are things that Stark knows, because he is a wideawake business man. I have no doubt that in the back part of his head right now he is contemplating starting a home building project out there near the factory. If he does it will mean a lot of work for the builders in this town, some good bills of lumber for the lumber dealers, and, I hope, an increased sale of building hardware, which I sell. So you see the three of us are interested in this curiosity of Mr. Stark about the prospect for homes. I believe that it might help some if we broached to him the subject of putting up some houses.

"You do it, Fred, you know more about this industrial housing business than either of us," urged Sam Williams.

"Well, I will," replied Beard. "I believe that there is a great deal more for a member of the building industry to do than merely be a good carpenter, or sell lumber, or building hardware. We have demonstrated to our own satisfaction that there is a whole lot of profit in promoting building. We not only make money for ourselves, but we make our city more prosperous. That's why I said I would be glad to take up this housing idea with Frank Stark. If I can be of help in inducing the automobile company to build homes I will be doing more than creating work and sales for us; I will be helping our town to grow, and we and all the rest of the business men will grow with it."



"Successful Manufacturers Are Seeing to It That Their Men Have Comfortable, Modern Homes These Days," Declared Fred Baird.

Industrial Housing in England

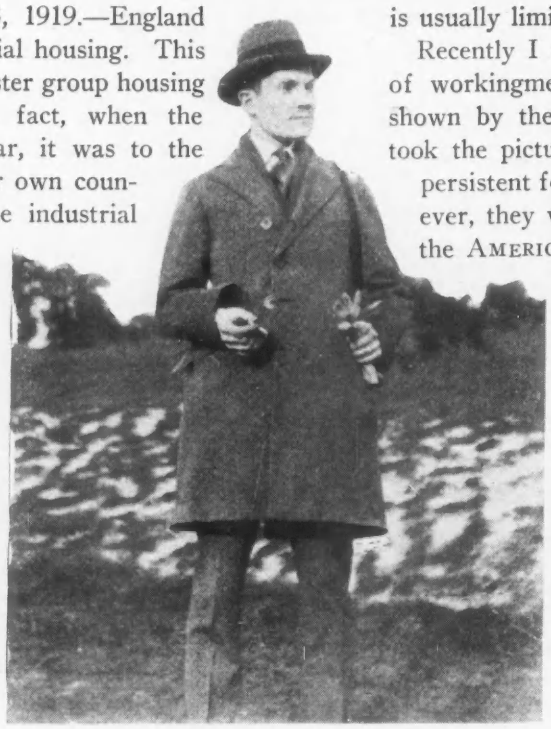
HOMES COST LESS THAN IN THE UNITED STATES, BUT LACK THE CONVENIENCES DEMANDED BY AMERICANS

By William A. Radford, Jr.

Who Is on a Trade Mission Around the World for the "American Builder"

LONDON, NOVEMBER 3, 1919.—England leads the world in industrial housing. This country was the first to foster group housing projects for workingmen; in fact, when the United States got into the war, it was to the experience of England that our own country looked for guidance in the industrial housing projects in the cities where the big munitions factories were located.

However, English workingmen's homes are far behind the houses erected for American industrial workers. The English homes are well built, but they lack the conveniences that Americans are accustomed to, and demand. Furnaces are practically unknown; small fireplaces in nearly every room supply the heat—what there is of it; the dining and living rooms are commined in one; few have bathrooms, and the water supply is usually limited to one or two taps.



William A. Radford, Jr., at Purley, England, Watching the Aeroplanes. Mr. Radford Was a Lieutenant in the American Air Force During the War, Which Explains His Intense Interest in Aeronautics.

Recently I made a rather exhaustive study of workingmen's homes; some of them are shown by the accompanying illustrations. I took the pictures myself, but because of the persistent fog they are not very clear. However, they will show the builder readers of the AMERICAN BUILDER the sort of homes that are constructed here. All of those shown cost to build from $2,500 to $4,000. They rent for from $20 to $30 a month, without "rates," which means minus water, light or heat. They are good houses, but they are, as I have said, far, far behind the American home in comfort and convenience.

One notable thing about building here is that wood construction is being used more extensively. This is true of the British Isles and the Scandinavian countries.

Three Types of Workingmen's Homes in England. At the Top (Left) Are Two Houses, Exactly Alike, Which Sell for 909 Pounds, or About $4,300 in American Money. They Rent for $300 Per Year. These Houses Had Just Been Finished When the Photograph Was Taken. At the Bottom (Left) Is a Good Example of the Average Home, Costing About the Same as the Ones Above and Commanding the Same Rent. The House at the Right Can Be Built for $2,500 in England and Rents for $225 a Year. All the Photographs by William A. Radford, Jr.

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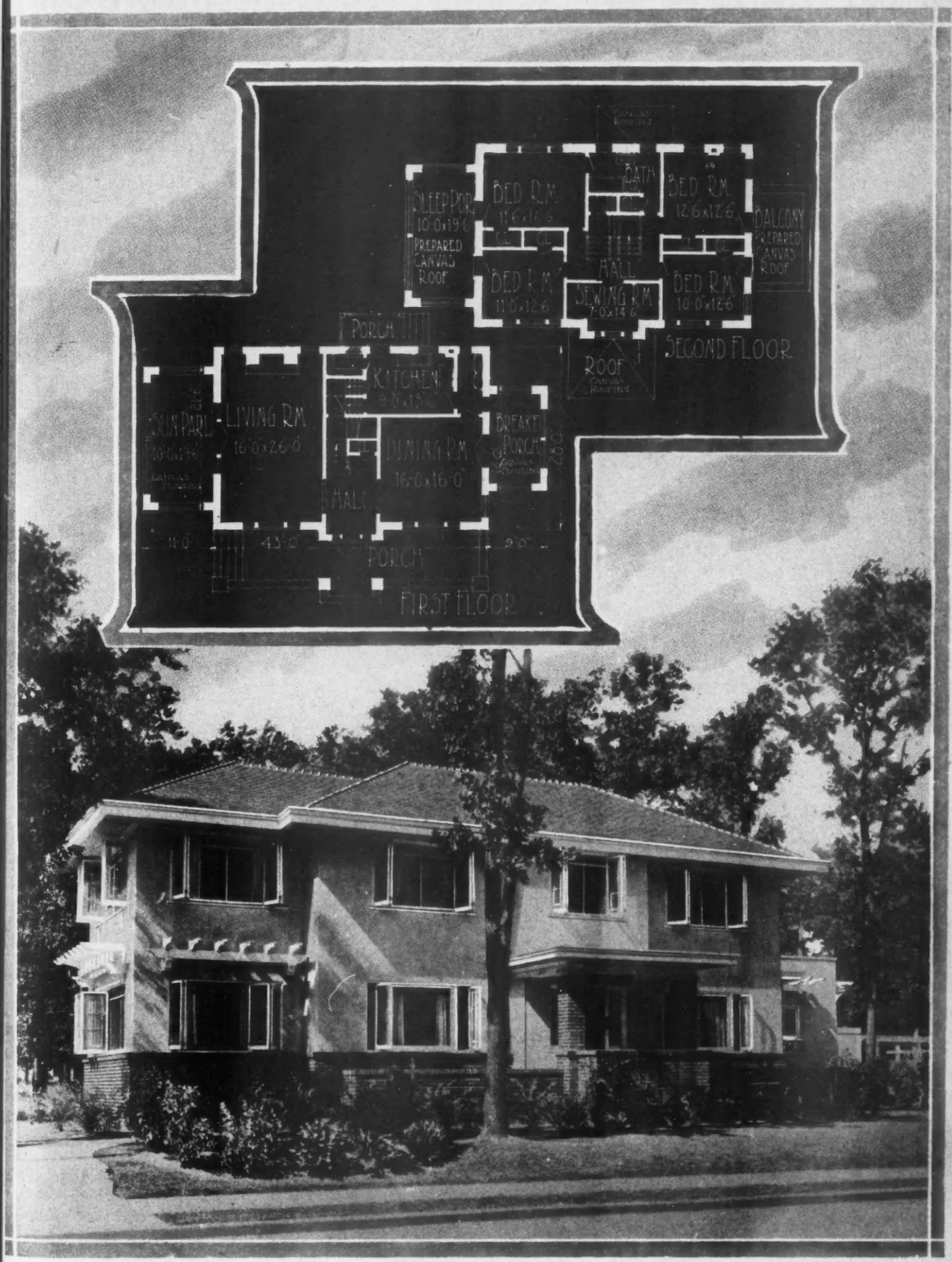

EIGHT-ROOM STUCCO AND BRICK HOUSE. Stucco and Brick Make a Happy Combination of Materials for the Home Builder. This Design is Especially Good for Those Who Want a Comparatively Large House, Containing All the Features That Go to Make a Comfortable, Up-to-date Home. The Exterior is Excellent as It Has Grace and Beauty. The Dimensions Are 43 by 28 feet, Exclusive of the Sun Parlor and Sleeping Porch Projection. Distinctive Features of the House Are the Large Living Room, 16 by 26 Feet, and the Sun Parlor, 10 by 19 Feet, 6 Inches, that Adjoins It. Preserving the Balance of the House, There is a Breakfast Porch at the Opposite End, While Over the Sun Parlor Is a Large Sleeping Porch. All the Porches Have Canvas Floorings. Four Bedrooms, Bath and Sewing Room Are on the Second Floor.

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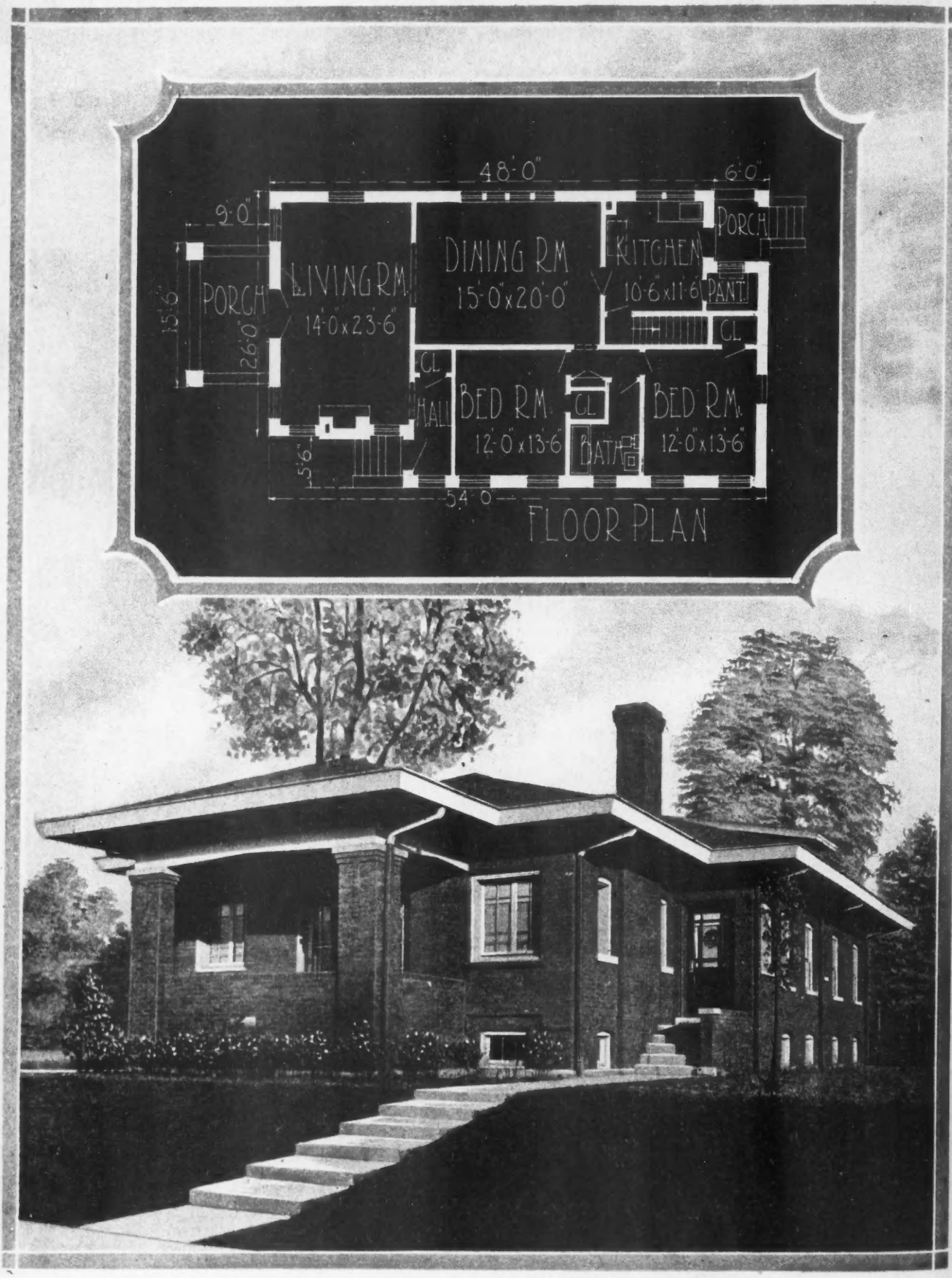
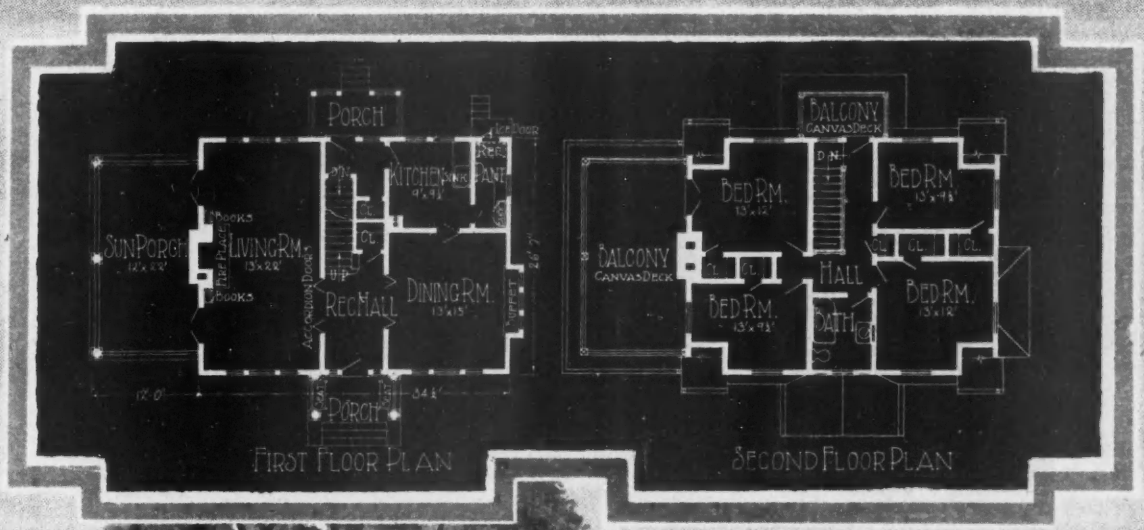
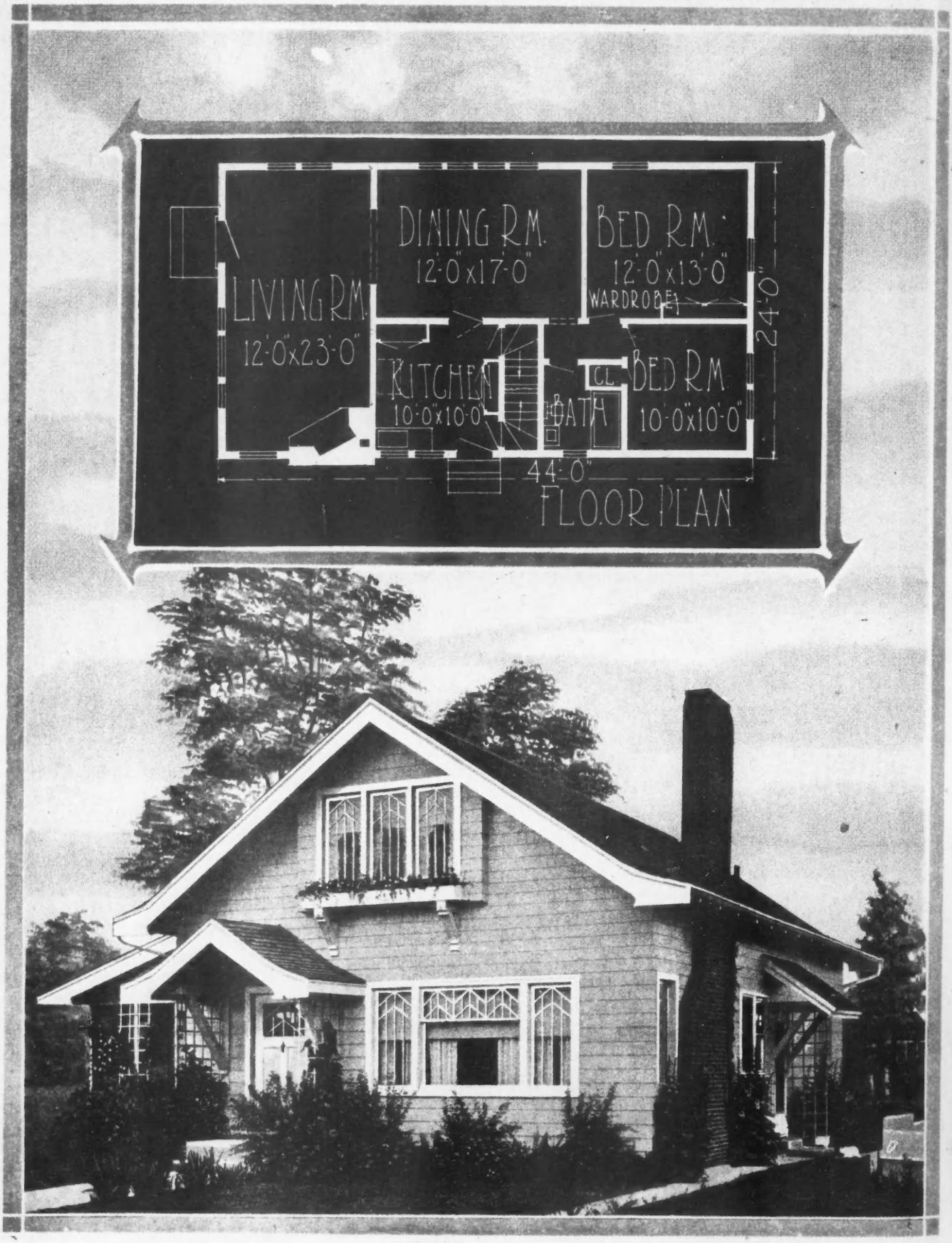


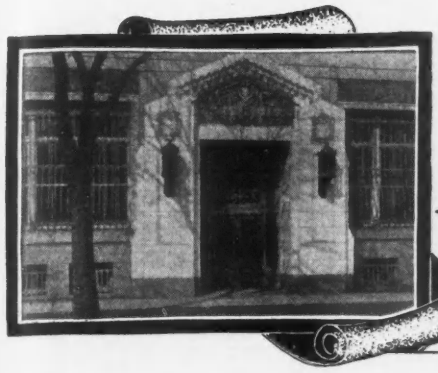
HIP-ROOF BRICK BUNGALOW. In every city there is an exceptional demand for brick bungalows of the proper dimensions for a narrow lot. This design is one that fills the demand in fine style. The dimensions of the bungalow are 26 by 54 feet. It is standard brick construction with a veneer of face brick, but frame construction and brick veneer can be substituted, if desired. The side entrance, the open porch, and the irregular lines of the home make it attractive. The floor plan shows five rooms and bath. The living room is of good size, 23 feet, 6 inches, by 14 feet. The dining room also is large, 15 by 20 feet, with the kitchen at the back. Ranged alongside the dining room and kitchen are the two bedrooms, with bath between.



A MODERATE-SIZE DUTCH COLONIAL HOUSE. This Dutch Colonial house has the appearance of being considerably larger than it is, the dimensions being 26 by 34 feet, 6 inches. Still it contains seven commodious rooms, and, in addition, has a large sun porch with balcony above it. The location of the fire-place in the living room is good, altho unusual. The living room is 22 by 13 feet, and is a sunny room. Following the Colonial style of interior arrangement, an entrance hall divides the living room from the dining room and kitchen. Four bedrooms, one on each corner, and the bathroom are on the second floor. The balcony has a canvas deck. Both the porch and balcony may be enclosed, providing a sun parlor for all year round use and a sleeping porch. The exterior of this house is unusually good.



AN ARTISTIC SHINGLED BUNGALOW. Here is a design for a five-room bungalow cottage that has real home atmosphere. Of wood construction, its several gables, the overhang of the roof, shingled sides and out-of-the-ordinary windows give it a fine exterior appearance. Five good rooms, living and dining rooms, kitchen, two bedrooms and bath are conveniently arranged on the first floor. If desired, the high attic can be finished to provide one or two more rooms. The dimensions of the house are 24 by 44 feet. Note how compactly the three "daytime" rooms and the two bedrooms are arranged. It has a full basement, providing adequate space for the heating plant, fuel and other storage rooms. This is an economical home to build.



ALL SORTS OF BUILDING PLANS

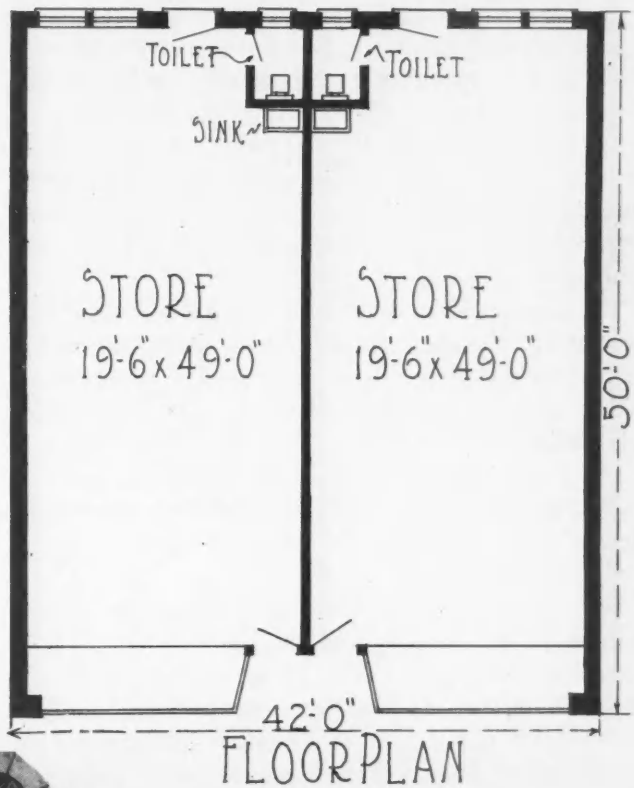
Design for a Double Store Building

THE maximum of window display space is provided in this design for a building for two stores. This is accomplished by placing the single door entrances side by side in the center of the building, one on either side of the dividing wall.

This front is exceptionally attractive. It is made so by a combination of face brick and terra cotta, the design of which is shown on the front elevation. The building is 42 by 50 feet in size, each store being 19 feet, 6 inches wide. Truss roof construction eliminated all supporting posts, leaving the interiors free of obstruction.

It is the front of this store, however, that makes this an exceptionally good store building design. It is of the type that will bring high rentals for the building owner because it is attractive and will provide the merchant with an up-to-date salesroom.

The store building shown here originally was of the old type of building, but has been remodeled, by installing a new front. This front is of the patented store front materials, supplied the contractor in the proper dimensions to be put into place.



An Unusually Attractive Store Front of Face Brick and Terra Cotta. This Building Is 42 by 50, and Contains Two Store Rooms, Each 19 Feet 6 Inches by 49 Feet. It Is Designed So that Both Stores Have a Maximum of Window Display Space.

Design for a Public Garage

ONE STORY BRICK BUILDING WITH TERRA COTTA TRIM FOR AUTOMOBILE STORAGE, WORKSHOP AND ACCESSORY DISPLAY.

CONTRACTORS and architects in cities, both large and small, are having an unusually large demand for public garages. The rapid increase in the number of automobiles is bringing a demand for storage space, automobile repair men are prospering, and because of their prosperity are enlarging their establishments. The consequence is much building activity in this type of structures.

The design shown here is of the size and type that is in greatest demand. It is a one-story structure of brick, with a fire wall rising above the roof line at the front, which is of face brick with terra cotta trim.

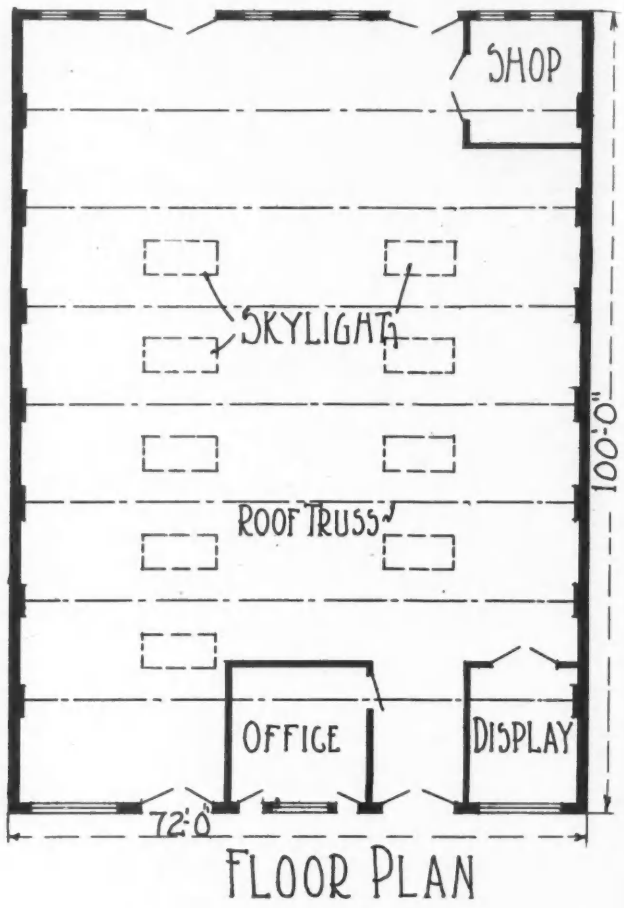
The building is 72 by 100 feet in size and is provided with two double door openings. In the center at the front is the office, and in one corner is a display room for accessories. At the rear is a shop for the repair men.

The floor plan shows the layout of the building. The locations of the roof trusses and the skylights are indicated by the dotted lines. The floor is of concrete, with a concrete curb around the interior of the outside walls.

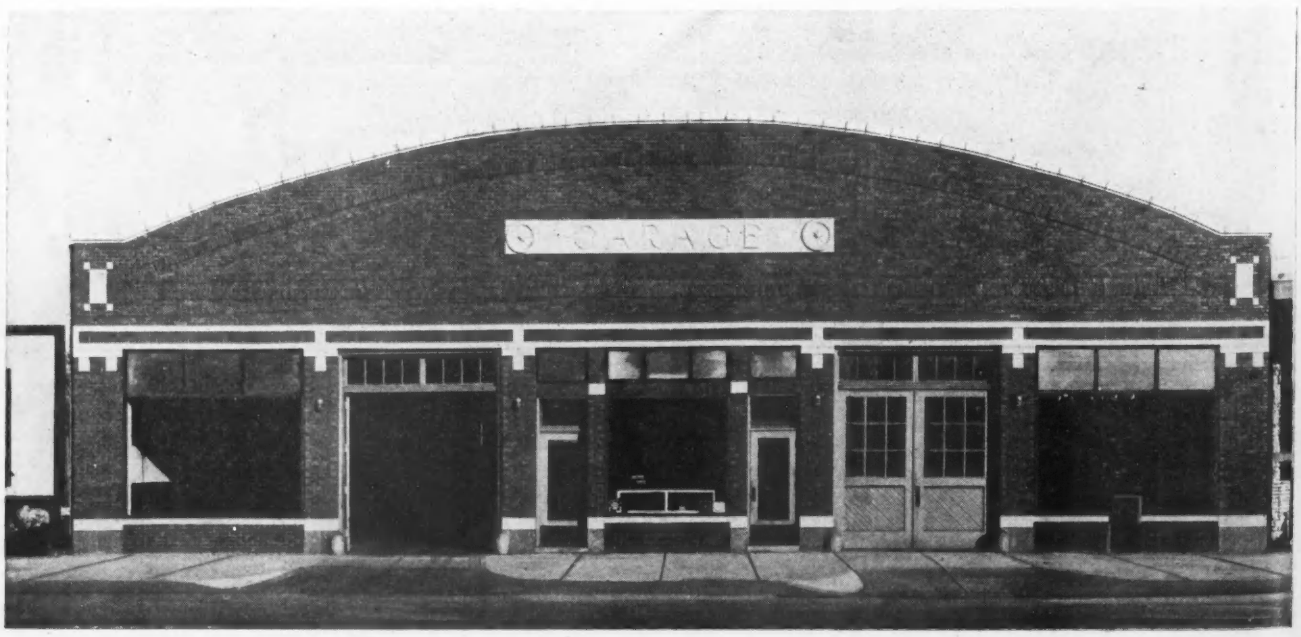
The artistic manner in which the face brick are laid up and the use of the terra cotta trim is shown by the view of the front elevation, which is worth a careful study.

This building is large enough to house a goodly number of automobiles and the other activities connected with a garage. The front follows the design of a building that is generally recognized by automobile owners as a garage. It is a modern building that is economical to build, but well-adapted to its purposes.

Garage building has become standardized. In other words, most public garages are very similar in design and the materials used. While none of the buildings is fireproof in the true sense of the word, they are of non-inflammable materials and are fire-resistant.



FLOOR PLAN



Front Elevation and Floor Plan of a Public Garage, 72 by 100 Feet. This Building Provides Storage Space for a Large Number of Automobiles, an Office, Accessory Salesroom and a Workroom. It Has an Attractive Front of Face Brick and Terra Cotta.

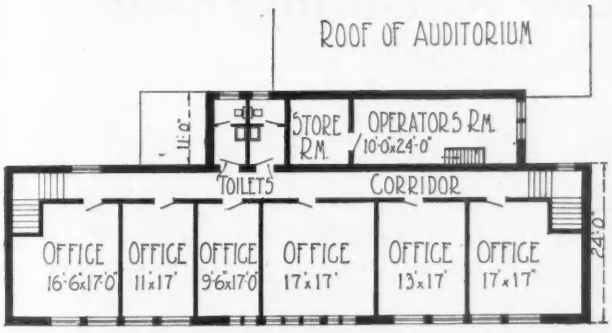
Design for Picture Theater and Business Building

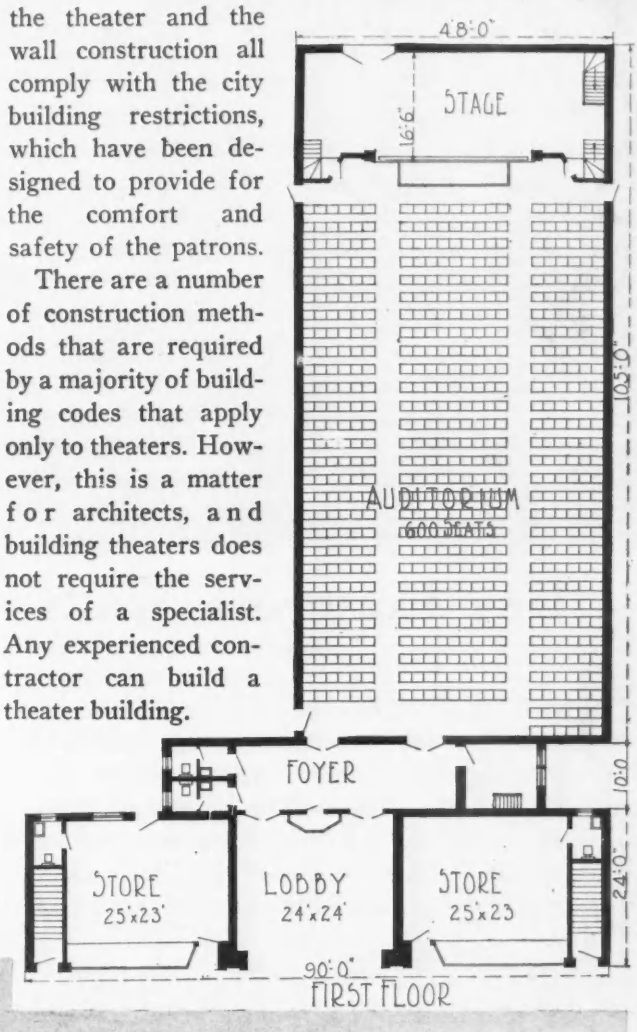
THIS design for a motion picture theater and business building combined is of the sort that has been found most profitable by owners. It not only provides a theater that will seat 600 people, but gives two good-sized storerooms on the first floor front and six offices of varying sizes on the second floor.

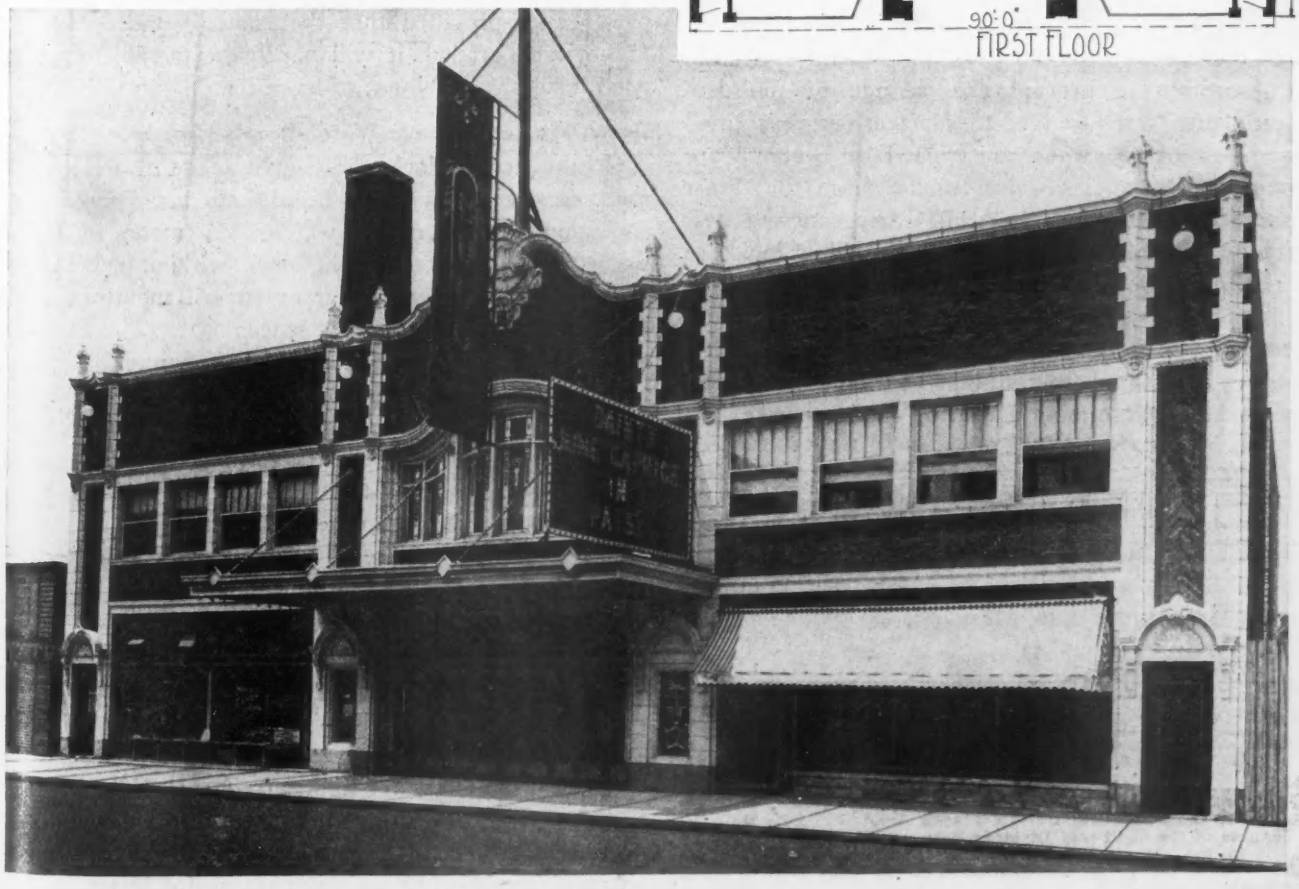
The two story section of the building facing the street is 90 by 24 feet. Between this building and the theater auditorium is a lobby 10 feet wide, and the auditorium and stage are contained in a building 48 by 105 feet. The floor plan shows the layout of the interior.

The front of this building is of the sort that will attract patrons to the theater. It is a combination of face brick and terra cotta, both used so that there is a good contrast. The building itself is of standard brick construction. The placing of the seats and exits in the theater and the wall construction all comply with the city building restrictions, which have been designed to provide for the comfort and safety of the patrons.

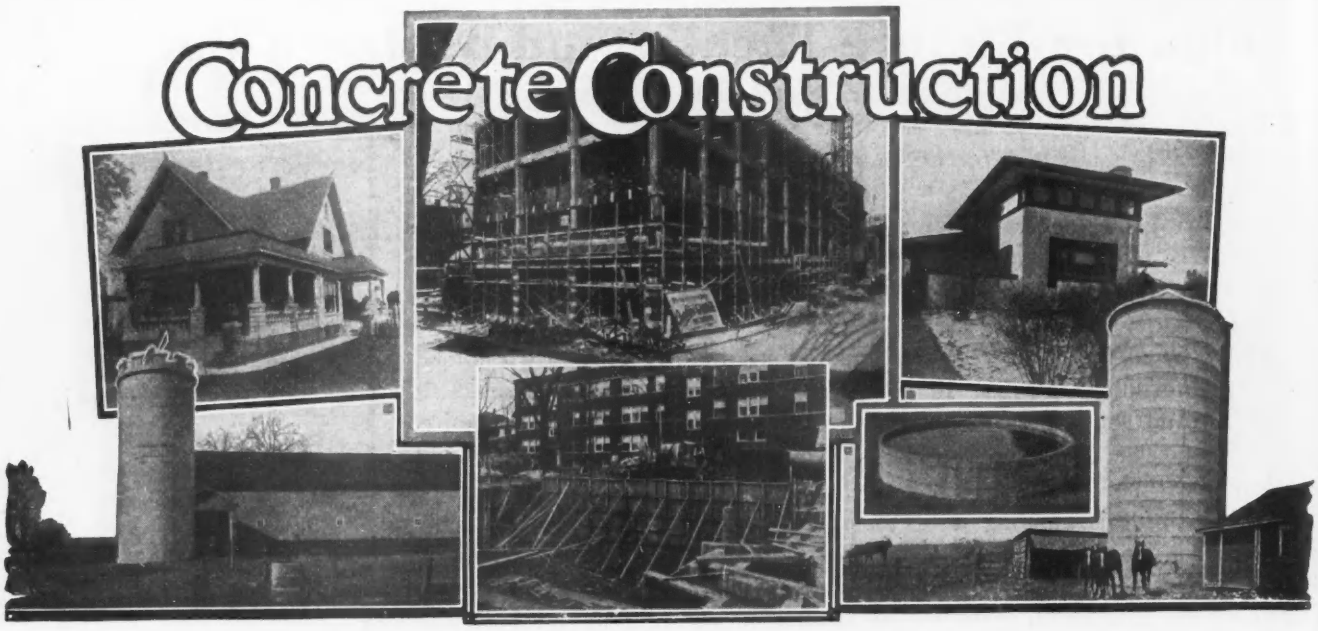
There are a number of construction methods that are required by a majority of building codes that apply only to theaters. However, this is a matter for architects, and building theaters does not require the services of a specialist. Any experienced contractor can build a theater building.







Perspective, Showing the Front Elevation of a Modern Building to House a Motion Picture Show and Retail Business and Providing a Number of Offices on the Second Floor. The Two-Story Part of the Building Is 90 by 24 Feet, With the Theater Proper 48 by 105 Feet, Seating 600 Persons. Face Brick and Terra Cotta Make the Attractive Front. Floor Plans Show the Interior Arrangement of the Building.

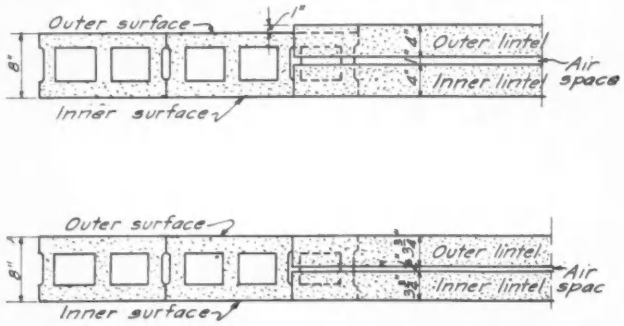


Dry Concrete Walls—How to Build Them

DOUBLE LINTELS MAKE WINDOWS WEATHER TIGHT

ONE of the most necessary qualifications for the contractor who specializes in the building of dwellings, schools, warehouses and other structures where people are housed or goods stored, is a thoro understanding of the principles involved in making walls that will present a uniformly dry interior, almost regardless of conditions of temperature and humidity.

Any good concrete wall, whether of monolithic or block construction, should have a sufficiently low rate of absorption to prevent the passage of moisture directly thru from surface to surface. A very small percentage of the walls constructed of concrete are porous enough to give any trouble from the direct passage of water thru the wall. Any concrete wall made of material so porous that it will allow moisture to go thru will be objectionable on other grounds as well. The passage of moisture indicates porosity, and porosity is an indication of weakness, just as density, water-tightness and strength may be used almost interchangeably in describing a wall of good concrete.



Sketch Showing 8-Inch Concrete Block Wall with Two-Piece Lintels. In the Upper Illustration, Lintels Are Each Made Half the Thickness of the Wall and Distance Between Lintels Equals Overhang; in the Lower Illustration the Lintel Sections Are Made slightly Less Than Half the Thickness of the Wall to Give Small Air Space Between.

Ordinarily the concrete wall should be made of a mixture of 1 part cement to 2 parts sand and 4 parts pebbles or stone, or if the form surfaces are to be exposed, possibly 1:2½:4 cement, sand, pebbles or stone should be used, as the latter mixture gives a little more mortar and makes it easier to obtain smooth surfaces. Where pebbles or stone is not available, the mixture should not be leaner than 1 part cement to 4 parts sand, provided that the same is well graded. If not well graded, it will hardly be possible to get good results with the use of more than 3 parts of sand.

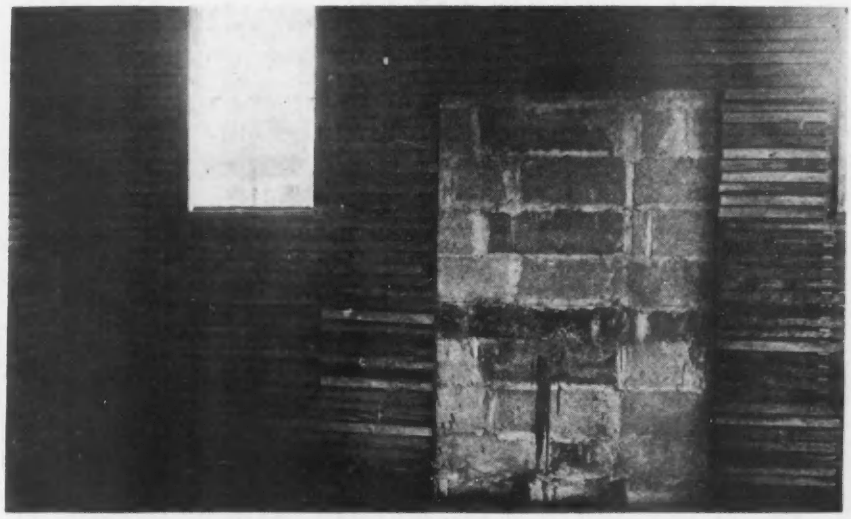
Dense Mortar Surface Water-Proofs Concrete Blocks

Good concrete blocks are usually made of about the mixture given above, and in addition usually have a surfacing of dense mortar which adds further to their water-tight qualities. Plain block without surfacing are being used to a greater extent all the time, the block serving as a base for a stucco coat. The Standard Specifications of the American Concrete Institute limit the absorption of concrete blocks to 10 per cent of their weight, but this means very little in considering the possibility of water getting thru the wall because this absorption test is conducted on the entire block and its ability to withstand water is taken care of without trouble either by the special facing or by the stucco coat. It is not uncommon to find block that has an absorption as low as three per cent. The almost universal method of laying up these block is in cement mortar, which may be considered absolutely water-tight if properly used.

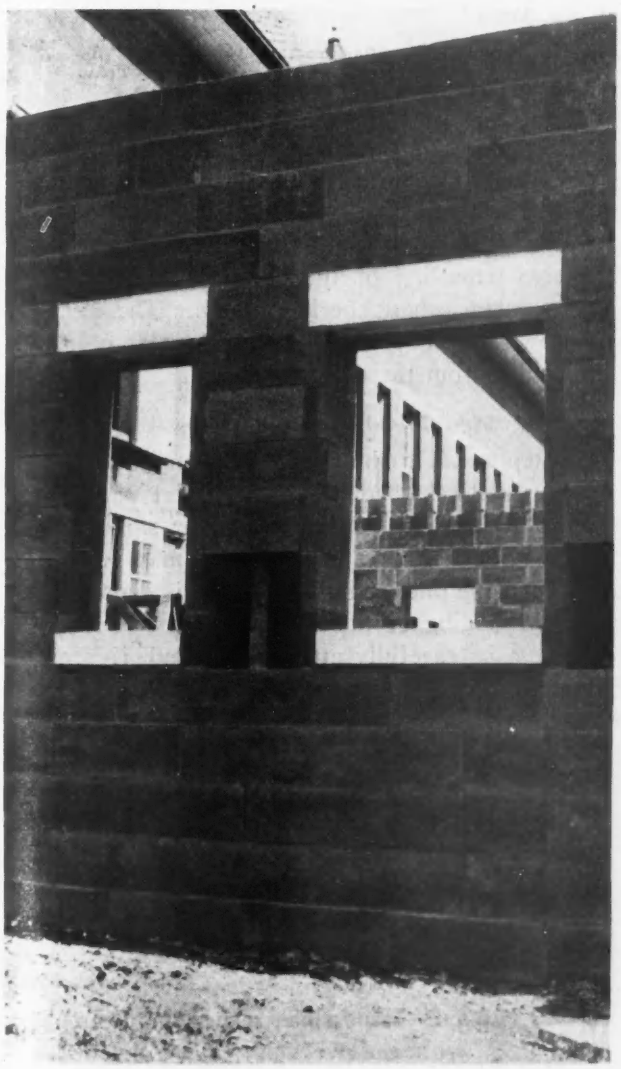
While the body of the concrete or other masonry wall is usually water-tight, frequent difficulty is experienced with water getting in around window openings. Much of the trouble is caused because the sills and lintels prove an easy passage for water, espe-

cially where exposed to driving storms. One of the best remedies is to make sills and lintels of two-piece construction, as shown in the illustrations, separating the inner and outer sections by convenient distance. The separation usually may vary from ¼ inch to 2 inches. Double sill and lintel not only prevent direct passage of moisture, but also provide insulation against the passage of heat.

The appearance of moisture on the inside of the wall is usually due to poor insulation and constant "sweating" of the wall rather than direct passage of the moisture thru. Regardless of the fact that thousands of masonry houses have been so constructed that plastering direct on the masonry wall has not been followed by condensation, it is generally considered best to "play safe" by furring and lathing such walls. This practice should be followed even in the case of concrete block and air space walls of other masonry materials.



Inside Surface of Concrete Block Wall Showing Furring and Lath Ready for Plaster. It Is Better to "Play Safe" by Furring and Lathing Interior of Masonry Building Walls. Illustration Shows Place Left for Concrete Mantle Piece.



Building Wall Showing Two-Piece Lintels in Place. If Both Sections of the Lintel Are Made the Same Size They May Be Made in the Same Mold. Only the Outside Section Need Be Finished with Special Facing. The Sills Are Made Similarly of Two Sections.

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Industrial Housing Projects

NECESSITY of providing homes for their employes or else losing them is driving many manufacturers into industrial housing projects. If they are to secure needed workmen, there must be modern, comfortable homes convenient to their factories; if they are to hold the men already in their employ, there must be homes available at prices the employes can afford to pay.

Workers Scorn Jobs Where Houses Are Scarce.

During the next year there will be many more industrial housing projects, backed and financed by large manufacturing concerns, than is generally imagined. This does not mean, either, that the houses to be erected will be shabby affairs; they will be well-built, modern homes—homes that will give the workmen comfortable shelter for themselves and their families, and houses that eventually will be sold to the men.

Housing projects are going to supply the building industry with a great amount of work next year.

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Bridging of Floor Beams

BY "bridging" is meant a system of bracing floor beams, by means of single pieces of boards set at right angles to the joists, and fitting in between them, or by means of small struts.

The effect of this bracing is decidedly beneficial in sustaining any concentrated weight upon a floor; but it does not materially strengthen a floor to resist a uniformly distributed load. The bridging also stiffens the joists, and prevents them from turning sideways. It is customary to insert rows of cross-bridging at from every five to eight feet in the length of the beams, and they should be in straight lines.

How to Build Concrete Steps and Stairs

PROPER METHOD OF CONSTRUCTING FORMS AND POURING THE CONCRETE

A POOR flight of steps has no advantage over a ladder. It may be more dangerous than the latter and no more convenient. Properly constructed concrete steps have many advantages, such as resistance to wear and rot, ease in cleaning and a surface which will shed water; but their very quality of permanence carries with it a solemn warning that concrete steps must be made right or they will prove a lasting regret.

In a few instances concrete steps have been constructed of a system of precast supports, risers and treads, and there are reasons to predict that in future masonry structures concrete step and stair units will be brought to the job ready for assembly. At the present time, however, it is almost universal practice to build stairs and steps by the monolithic or cast-in-place process.

How to Build the Forms

Altho the general dimensions of the steps or stairs may vary considerably, the forms are usually laid out and constructed as shown in the model, Figure 1. The saw-tooth side supports for the riser forms should be of 2-inch planks and the riser forms of 1-inch material planed on one side; for wide layouts it will be necessary to use 2-inch material or use center supports for the riser forms to prevent bulging. The outer forms are simple and may or may not be required, depending on whether the steps are located where vertical earth walls can be employed for this purpose.

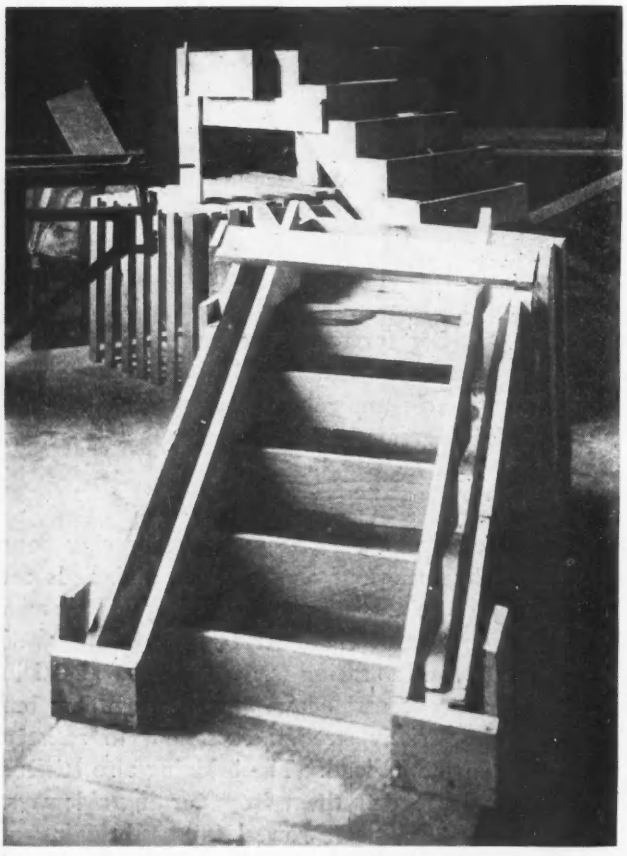


Fig. 1. Step and Stair Forms Should Be Carefully Made, and if so, May Be Used Several Times.

Figure 2 directs attention to a feature which should be regarded everywhere as desirable in concrete step construction. Side forms supporting the riser forms should be laid out so that the latter will incline from the vertical a distance of about 1¼ inches in the height of the riser. This will produce pitched risers, accomplishing exactly the same purpose as constructing an overhang on the step tread, an operation which requires more elaborate forms and more labor in finishing. The tread overhang is weaker than the body of the step and its exposed position invites injury. Excessive troweling of the overhang may result in slippery surface, hair checks or both. The construction shown in Figure 2, diagram A avoids possibility of difficulty from these causes.

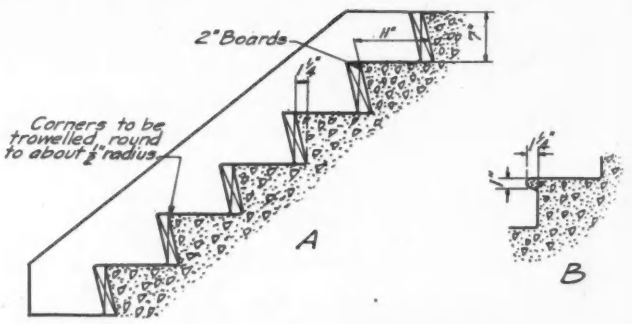
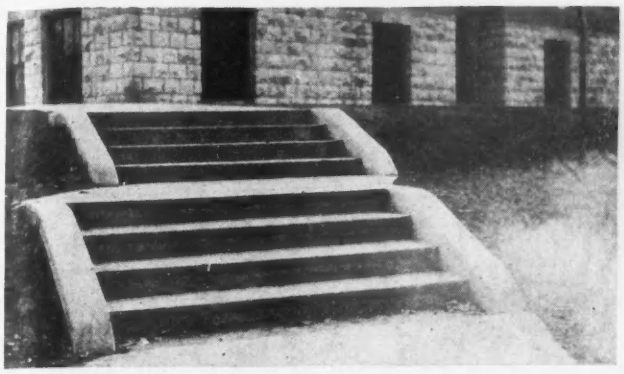


Fig. 2. Note the Step Construction Indicated in Diagram A, Pitching the Risers in Order to Give Plenty of Tread Width, Avoiding the Tread Overhang Pictured in Diagram B.

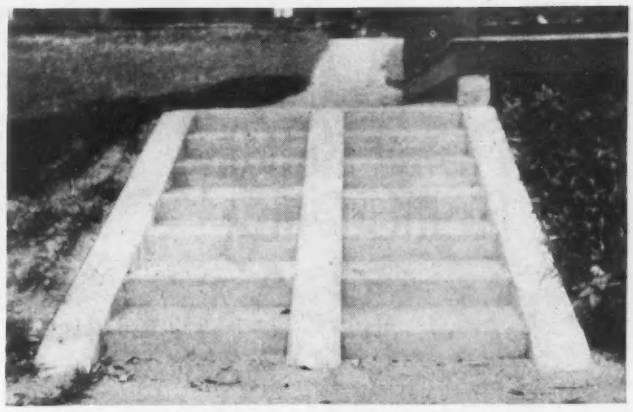
Step Treads Should Be Level

The step treads are best made absolutely level. Concrete for the steps should be made of 1 part cement to 2 parts sand and 4 parts pebbles or stone, thoroly mixed with sufficient water so that the mass will barely stand up in the pile. As the concrete is deposited the necessary spading of the material next to form surfaces must be carefully attended to, and, if properly done, will prevent unsightly blemishes on exposed surfaces. The riser and tread surface should be faced with a 1:2 cement and sand mortar to a depth of about one inch, carefully laid in next to the riser forms as the concrete "backing" reaches the proper level.

The concrete in the steps should be tamped, and if of the consistency indicated above, moisture will come to the surface under light tamping. The mortar surface on the tread should be brought to a true level by means of strike board and spirit level before the trowel is applied. If possible, secure the desired surface texture with the wooden trowel, avoiding the steel trowel or using it as sparingly as possible. It is better to leave the treads a little rough rather than over-trowel with a steel tool, which will make the



Two Low Flights Are Safer Than One Higher Flight of Steps on School Grounds or Where Traffic Is Crowded. Two Low Flights Usually Present a Better Appearance Than One Long Flight.



Attractive Flight of Steps with Center Partition Suggesting Division of Upward and Downward Traffic.

surface slippery and subject to hair checks. The rounded corners are produced with the metal corner trowel and should be rounded to approximately one-half inch radius. If the steps are exposed to ice and snow it may be desirable to corrugate the surfaces by means of three or four longitudinal depressions about one inch apart, best produced with a groover. In many cases, especially where the steps will be exposed and subject to heavy traffic the installation of metal safety treads is desirable.

Use Care in Removing Forms

The forms should be carefully removed as soon as possible without danger of injury to the steps. In moderate temperatures this can be accomplished within 24 hours. Immediately on removal of the forms inspect the exposed surfaces, especially the risers, for small pockets, depressions or blemishes; wherever found, cover these defects with cement and sand mortar of the identical mixture used in surfacing treads and risers. This treatment can only be applied with full assurance of success while the concrete is green and the surface clean and moist. The steps should be kept damp for a week or ten days. To avoid the necessity for frequent sprinkling they may be covered with earth, sand, or baled shavings and the latter moistened once a day, or oftener if required.

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Factors of Safety

A FACTOR of safety usually means the ratio in which the breaking load exceeds the safe load. In designing a piece of material to sustain a certain load, it is required that it shall be perfectly safe under all circumstances; consequently it is necessary to make an allowance for any defects in the material, workmanship, etc. For materials of different composition, different factors of safety are required. Steel, being less liable to defects than wood, does not require so great a factor of safety. And, again, different kinds of strains require different factors of safety. A long wooden column or strut requires a greater factor of safety than a wooden beam.

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Generous Hospitality—Doorways to Express It

By EVELYN M. WATSON

AN inviting outer door is one of the charms of a home. An old architect once said a door should be so inviting that a person would find it "easier to pause than to pass." Charming doorhoods, quaint little settees, and viney arches all add to the attractiveness of the front door: the front door is the "visible voice bidding welcome"—it is the one entrance that, to friend and stranger alike, to the passing press and to guests who come, best speaks the character of the house and the character of its occupants. If you would show generous hospitality, that aim of all who would individually show what a democracy this country is, if you would show only to your guests your openness of spirit, if you would offer hospitality just, indeed, to a few friends, or to your family circle and its nearest and dearest, you will find no better way than to have a kindly, friendly front doorway.

Attractive Steps with Ornamental Gate Posts and Side Walls Which Serve as Balustrades.

OWN A HOME-SAVINGS CLUB

"Oh! For a Home of My Own"

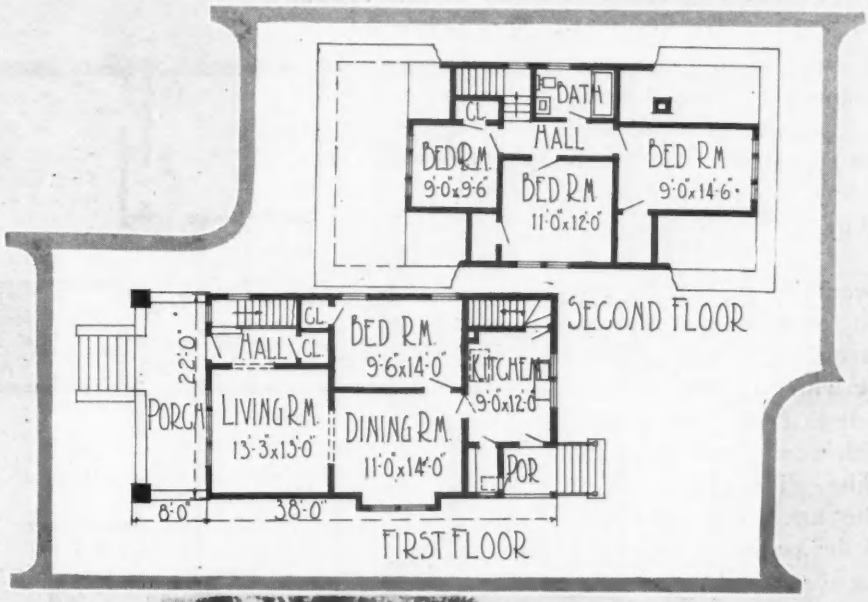
SHORTAGE OF HOMES EVERYWHERE BRINGS SUPPORTERS FOR THE "OWN A HOME SAVINGS CLUBS." NEW YORKERS ARE CAMPING OUT.

"OWN A HOME SAVINGS CLUBS" provide the wage earner and the man with a salary an opportunity to secure a home of his own as easily as a young couple buys the furniture to set up housekeeping. Since this idea was first suggested to the members of the AMERICAN BUILDER Family, hundreds of clubs have been started, and are getting in operation. It will not be many months before these charter members are in a position to build homes of their own.

To show the necessity for homes, especially among those who should be members of an "Own a Home Savings Club," the accompanying illustrations are interesting. These photographs were taken in New York City, and show the expedients that have been resorted to in securing places to live.

A trolley car that has outlived its usefulness as a means of conveyance, has been converted into a home. The first cost of such a home is from $25 to $100, according to the condition of the street car. The interior of the car shown here was fixed up with a living room, bedroom and kitchenette. This makes a cozy home for a family of two adults and two children. The woman hanging out the wash is the housekeeper, while the woman occupying the stool is a neighbor, who has the same type of home.

Another method of solving the rent and shortage-of-homes problems is to rent a site for a tent home on a vacant lot in the outskirts of the city, pitch a tent on a board platform and set up housekeeping. Altho the surroundings of this home might be a great deal more pleasant, the occupants have made a comfortable porch for summer use and have beautified the yard by planting flowers and vines. The cost of this tent home is $25 per month.



SEVEN-ROOM STORY-AND-A-HALF HOUSE. Here is an attractive and economical frame house containing seven rooms and bath—the sort that members of the "Own a Home Savings Clubs" will be building. Its sloping roof, dormer windows and comfortable porch make this a homey house. It is 22 by 38 feet in size, exclusive of the 8-foot porch projection. On the first floor are living and dining rooms, kitchen and one bedroom. The second floor contains three bedrooms and the bathroom. The use of shingles and siding on the exterior and the stucco covered porch supports at the corner combine to add to the exterior attractiveness.

An Attractive Six-Room Bungalow

DESIGN FOR HOME PLANNED FOR A DOCTOR

By John F. McClarren

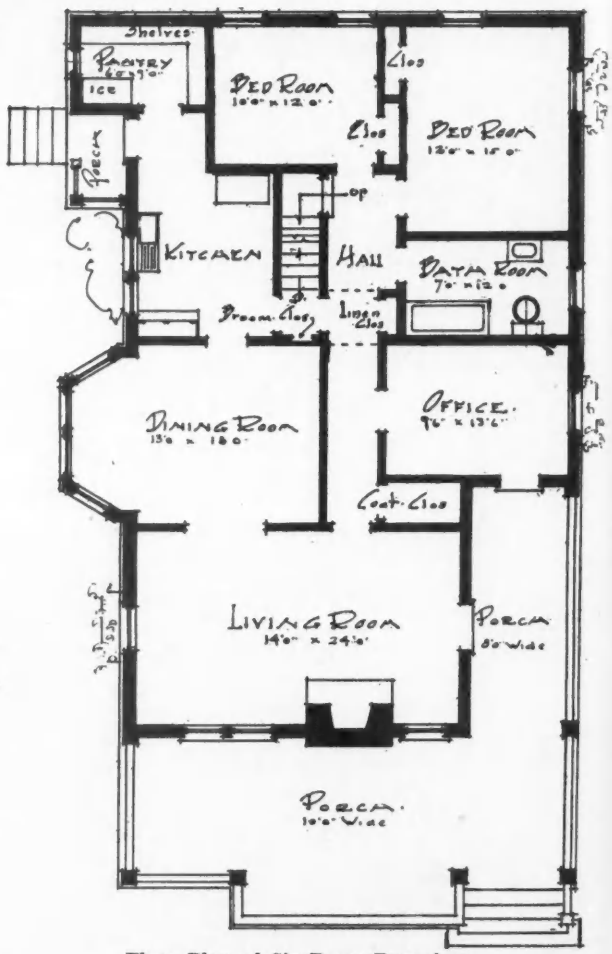
A VERY attractive and rather inexpensive bungalow, particularly planned for one desiring office space as well as comfortable and well adapted living quarters, is contemplated in the accompanying sketch and plan. Any lot, irrespective of location, measuring about 60 by 100 would be a suitable site.

This sort of a bungalow would be suitable for any climate and especially adapted for the uses of a physician or professional man requiring office quarters.

The bungalow is one story with an attic, and contains six rooms and bath. It is frame and plaster, rough cast on the outside with wood porch posts and half timber work in the gables. The chimney is of brick with a red pot on the top. The plans contemplate that the woodwork be stained a rich dark brown. The living room is spacious and the arrangement of all the rooms is considered especially convenient.

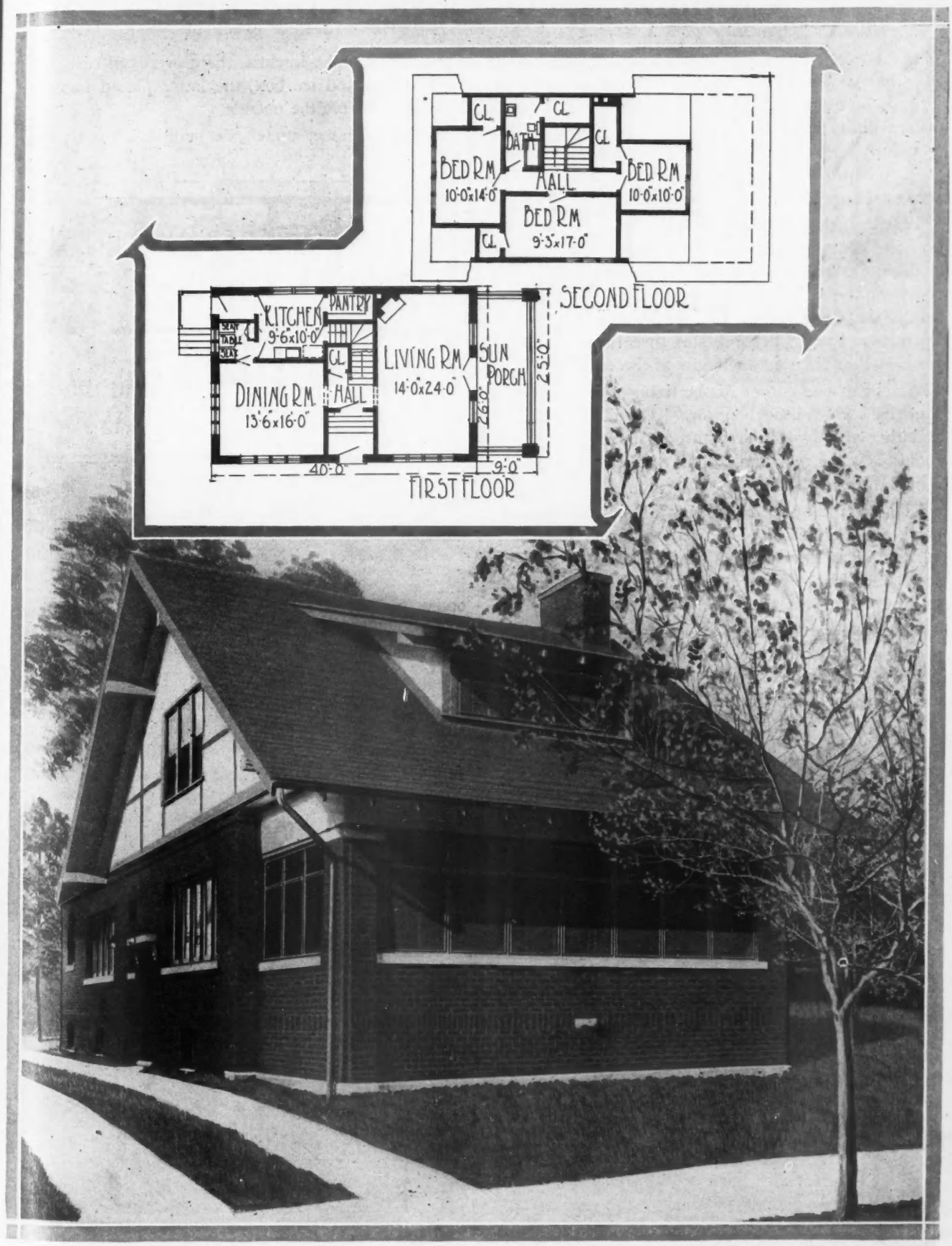
The section set off for office quarters is especially well arranged, inasmuch as there are two entrances from the outside, one directly from the street and the other by way of the porch without going into the living quarters proper.

The plans call for a built-in tub with a shower and that the kitchen be equipped with a gas range. In the pantry there is to be a built-in icebox, which can be filled from the small outside porch nearby. Very generous provision is made for closets. The dimensions of the bungalow are 34 by 53 feet.



Floor Plan of Six-Room Bungalow.

Six-Room Frame Bungalow, 35 by 53 Feet, Designed Especially for a Physician's Use. Folsom & Stanton, Architects, Philadelphia, Pa.



A HANDSOME BRICK AND STUCCO HOUSE. Here is a design for a most attractive home—in fact, a home that will incite home building. It is a story-and-a-half structure, of brick and stucco and contains six good rooms. An unusual feature is the grade entrance at the side, leading into a hall that separates the living and dining rooms and out of which runs the stairs. There are the usual three rooms on the first floor, and three bedrooms and bath on the second. The wide, enclosed living porch is another excellent feature of this house. Both the perspective and the floor plans give the prospective builder some out of the ordinary home-building suggestions.

Colonial Style White Bungalow

DESIGN FOR A FIVE-ROOM HOME THAT IS OUT OF THE ORDINARY

IN this home building design the balance of the Colonial house, both in the exterior and interior, has been transferred to a bungalow. The center door, with its small porch, the columns supporting the gracefully curved roof, and the windows all denote the Colonial. The floor plan shows how the same balance of design has been preserved inside.

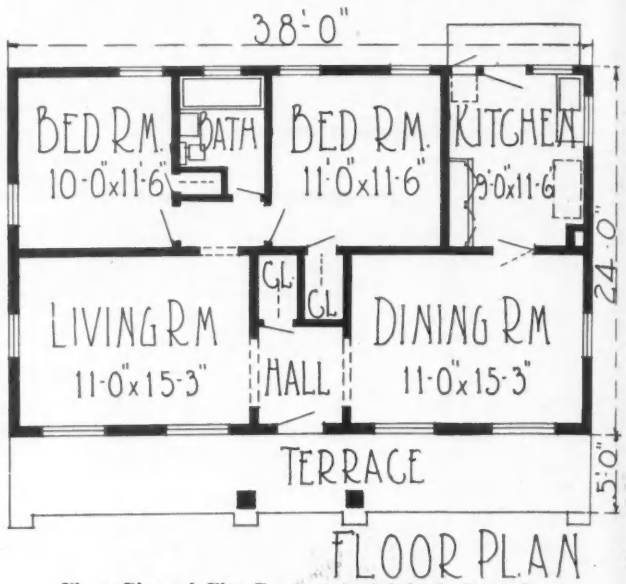
This bungalow is 38 by 24 feet, of frame construction and contains five rooms and bath. The entrance leads into a hall, on one side of which is the living room 15 feet 3 inches by 11 feet, and on the other side is the dining room, 15 feet 3 inches by 11 feet. Each room has duplicate sets of three windows in the front wall and a single window at the end.

A door at one corner of the living room leads to a short hall, which has a bedroom, 10 by 11 feet 6 inches, at either end, with the bathroom between the bedrooms. At the rear of the dining room is the kitchen, 9 by 11 feet 6 inches.

This truly may be called an "out-of-the-ordinary" home building design. The preservation of the Colonial style of architecture, both inside and out, is seldom seen in a bungalow. And when the bungalow is painted white, it is reminiscent of New England.

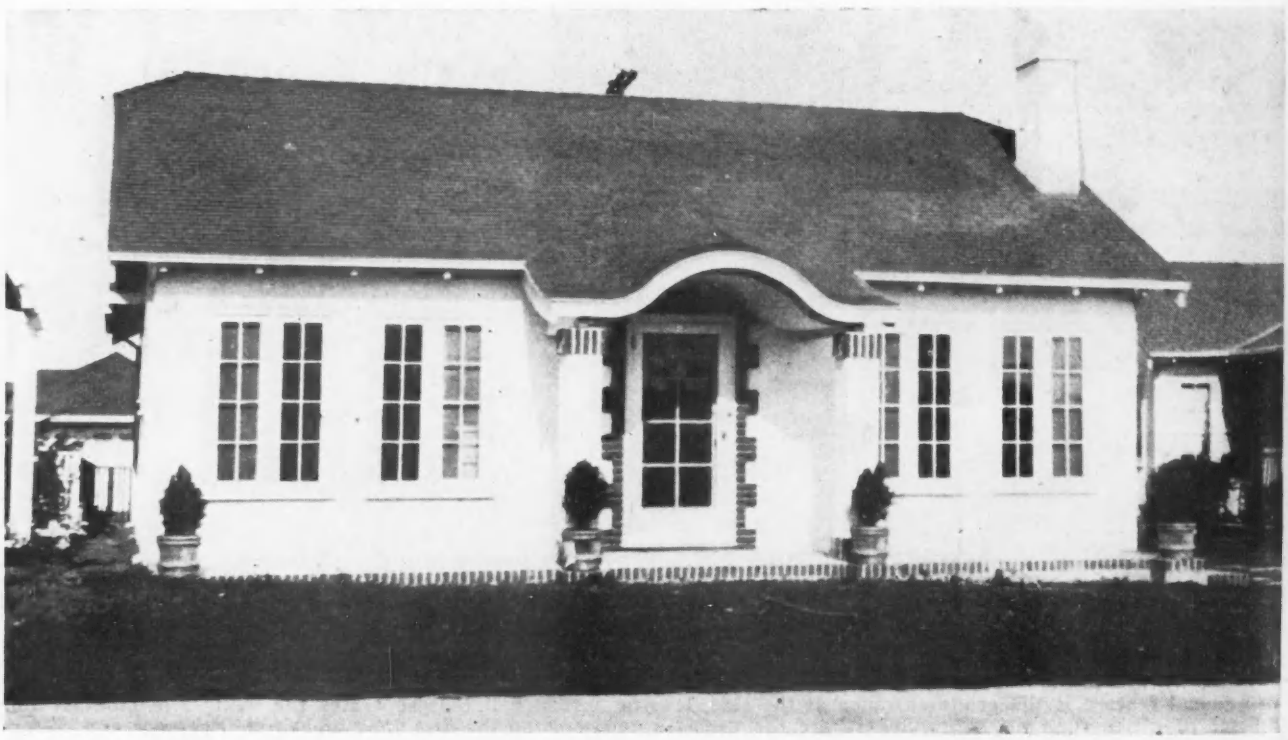
There are a number of features, outside of the compactness and convenience of the interior arrangement, that are interesting. Three closets have been included, and while they appear small, they are planned to be equipped with sliding telescopic clothes hangers, indicated by the dotted lines shown on the plan, giving the closets a capacity for more than the usual number of garments. In the kitchen, there is a wall case, work table, range and ice box, the latter placed so that it can be iced from the outside.

A full basement under the bungalow provides the space for the heating plant, fuel room and storage rooms. The sloping roof gives plenty of attic space to keep the house cool in summer and warm in winter.

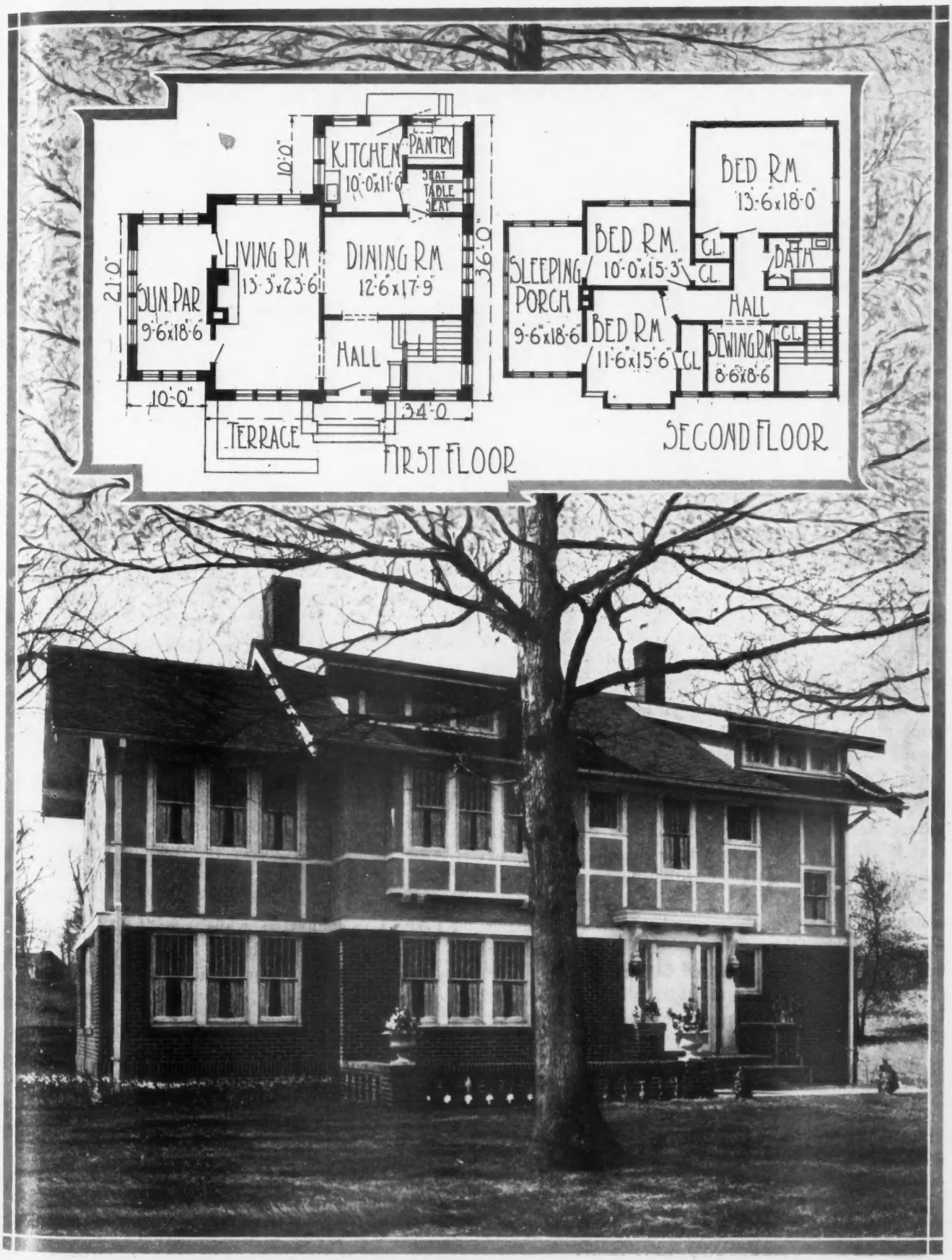


Floor Plan of Five-Room Colonial Style Bungalow.

This is an economical house to build and provides sufficient room for a good-sized family. The beauty of the exterior, the original room arrangement and the low cost make this bungalow one that will provide many home builders with just the dwelling they want.



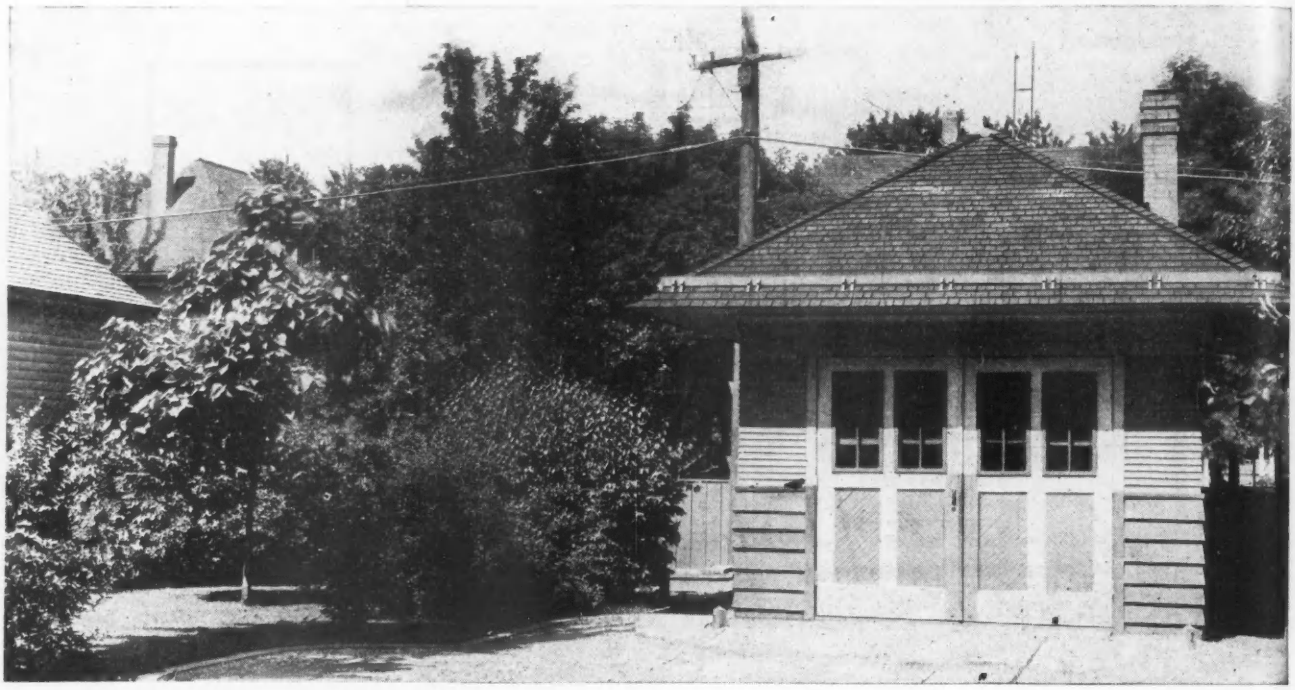
This Is a Unique Bungalow, Both in Exterior and Interior. The Size Is 38 by 24 Feet, and Follows the Colonial Style of Architecture Closely. It Contains Five Rooms and Bath.



SEVEN-ROOM STUCCO AND BRICK HOUSE. This house, because of its lines, looks large, but it is only 34 by 36 feet in dimensions, exclusive of the sun parlor and sleeping parlor projection. On the first floor are living room, 23 feet 6 inches by 13 feet 3 inches, with the sun parlor 18 feet 6 inches by 9 feet 6 inches opening off it; the dining room, 12 feet 6 inches by 17 feet 9 inches, and the kitchen. Upstairs are three good-sized bedrooms, a sewing room and the sleeping porch. An unusual feature of the house is the fireplace set in the front wall, between the doors leading to the sun parlor. The house is of frame construction, veneered with face brick to the second floor sill and stuccoed above.

Design for Attractive One-Car Garage

BUILDERS WANT HOUSES FOR THEIR CARS THAT MATCH THEIR HOMES



One-Car Frame Garage of Attractive Design. This Little Building with Its Hip Roof and Pleasing Exterior Is 12 by 20 Feet, Large Enough for the Automobile and a Work Bench. It Has a Concrete Floor, Pitched to a Central Drain.

FEW of the better class homes now are planned without a garage, either adjoining the house itself or in the back yard. A well rounded home building group provides for a garage that follows the same architectural design as the house, and for that reason architects are supplying the perspectives for garages.

For a hip-roof house of frame construction, the garage design shown here is excellent. It makes a pretty building, especially when it has a setting of shrubbery such as is shown in the illustration.

The dimensions of the garage are 12 by 20 feet, which is sufficient for the car and a work bench at the rear of the building. The cross-section shows the dimensions and materials used in the building. The concrete floor is pitched to a drain in the center to make the work of washing the car easy.

While this garage has two swinging doors, sliding and folding doors, which are space-savers, can be substituted. The wide projection of the roof and the different kinds of siding combine to give this garage a fine exterior appearance.

It has been suggested that when contractors are discussing, or rather after the home building plan has been decided on, the subject of a garage be brought up. It is less costly for the owner to build a garage at the same time the house is being constructed. A great majority of home builders either already have automobiles or are planning against time when they will have one. A suggestion at the proper time will bring many garage building jobs, along with the work of building the home.

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VERY few stones will successfully stand the action of severe heat, and consequently stone should be used very sparingly in fire-proof buildings, and certain stones not at all.

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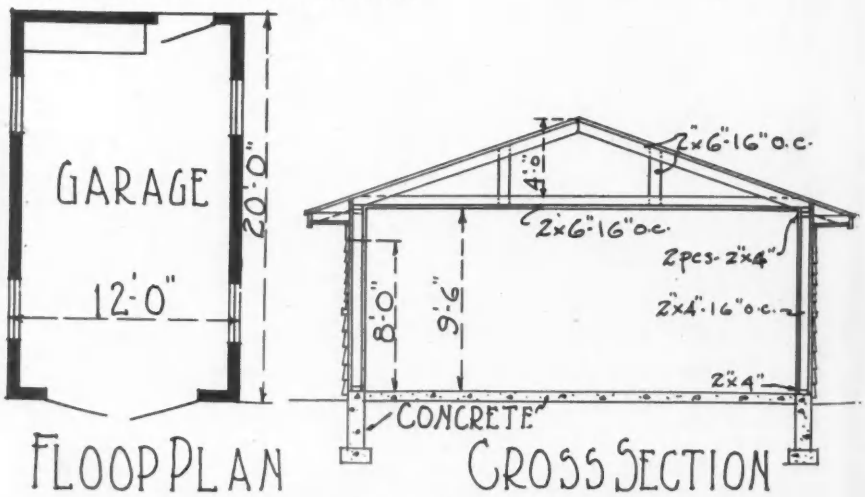
PARTLY completed walls should be covered at night, particularly during bad weather, to protect the newly completed work against damage from rain, snow and frost.



Floor Plan and Cross-Section of One-Car Garage.

"This is the Home I Am Going to Build"

By J. D. Eddy

MR. Y, OF THE AMERICAN BUILDER STAFF, ASSERTS THAT A TWO-FLAT BUILDING IS A GOOD PROPOSITION FOR MEMBERS OF THE "OWN A HOME SAVINGS CLUB." THE PLANS FOR HIS BUILDING ARE SHOWN IN THE BLUE PRINT SUPPLEMENT

WHEN other members of the AMERICAN BUILDER staff who also belong to "Own a Home Savings Clubs" saw in the November AMERICAN BUILDER the design of the house that Mr. X intends to build, they were exceedingly generous with their criticism of it—that is, they handed out a lot of it, and called it "constructive" criticism. And let it be said quickly that if Mr. X follows that advice the house he builds will look about as much like the original design as a public garage looks like a cathedral building. However, knowing Mr. X, it can safely be predicted that his house will be the sort of house he wants, as his dome sheds criticism as efficiently as a well-built roof defies the rain.

One who was not backward in his criticism of the design is Mr. Y. Mr. Y has what is generally termed a "bump of acquisitiveness." In other words, when the money is going out he likes to have a sporting chance that some of it will return. And his past history denotes that he will be successful in his home building project. It is this trait that has caused him to select for his home a two-flat building—one apartment for himself and his family and the other to return to him each month a sum that will take care of the fixed charges and leave a little besides.

The Home Mr. Y Will Build

The home that Mr. Y will build is shown in the blue print supplement. It is an exceptionally good-looking two-flat building of face brick, with an artistic terra cotta trim. The manner of placing the entrance gives the exterior a more pleasing appearance than is found in the average apartment house. The interior is modern in every way. In fact, this is just the sort of a building that will invite tenants and will be readily saleable should Mr. Y so desire in the future—at least, that is his opinion.

The dimensions of the building are 27 feet, 4 inches, by 54 feet, the width being such that it will go nicely on a 30-foot lot. The construction is of standard brick with a veneer of face brick, set on a concrete foundation. The trim and the face of the sill courses are of terra cotta.

Five Room Apartments

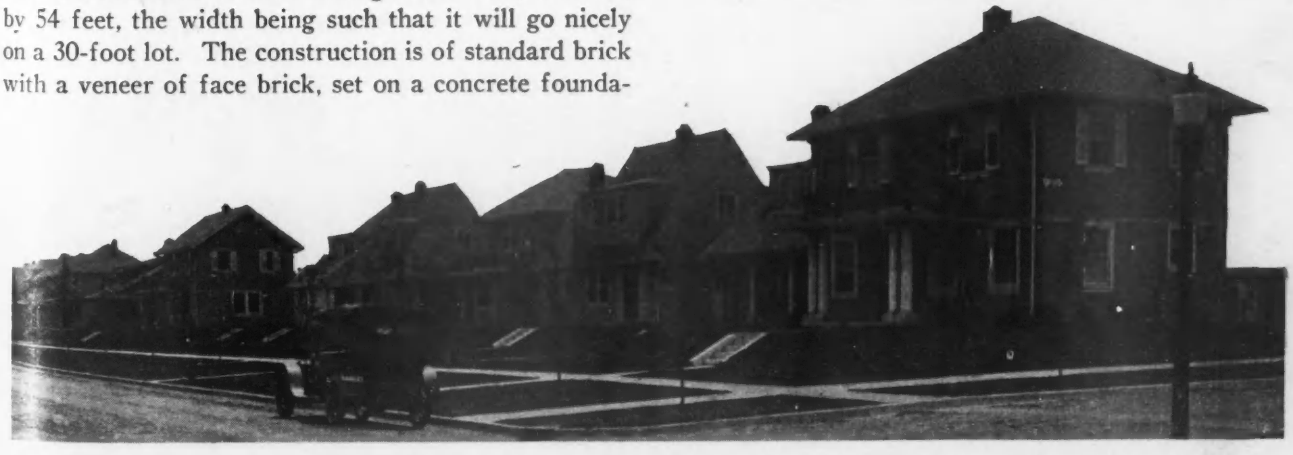
Five good rooms, bath, sun parlor and sleeping porch are contained in each apartment, but the addition of a space-saving bed in the living room gives it an additional sleeping apartment.

The entrance door leads into a narrow hall, which has a space-saving clothes closet at one end. A cased opening leads to the living room, which is 16 feet, 9 inches, by 14 feet, 6 inches. The bed closet, with cases on either side of the doors that conceal the bed, is a feature of this room. An elevation of the bed closet and cases is shown on sheet I of the blue print section. The sun parlor is 10 by 10 feet, and the cased opening makes it in reality a part of the living room.

Connected with the living room by a cased opening is the dining room, 12 by 18 feet, an extraordinarily large dining room for an apartment building. Off the dining room at one side is a short hall, at each end of which is a bedroom, one being 12 by 10 feet, and the other 12 by 10 feet, 9 inches. Between the bedrooms is the bathroom. Adjoining the rear bedroom is the sleeping porch, 11 by 7 feet, 6 inches.

The kitchen is of a size and is so arranged that it is a convenient workroom for the housekeeper. It is 8 feet, 6 inches, by 12 feet, and has a good-sized pantry.

The argument for this sort of a home Mr. Y puts forward is that it does not cost much more to have a second floor to his five-room brick house, and that the extra apartment will bring him sufficient revenue to pay for the heat, taxes, insurance and give him a small balance besides. The work of caring for the building, especially the heating plant, is no more. But,



By Joining an "Own a Home Savings Club" Your Prospective Customers Soon Will Have Saved Enough to Build a Home. Home Owners Are the Best Citizens. They Are the Substantial Men of Every Community. Their Houses and the Grounds Around Them Are Well Kept. Promote An "Own a Home Savings Club" in Your Town, and Soon You Will Be Erecting Homes Like These.

he says, the addition of a third flat would force him to either hire a janitor or do a whole lot of work himself after hours.

There are many interesting features of this building shown by the detail drawings contained in the blue print pages. Aside from the bed closet and cases in the living room, there are details of the sleeping porch, the linen case in the bathroom, together with a number of construction details, the basement floor plan and front and side elevations. All of these will give the builder many good ideas about apartment building construction.

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The Different Strains to Which Building Materials Are Subjected

BUILDING materials may be exposed to a number of different strains. They are:

Shearing strain, as in the case of rivets, treenails, pins in bridges, etc., where equal forces are applied on opposite sides in such a manner as to tend to force one part over the adjacent one.

Transverse or cross strain, as in the case of a load on a beam, tending to bend it.

Torsion, a twisting strain, which seldom occurs in building construction, tho quite frequently in machinery.

Tension, as in the case of a weight suspended from one end of a rod, rope, tie-bar, etc., the other end being fixed, tending to stretch or lengthen the fibres.

Compression, as in the case of a weight resting on top of a column or post, tending to compress the fibres.

The parts of structures are often subjected to two or more of the above strains at the same time, as in the case of "strut beams" and "tie beams," and all beams and girders are subjected to a shearing strain, as well as to a transverse strain.

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USE fire clay flue linings in all chimneys.

✣

SNOW should not be allowed to thaw and freeze on structural tile, as a film of ice on the tile will prevent the mortar from adhering to same. Piles of tile should, therefore, be covered in cold weather.

Two-Apartment Building of Brick and Terra Cotta. This Is the Home that Mr. "Y" of the American Builder Staff Is Going to Build. It Will Not Only Provide Him With a Home of His Own, But Will Furnish Him With an Income to Pay the Taxes, Insurance. Build. It Will Not Only Provide Him with a Home of His Own, But Will Furnish Him with an Income to Pay the Taxes, Insurance, Etc.

PLANS FOR THIS TWO-APARTMENT BUILDING ARE CONTAINED IN THE BLUE PRINT SUPPLEMENT THAT FOLLOWS.

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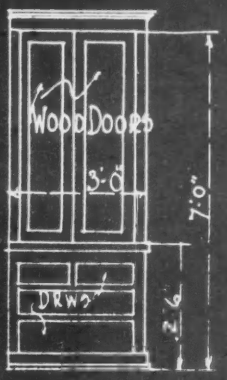
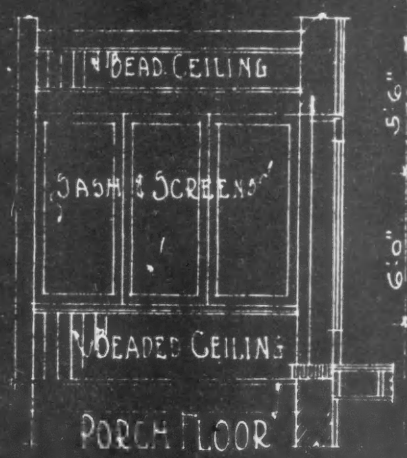
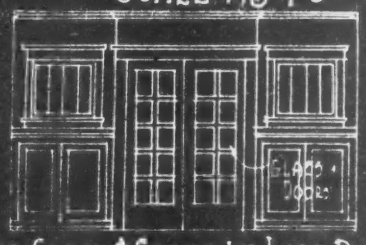
AMERICAN BUILDER BUILDING PLANS



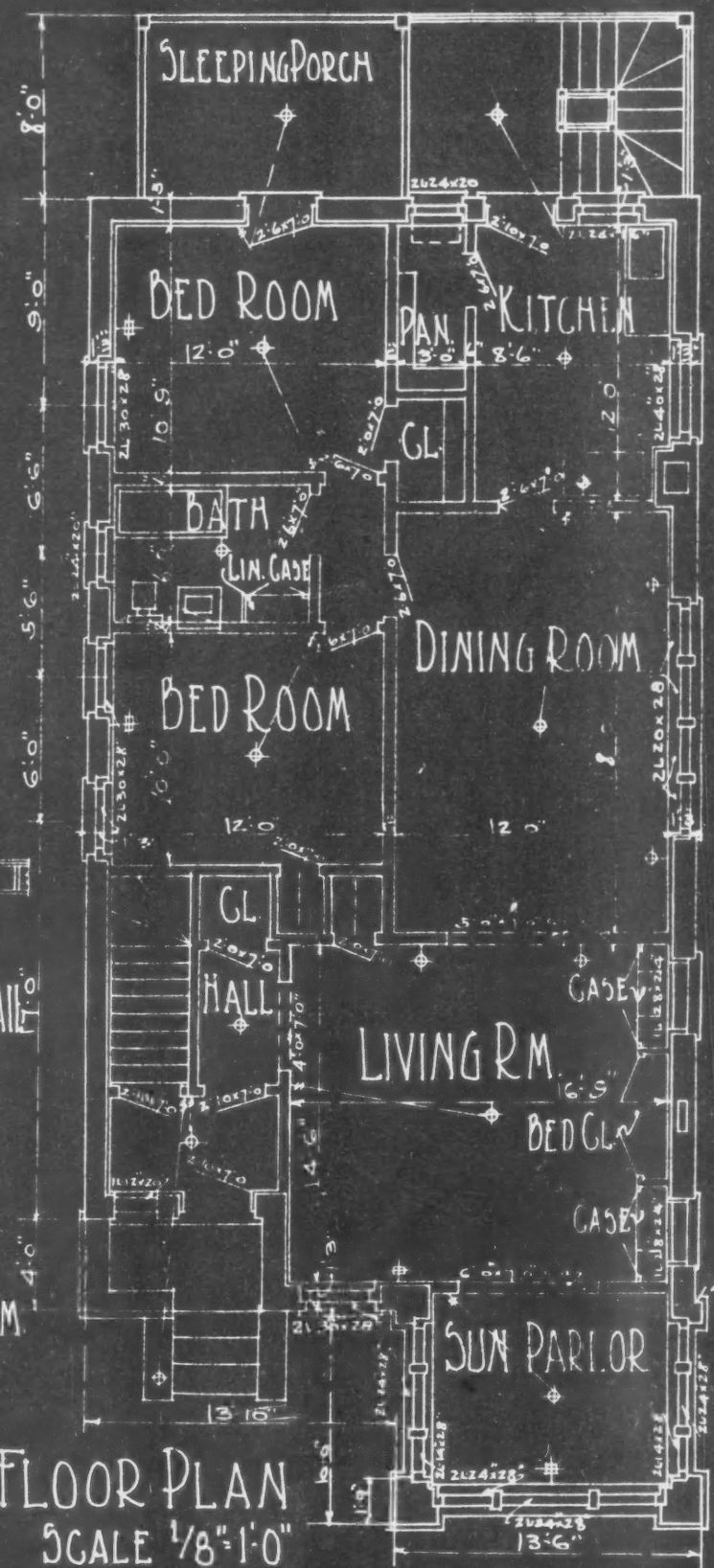
LINEN CASE
SCALE 1/4"=1'-0"



SLEEPING PORCH DETAIL
SCALE 3/16"=1'-0"



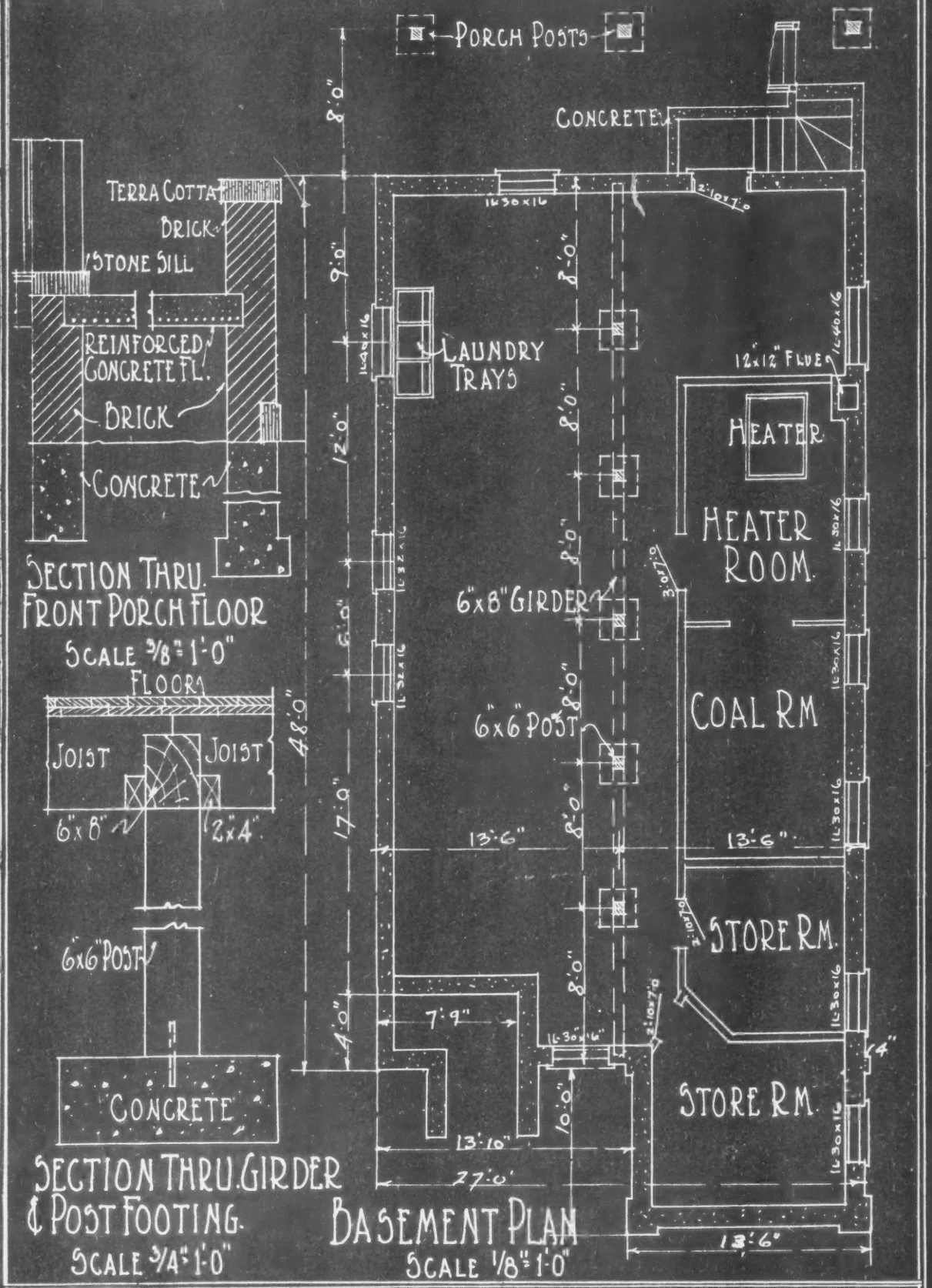
BED CLOS. & CASES IN LIV. RM.
SCALE 1/8"=1'-0"



FLOOR PLAN
SCALE 1/8"=1'-0"

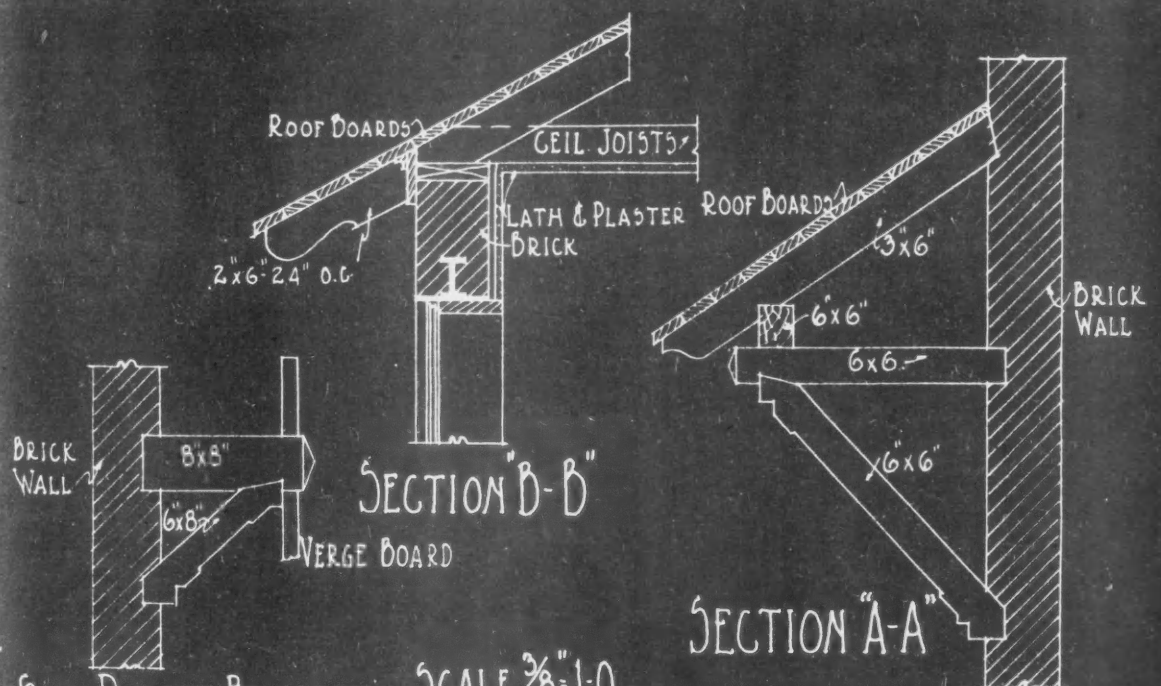
TWO APARTMENT BUILDING SHEET Nº 1

AMERICAN BUILDER BUILDING PLANS



TWO APARTMENT BUILDING SHEET No 2

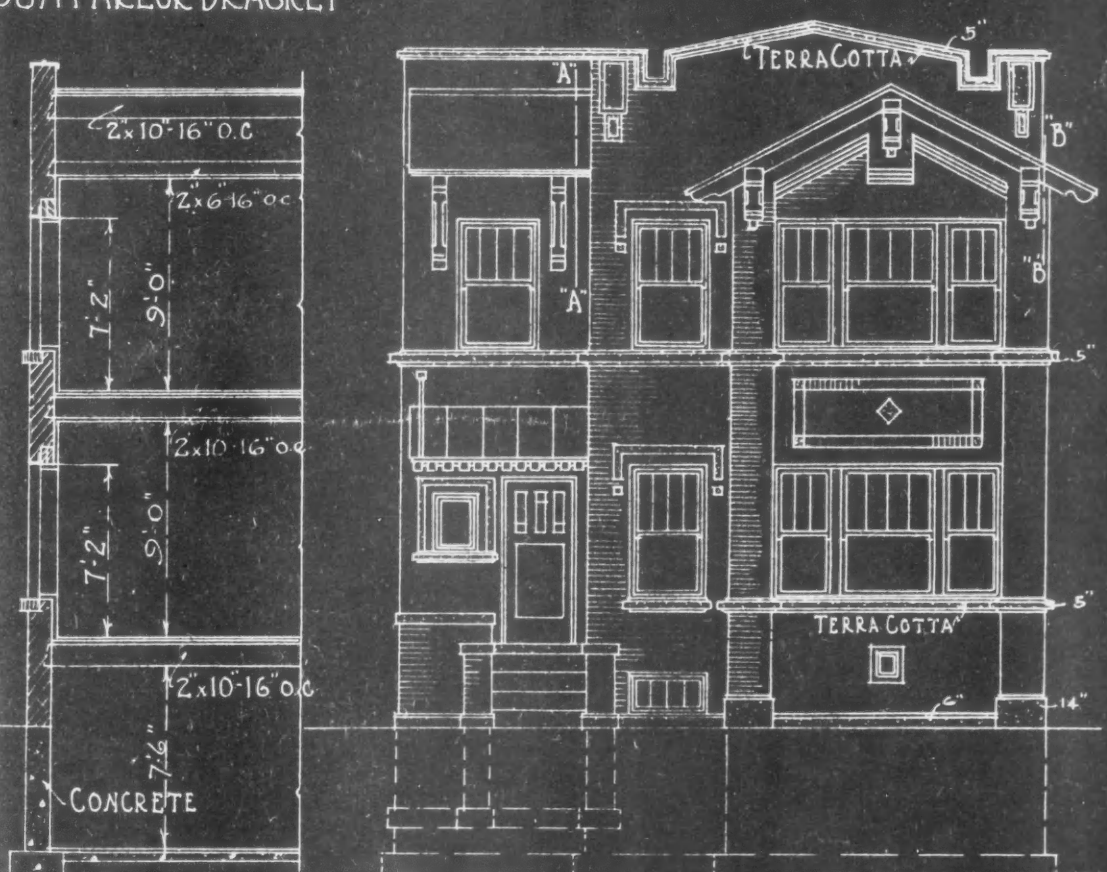
AMERICAN BUILDER BUILDING PLANS



SECTION "B-B"

SECTION "A-A"

SUN PARLOR BRACKET SCALE 3/8"=1-0

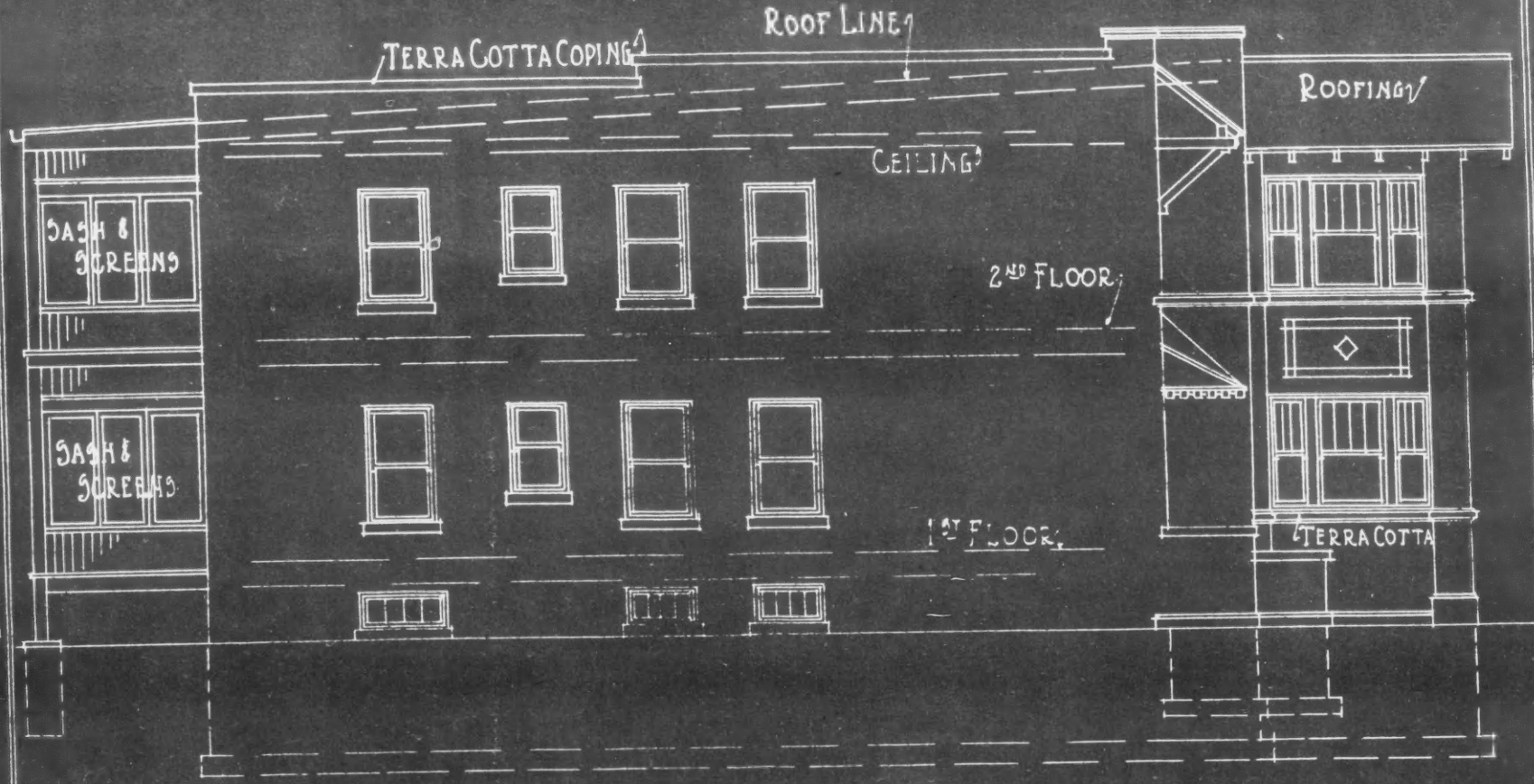


CROSS SECTION SCALE 1/8"=1'-0" FRONT ELEVATION

TWO APARTMENT BUILDING SHEET Nº 3

TWO APARTMENT BUILDING SHEET No 4

AMERICAN BUILDER BUILDING PLANS



SIDE ELEVATION

SCALE 1/8" = 1'-0"

S

SCALE

4

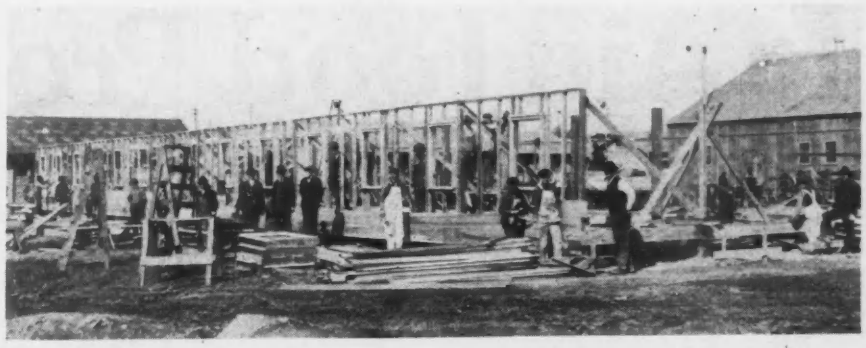
Build Two-Story Frame Building in 12 Hours

FLINT, MICHIGAN, CARPENTERS ERECT IN ONE DAY BUNKHOUSE TO ACCOMMODATE 100 MEN

By Chester W. Shafer

PROBABLY in no place in the country of its size is there more buildings under construction than at Flint, Mich. The need for houses and the coming of large manufacturing plants have caused enormous building activity in the Michigan city, and construction work is progressing rapidly.

Erecting a frame building and equipping it with water and light in a day was one of the accomplishments at Flint recently. The building was a bunkhouse for men employed on the huge factory that is being erected there for the General Motors Co. The speed with which this building was erected is shown by the illustration—one shows how far the work had progressed at 8 in the morning; the second at noon, and the third, the building practically completed at 6 in the evening.



The Bunkhouse After the 40 Carpenters Had Been Working at It Two Hours.

The building was put up by the DuPont Construction Co., with Allen J. Scoville, resident engineer, and Tom Bowles, carpenter foreman, in charge. The General Motors Co., notified the construction company that it would have a gang of workmen on the job the next evening after the notification. The engineer and the foreman with a gang of 40 carpenters began building at 6:30 a. m. and at 7:30 p. m. the bunkhouse was completed, as shown by the illustration. It is a two-story building and accommodates 100 men.

The Building Completed at 5:30 P. M.

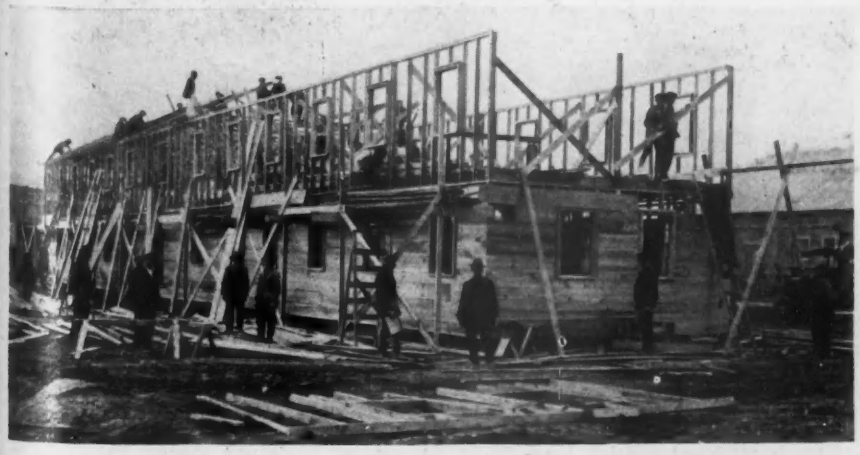
Twelve working hours were consumed in erecting the building. The men took an hour off at noon, and at 5:30 the structure was complete. Plumbers and electricians followed the carpenters, and two hours later the building was lighted and the water running from the taps. ✣

"Live Loads" and "Dead Loads"

AS used in mechanics, the term "dead load" means a load that is applied by degrees, and that remains steady, such as the weight of the structure itself.

A load that is applied suddenly, or accompanied with vibrations, is called a "live load," such as trains going over a railway bridge. The effect of a live load on the beam or other piece of material is twice as severe as that of a dead load of the same weight, consequently, a piece of material designed to carry a live load should have a factor of safety twice as large as one designed to carry a dead load. Usually there are both dead and live loads to be supported.

✣



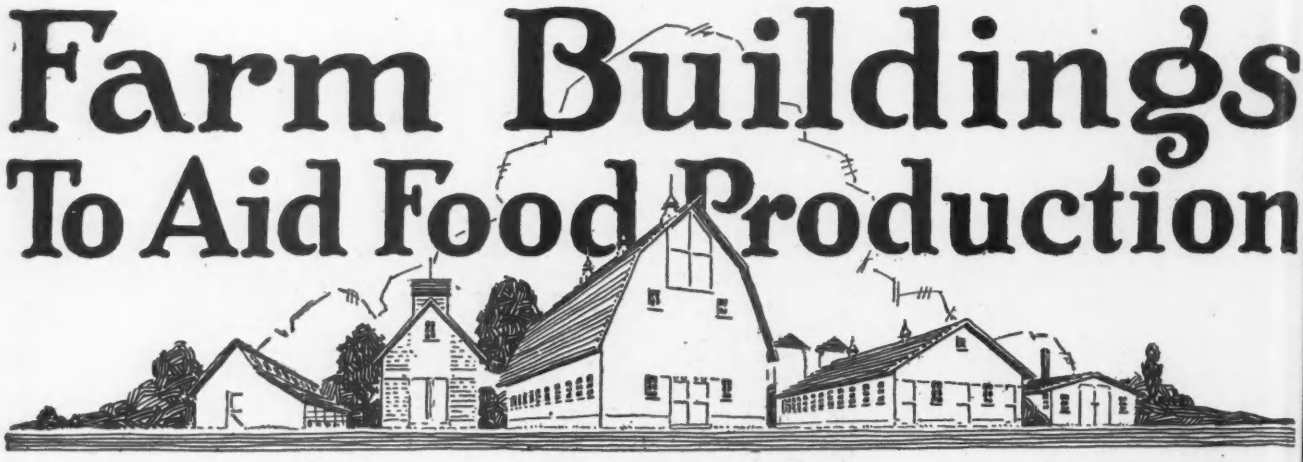
The Stage the Building Had Reached When the Carpenters Knocked Off Work for Dinner at Noon.

ONLY a good portland cement mortar mixture should be used in setting hollow tile. When the kind of sand available is poor, or loamy, be sure to use more cement.

✣

HOLLOW tile should not be dumped from truck or teams. Each size or shape should be piled separately. Breakage will be avoided and a saving in the mason's time effected.

Farm Buildings To Aid Food Production



Modern Dairy Barn and Auxiliary Buildings

COW STABLE, IMPLEMENT HOUSE, FEED HOUSE, SILO AND MILK HOUSE GROUPED MAKE FARM WORK EASY

EFFICIENT grouping of farm buildings has come to be looked upon as one of the most important phases of erecting farm structures. In reality, it is applying to the buildings that house the various farm activities, the modern factory system of aligning the various steps in the process of manufacture so that there is no lost motion.

Such a group of farm buildings is shown in the accompanying design for a dairy barn, implement house, silo and milk house. Here the buildings are combined so that the work of caring for a herd of thirty-three or more cows can be accomplished with a minimum of labor, and the feed for the animals stored right at hand. Also there is a storehouse for the milk they produce, all so located as to secure economy in the time of the men.

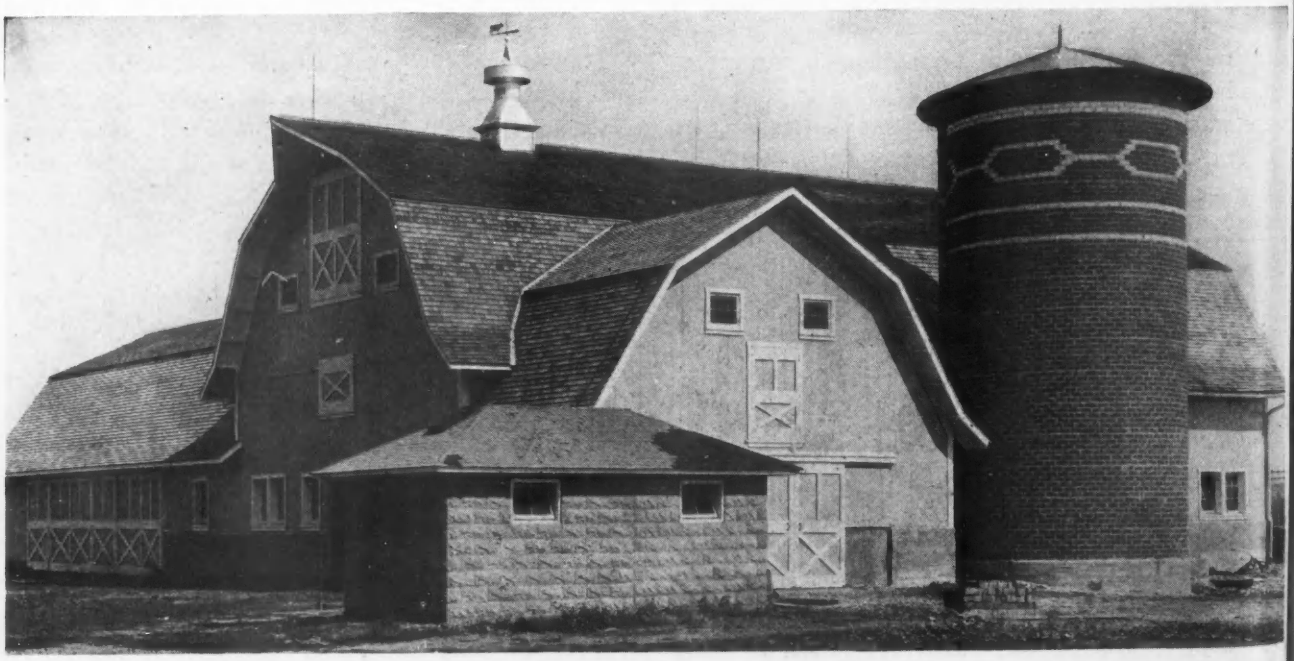
The barn, implement house and feed rooms all are joined under one roof. The silo is so placed that it is a part of the barn. The milk house is only a few feet away from the other building.

Dairy Barn Has Modern Equipment

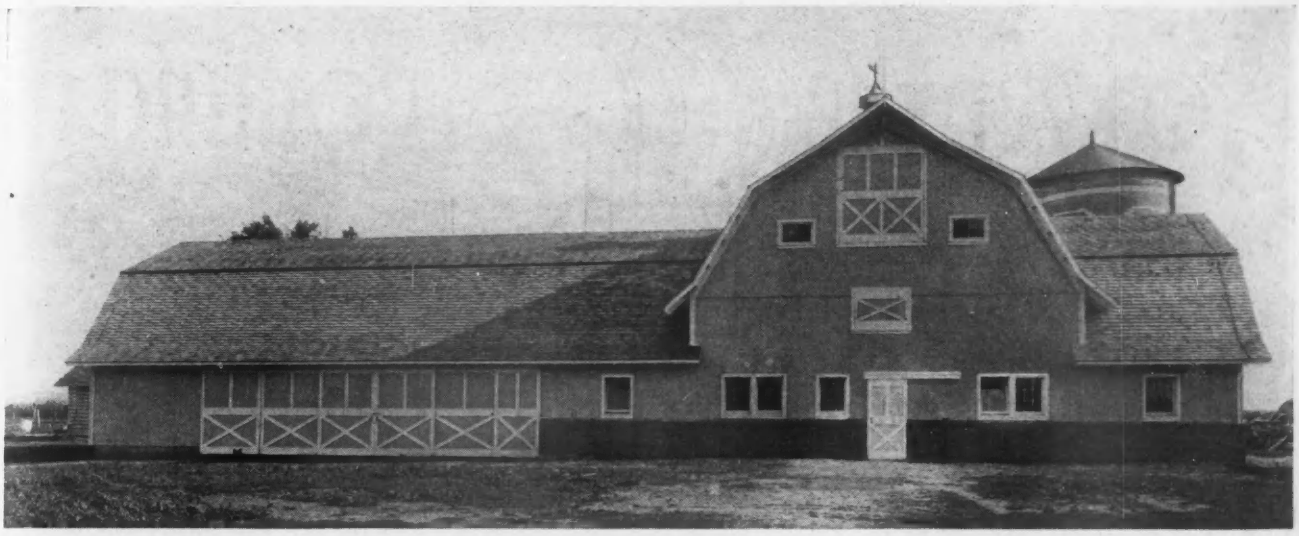
The main portion of this structure is the dairy barn. This is a frame building 36 by 80 feet, with single stalls for thirty-three cows, and three pens. As will be seen by the floor plan on the following page, the stalls are placed so that the animals face feeding alleys on either side of the building and the litter alleys run thru the center. This part of the building is equipped with modern stall partitions and movable stanchions, while over both the feeding alleys there is an overhead carrier track. The dot and dash line on the plan shows the location of the track. It connects all parts of the stable with the feed room, providing a mechanical means of transporting the feed to the mangers at the stall heads.

Feed Room is Well Placed

The second floor of the wing of the barn wherein are the feed rooms can be used either as a part of the



EFFICIENT FARM BUILDING GROUP. Here is combined a dairy barn, 36 by 80 feet, an implement storage house, 60 by 24 feet, a feed house 24 by 24 feet, a brick silo and a concrete milk house, 10 by 10 feet This arrangement of buildings makes the work of caring for the dairy herd more simple and saves costs.



Another View of the Combined Dairy Barn, Implement House, Feed House, Silo and Milk House. The Latter Is Out of the Picture.

hay mow, or for the storage of small grain for the animals. This wing is 24 feet square and is connected with the silo by an enclosed runway, so that taking the ensilage out of the silo and carrying it to the mangers all is done under cover.

The implement house is a story and a half wing attached to the barn on the side opposite from the feed room. The front elevation of the implement storage house and of the dairy barn is shown in the second illustration. This part of the building is 60 by 24 feet and will provide space for all the farm implements and machinery. Keeping the costly machinery necessary to economical farm operation under cover saves the cost of such a building in a few years in preventing depreciation of the implements.

Milk House of Hollow Concrete Blocks

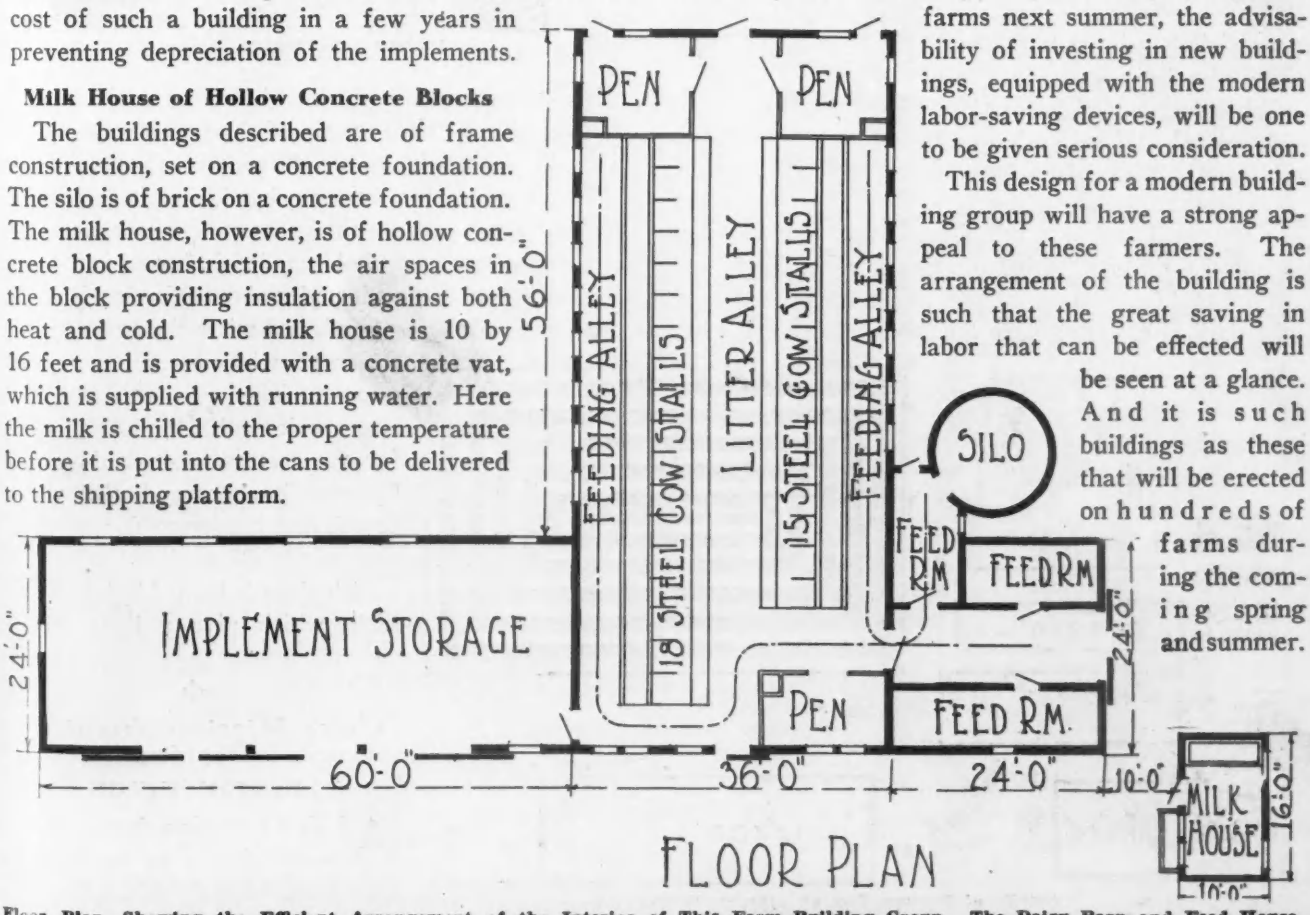
The buildings described are of frame construction, set on a concrete foundation. The silo is of brick on a concrete foundation. The milk house, however, is of hollow concrete block construction, the air spaces in the block providing insulation against both heat and cold. The milk house is 10 by 16 feet and is provided with a concrete vat, which is supplied with running water. Here the milk is chilled to the proper temperature before it is put into the cans to be delivered to the shipping platform.

Such a building, or rather combination of buildings, is what the modern farmer wants and has the money to pay for. During the last season, labor costs have been so high on the farm that the farmers are ready to build modern labor-saving buildings. It will be difficult to find a more efficient grouping of buildings than that shown here.

Farmers Realize Value of Modern Buildings

With their troubles caused by the scarcity and high price of labor fresh in their minds, farmers will be figuring this winter on how to do the work on their places more economically and with less help. And while they are considering this phase of operating their farms next summer, the advisability of investing in new buildings, equipped with the modern labor-saving devices, will be one to be given serious consideration.

This design for a modern building group will have a strong appeal to these farmers. The arrangement of the building is such that the great saving in labor that can be effected will be seen at a glance. And it is such buildings as these that will be erected on hundreds of farms during the coming spring and summer.



Floor Plan, Showing the Efficient Arrangement of the Interior of This Farm Building Group. The Dairy Barn and Feed House Contain the Modern Sanitary Equipment That Makes the Work Easy and Economical.

Pattern Top Library Table

By C. J. EMMERT

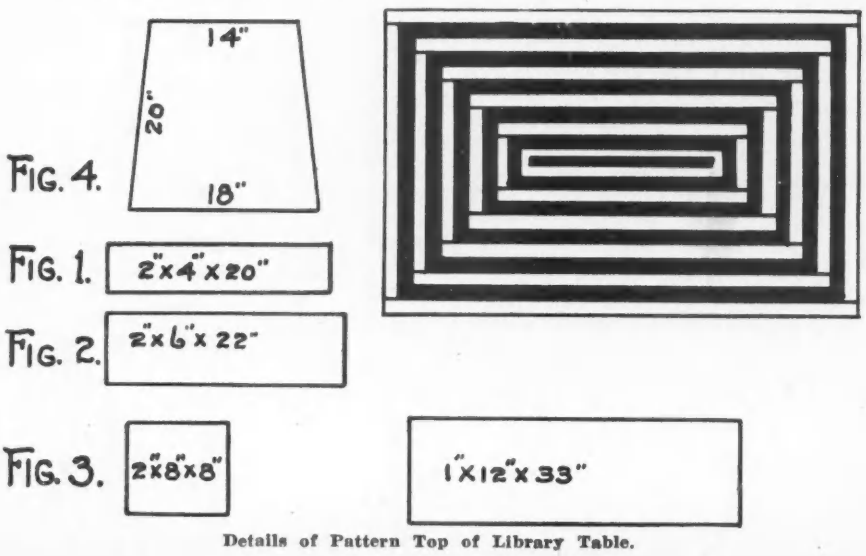
THE accompanying sketch shows all of the top and shelf, but only half of the upright pieces or legs. First, saw out two each of Figs. 1, 2, and 4, and four of Fig. 3. Rub the sawed ends well with sandpaper, using the coarse first and finishing with the No. 0. Fasten Fig. 1 on to Fig. 2 firmly with 3-inch screws and countersink them, measuring carefully to get Fig. 1 exactly in the center of Fig. 2. Then put the 2 by 8 by 8-inch blocks, or Fig. 3, onto the ends of Fig. 1, as shown in the illustration. These screws need not be countersunk, as they will not show. Mortise the 18-inch end of Fig. 4 into Fig. 1, using just a small amount of glue. Bolt a 2 by 2 by 20-inch piece to the 14-inch end of Fig. 4 to give a firm foundation for the top board. Now the upright ends are complete, excepting the casters, which should be put on last.

The top is more difficult, as every piece has to be exactly right. Saw out a board 26 by 44 inches, of some kind of hard wood (walnut was used in the one described) and fasten with nails or screws to the uprights, 6 inches from end of top board. Now the shelf can be put in.

Get equal amounts of 3/8-inch dark oak and light maple flooring for the bottom top, or veneering. Begin in the middle. The first strip is cut 20 inches long of the dark oak. Glue very lightly to the center of the top board, and nail with brads in two or more places along the tongue. Then saw two square blocks of the light maple and glue to ends of first strip. Then cut two light strips the full length of blocks and dark strip, and fasten in place as shown in sketch. Continue in this manner until the 26 by 44-inch board is covered. Finish the edge with a strip of the flooring nailed flat, with the upper edge of strip level with the top. Mitre the corners of this finishing band, and it looks as if the entire top was the thickness of the flooring, giving a uniform appearance. Use a 3½-inch or 4-inch board for the apron, setting it under about 3 inches from the edge of the finishing band, and mitre the corners.

Pattern Top Library Table.

Scrape with floor scraper until smooth. Then rub with any crack and crevice filler, and it is ready for the casters, stain and varnish. Cypress lumber, and the walnut board, and hardware for this table cost about $7 and sold for $28. Finished with lamp black and varnish, which give a light mission color.



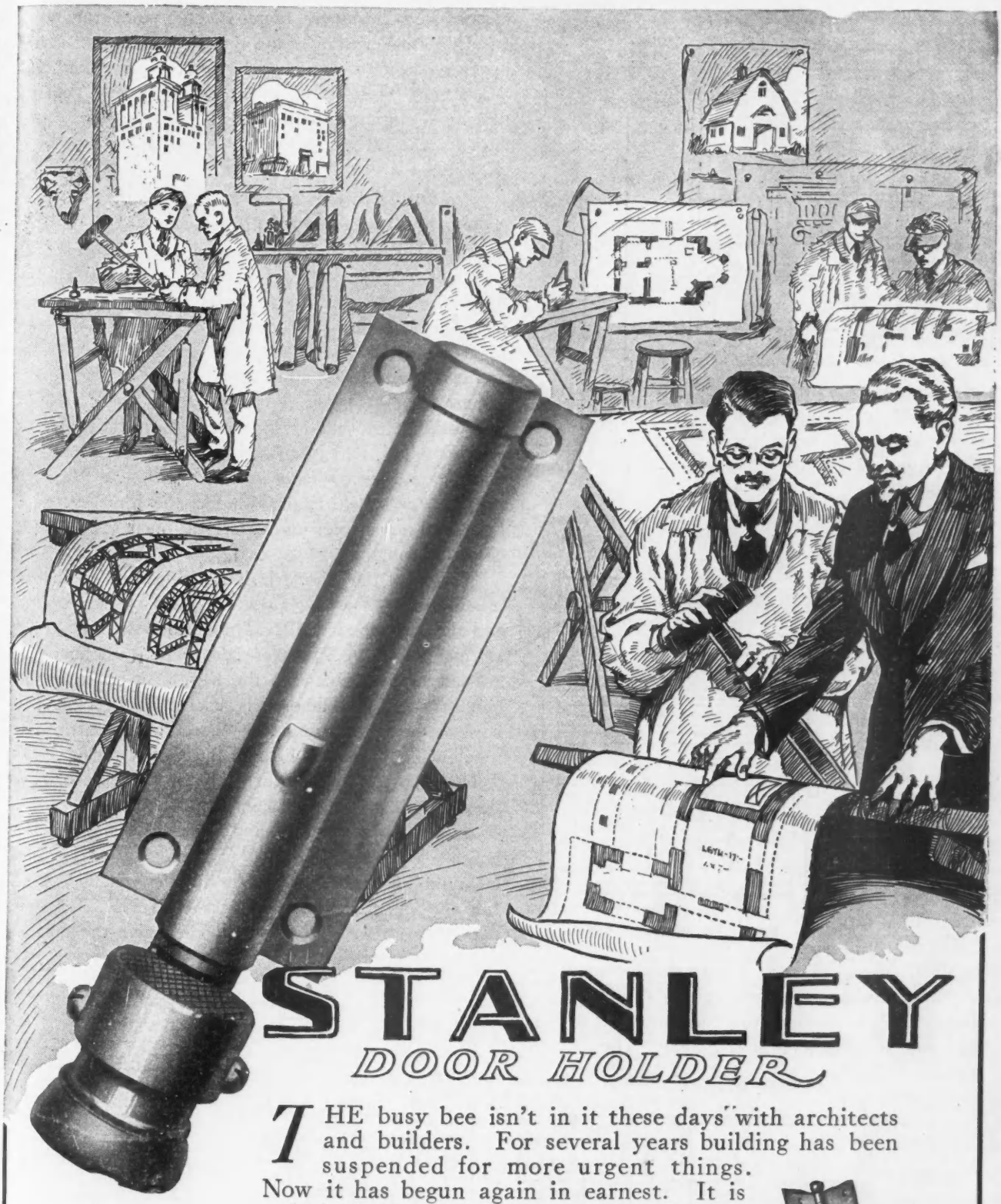
Details of Pattern Top of Library Table.

✣

Three Mission Furniture Designs

By JOHN UPTON

ALTHO mission furniture may seem simple to make, it requires considerable skill. However,



STANLEY
DOOR HOLDER

THE busy bee isn't in it these days with architects and builders. For several years building has been suspended for more urgent things. Now it has begun again in earnest. It is authoritatively estimated that the United States at the present time faces a building shortage equivalent to the needs of over four million people. An era of big building unquestionably is at hand.

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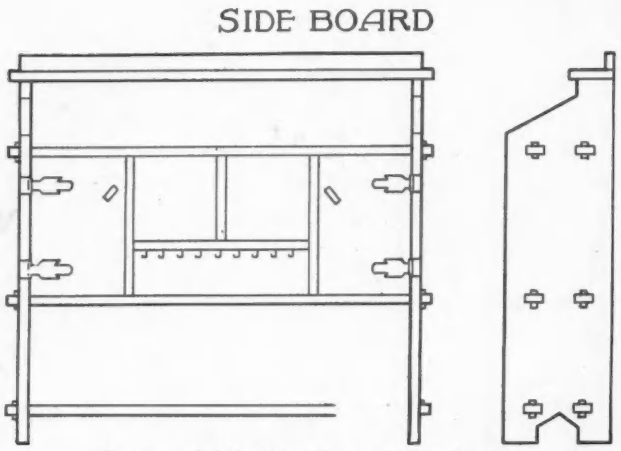
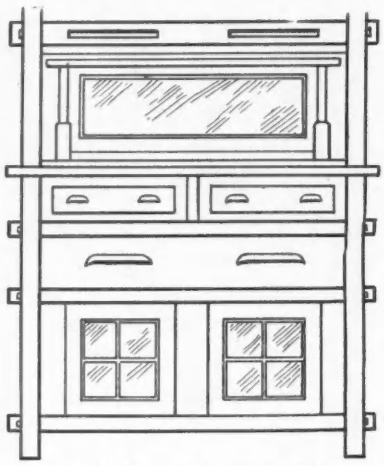


Front and Side Elevations of Side Board.

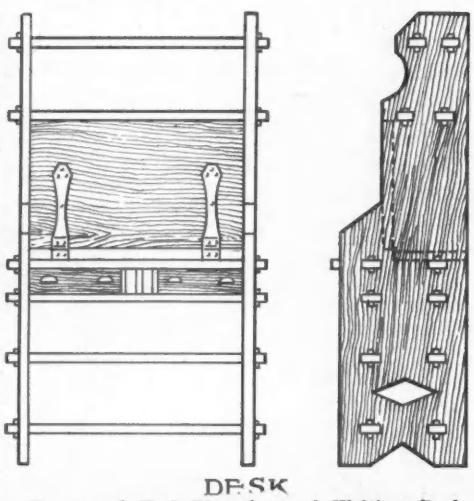
any carpenter who is proficient in the use of his tools and is capable of applying to furniture making the knowledge he has of carpentry can turn out some good looking and saleable pieces in the shop during the winter months.

In olden time the mortise and tenon joints were much used, the tenons projecting thru and being held with wedges. But now the term "mission furniture" is applied to almost any style of hand made work, altho the builder of the early mission furniture would hardly recognize the work turned out today. Then oak wood, which grows more and more beautiful with age, was nearly always used. Now all sorts of woods are used and usually are stained to represent oak.



Front Elevation of Buffet.

Here are three designs for furniture that I have found good, and that have sold quickly. They are for a desk, a buffet and sideboard. I have purposely omitted the dimensions, leaving them for the maker to decide upon. From the drawings the skilled carpenter will get the ideas of the designs and can produce these pieces in sizes to suit the needs of his customers. However, there is one point that the furniture maker should always keep in mind. The better the work is done, the higher the price that can be obtained for it. Care in fitting the pieces together, making the joints smooth, and in finishing are requisites for the successful maker of furniture.



Front and End Elevations of Writing Desk.

✣

Design for a Round Taboret

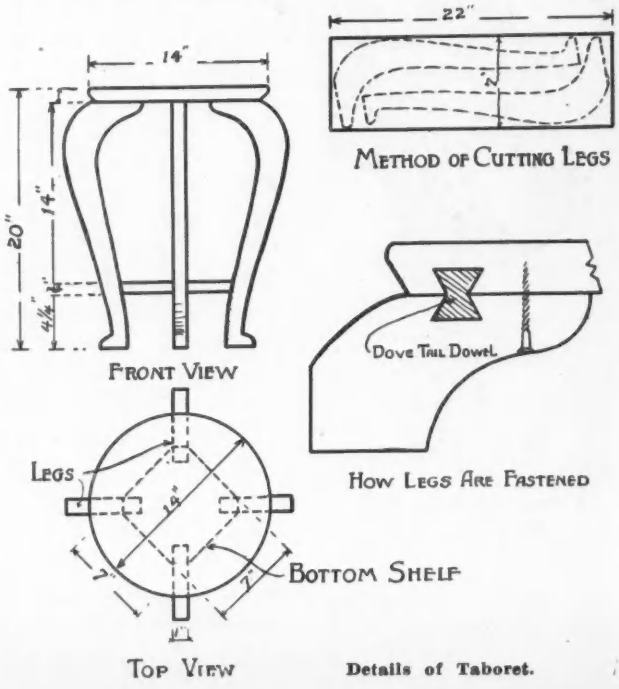
By Frank P. Dufrechou, Jr.

AIDED by the accompanying drawings anyone possessing a general knowledge of the use of tools should have no difficulty in making this simple piece of furniture. While the construction of this taboret is simple, it is very attractive and it will be appreciated by any housekeeper who sees it.

Care should be taken in laying out the legs. I would suggest that the builder first make a full-size drawing of the legs on paper, then place the pattern on the material and outline with a piece of steel. By arranging them as shown in the drawing the four legs may be cut from a piece of material 7 inches wide and 44 inches long.

The top of the taboret is 1 inch thick and 14 inches in diameter. The edges are cut on a 60-degree line and the top rounded off. The bottom shelf is ¾ of an inch thick by 7 inches square, and the corners are cut to fit in between the legs. By omitting the bottom shelf this taboret is useful as a stand for flowers. By increasing the taboret in proportion to a height of 3 feet it will be a fine center table.

The taboret is made out of birch. To finish, first stain a dark mahogany color with an oil stain. After 20 minutes wipe lightly and then let stand for 12 hours. Then give it a coat of mahogany coater and let stand for five hours. After another coat has dried for 48 hours sandpaper lightly with No. 00 sandpaper or rub with steel wool. Then give the taboret a coat of flat varnish.



Details of Taboret.

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How to Build a Phonograph

THE popularity of the phonograph, which is increasing each year, has brought to the woodworking shop another source of profitable work. That is building phonographs. Many builders are finding that the construction of phonographs is not only interesting, but is highly remunerative, as much as $150 or $200 having been received for the completed instruments.

The accompanying illustration shows Charles Leaderer, of Goshen, Ind., putting the finishing touches on one of the several phonographs he has made in his shop. Mr. Leaderer is putting in the plate that holds the record. The motor and tone reproducer will follow. The case was built by Mr. Leaderer from plans he secured from a manufacturer of motors and the other equipment necessary, and the ready-made working parts were quickly installed, as it is a simple operation.

Carpenters and builders who enjoy doing cabinet work in their shops at odd times and when building is slack will find the making of phonographs a pleasant occupation. They are made of oak, walnut, or mahogany, and really do not require more skill than is possessed by every first-class workman. Care in joining the pieces, so as to make a smooth, finished job, and in varnishing and rubbing the case after it is completed is what is required to turn out a phonograph that will compare most favorably, and, in many cases, be a great deal more handsome than those made in factories.

By following the plans furnished by the manufacturer of the equipment and installing the various parts accurately the shop-made phonograph will bring a good price and give the builder a fine profit.

Charles Leaderer at Work on a Phonograph He Built in His Shop at Goshen, Ind.

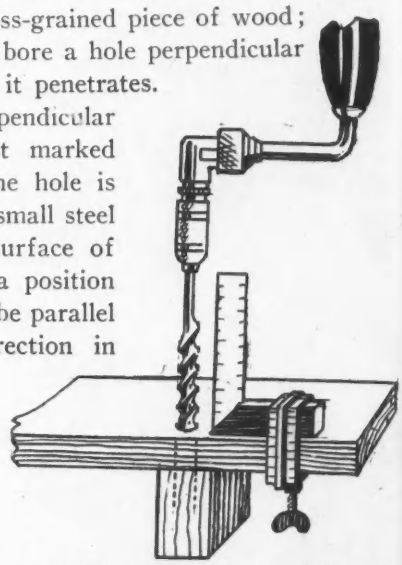
✣

Two Woodworking Hints

By F. H. SWEET

TWO problems are common to beginners in woodworking who have not had the advice of some one experienced in the art. One is how to smooth the surface of a cross-grained piece of wood; the other is how to bore a hole perpendicular to the surface that it penetrates.

To bore a perpendicular hole: Having first marked the position that the hole is to occupy, clamp a small steel try-square to the surface of the wood in such a position that the blade shall be parallel to the line of direction in which you wish to bore, and the edge of the blade just outside the circumference of the hole. If you watch the space between the bit and the blade of the square, and keep the edges of the space parallel your hole will be "straight"—that is perpendicular.



Showing How the Steel Try Square Is Used as a Guide for the Auger.

To smooth a piece of wood in which the grain is tortuous or uneven, use a double iron plane. See that the cutting edge is as sharp as you can make it. Loosen the screw that holds the two irons together, and slip the guard iron down until only the smallest possible cutting edge of the blade is left exposed—a sixty-fourth to a thirty-second of an inch is enough. Screw the irons together very tight, and "set" the plane as fine as possible. It will then do smooth work on the most difficult wood.

✣

WINDOW frames of a size that will fit in with the tile units without cutting should be used whenever possible.

✣

TILE should be so built in the wall that all open ends of the cells are sealed up to preserve the insulating value of the dead air spaces; all joints should therefore be well filled with mortar.

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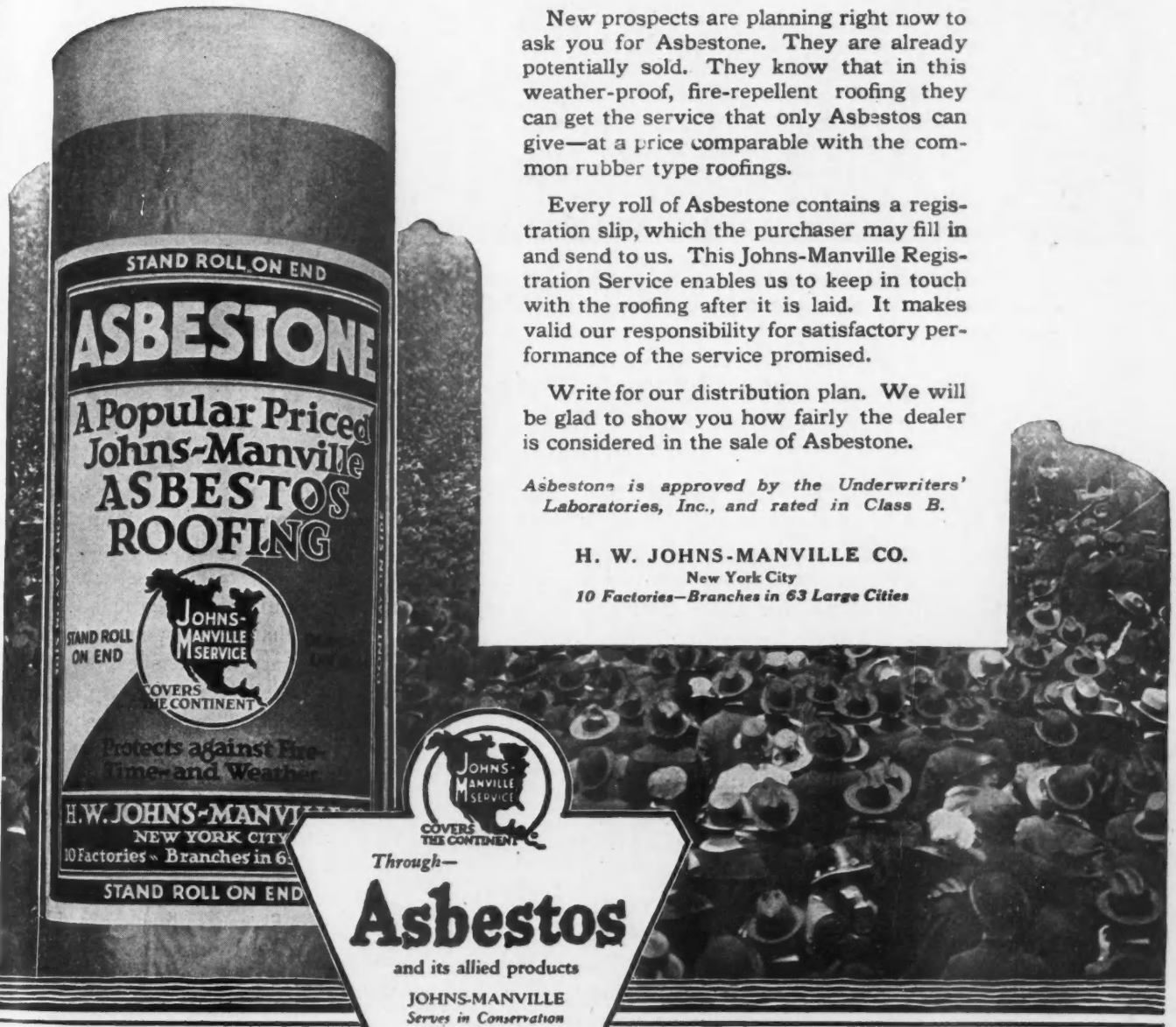

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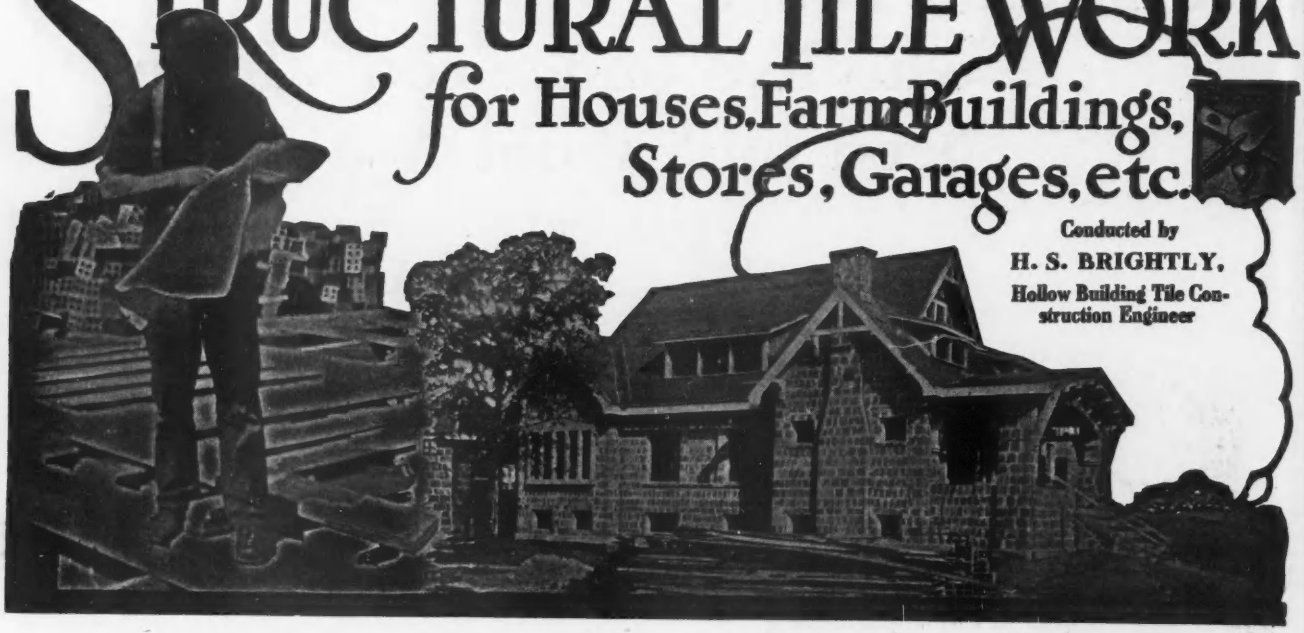

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If you will send us a plan or sketch of the building you are thinking of erecting, Mr. Brightly will tell you about the sizes, shapes and quantities of hollow building tile that will best serve your requirements.—EDITOR.

Hollow Building Tile Construction

LINTEL DETAILS CONTINUED—SELECTING PROPER WINDOW HEIGHTS FOR HOLLOW BUILDING TILE WALLS

By H. S. Brightly

LAST month's article gave details for various types of reinforced tile lintel construction; this month the subject will be continued, giving details for other forms of lintel construction, following which next month the selection of window frame sizes will be taken up.

While all the details described in last month's article referred to walls of either 8 by 5 by 12-inch or 8 by 12 by 12-inch tile, practically all of these forms may also be used in walls built of 8-inch-high tile courses and with other forms of hollow building tile.

With most forms of hollow building tile construction it is customary to avoid the use of structural steel shapes, particularly for rural residences and farm buildings, as structural shapes are not always obtainable in such localities. The reinforced tile lintels described in the November article are therefore given preference, as rods can usually be obtained at any blacksmith or wagon shop.

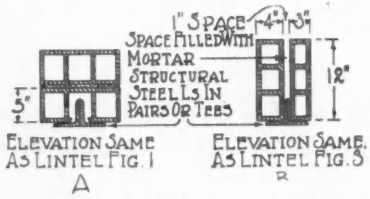


Fig. 5. Lintels for Structural Shapes. Section "A" for 8-Inch Walls of 8 by 5 by 12-Inch Tile; Section "B" for 8-Inch Walls of 8 by 12 by 12-Inch Tile. The Size and Weight of Steel Shapes Required by Any Span and Loading May Be Figured from the Carnegie or Other Structural Steel Handbook. These Lintels Should Usually Have 12-Inch Bearing.

Wide Lintels Using Structural Steel Shapes

Structural steel angles and "tees" are frequently used in the cities where such shapes are readily obtainable, and these lintels are most suitable for use over wide openings, such as the opening into a projecting bay window or over a group of casement windows and over garage doors, etc. In this form of lintel the structural steel takes the place of both concrete and steel reinforcing rods and with the tile that is set upon same forms the carrying member.

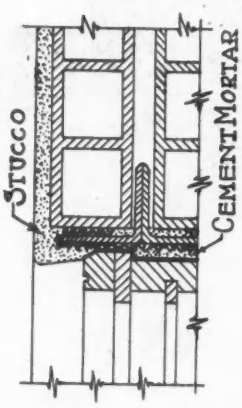


Fig. 6. Projecting Lintel Steel Is Covered with Stucco.

Details for this form of lintel using steel angles are shown by Figure 5 (A, B). Figure 5 (A) shows the use of same in wall of 8 by 5 by 12-inch building tile and Figure 5 (B) in wall of 8 by 12 by 12-inch load-bearing tile.

The angles or other steel shapes should generally have a 12-inch bearing on the tile wall at each side of opening and should be solidly seated on a bearing slab of tile or the tile immediately under same be filled with concrete.

When the lower flange of the angle extends out to the face of wall, or beyond a point that it will be covered by the window frame and must be covered by the stucco that is returned into the opening, the edge of the flange so exposed should be wrapped with a strip of small mesh expanded metal lath as shown by Figure 6.

It is always best to fill all spaces between wood frame and steel or tile lintel with mortar and in all

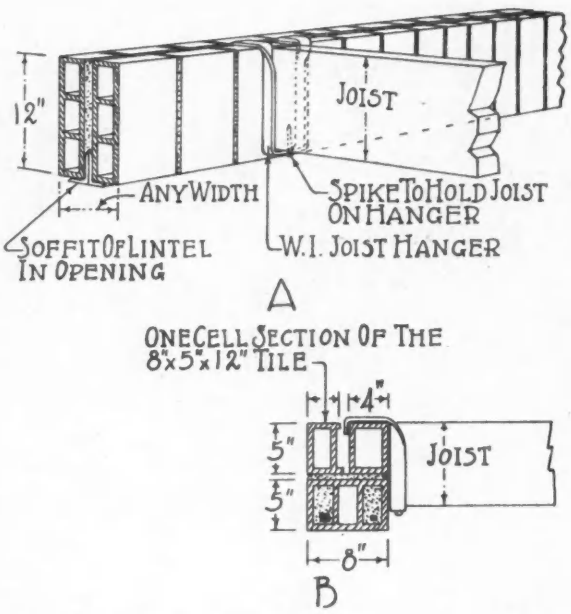


Fig. 7. Joist Hangers May Be Used with Various Types of Lintels to Keep Head of Window Opening Close to the Ceiling Line.

cases where this is done a strip of tar paper should be placed over top of frame to prevent the warping of same, as shown in cut.

Small I beams are sometimes used over openings, but they are more difficult to combine with the hollow tile wall construction and for several reasons are not nearly as suitable as the angles and tees.

Flat Arch Lintels the Simplest with Certain Forms of Tile

For all lintels over single windows or doors in walls built of any tile having courses eight inches or more in height, the simplest and probably the best form of lintel is the flat arch cut from the same tile that is used in the wall, as shown by Figure 8. These flat arch lintels if 12 inches in depth may be used for openings up to 5 feet in width, and if 8 inches in depth for openings up to 3 feet 6 inches in width. Heads of frames should be temporarily braced with this form of lintel, which also should always have proper abutment to resist the thrust. These flat arch lintels therefore should not occur too close to the corners of walls or be supported on slender piers; ordinarily the corner piers should not be less than three feet wide. In all cases where they must be used near corners, a reinforcing tie of strap iron or woven wire should be bedded in cement mortar in the joint under same, as shown by Figure 8-B, and be turned up into the vertical joints for anchorage. This makes a very excellent lintel.

The flat arch lintels are not used as extensively as they should be, probably because the shapes required are not carried regularly in stock by the dealers, and by some manufacturers are only made on order. This form of lintel has many advantages for the short spans which occur in residence buildings. They are light and easy to set, no previous preparation is required, no reinforcing or concrete filling is required, they retain the insulation feature of the hollow wall, and, with the three shapes shown, a lintel of any length in steps of six inches can be built by varying the number of fillers used. Special length lintels, therefore, are not required for the different widths of opening, and if builders would create a greater demand for these shapes in connection with load-bearing wall tile, the manufacturers would doubtless quickly respond to the demand. The cost of such lintels is little, if any, more than the regular square foot price of the tile shapes from which they are made, when ordered along with the straight wall tie. Naturally, if separately ordered, the cost of these special shapes will be somewhat greater.

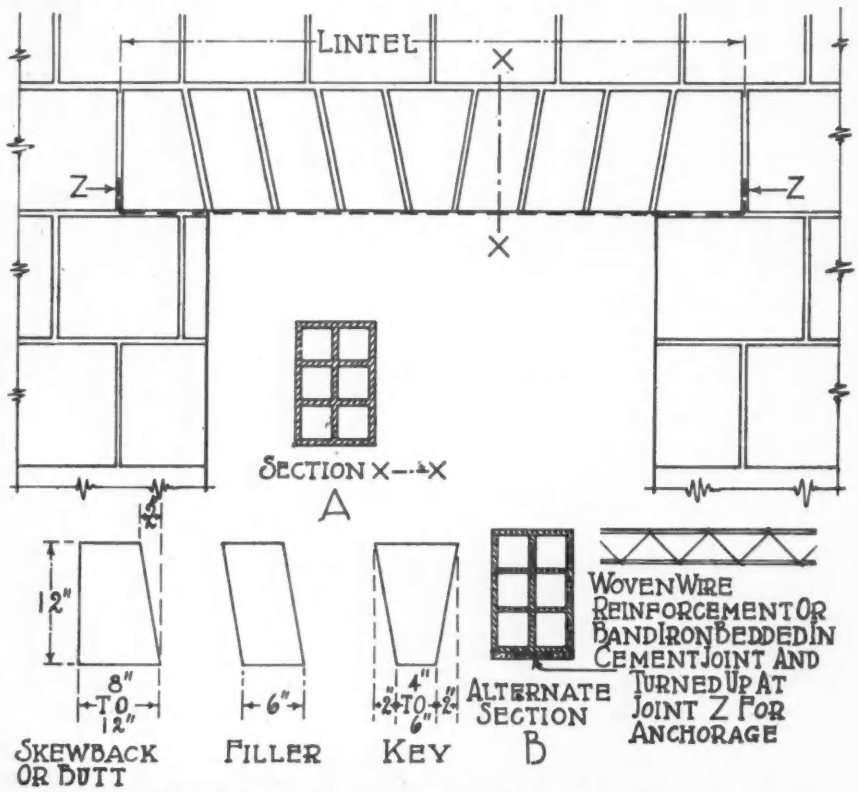
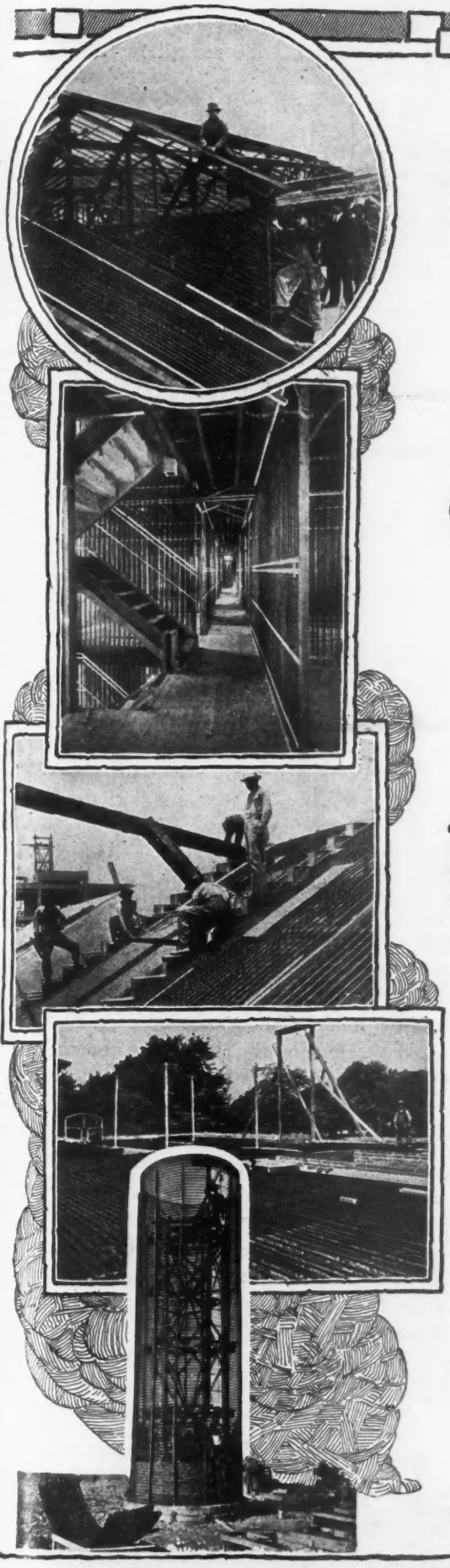


Fig. 8. Flat Arch Lintels May Be Cut for Any Thickness of 12 by 12-Inch Tile. Alternate Section "B" Shows Arch Reinforced for Use Where the Abutment Is Limited.

For Lintels Constructed at Floor Line Hangers Are Used

Where it is necessary to have the rough opening on a line with or close to the under side of joist, as is frequently required at cellar windows, where the first floor is set close to grade line, "Lane," or similar type flat bar iron joist hangers may be used to carry the ends of joist that occur over openings, as shown by Figure 7. For such construction the types of lintels shown by Figure 3-A, 3-B in the November article and Figure 5-B in this



adaptability

Self-Sentering
Adapts itself to any metal-reinforced construction need. In flat floors or on pitched roofs,—placed on edge or on end in walls and partitions,—in suspended ceilings or in any curved construction — *Self-Sentering* makes good.

economy

Self-Sentering
Ease of application, — the elimination of temporary form-work and reinforcing,—the speed of erection, all save *big* in time, labor and money. Its light weight, absolute rigidity, its perfect "keying" qualities, and the economy in plaster or cement used, spell—*less cost.*

permanence

Self-Sentering
Its fireproof character and strength under load mean permanence and durability. *Self-Sentering* presents the maximum resistance against fire, decay, weather and stress.
In short,—*Self-Sentering* is the final answer for any construction requiring metal reinforcing.

For detailed description of the manufacture and uses of GF Self-Sentering, ask for Catalog DA-440-1. A copy is waiting for your correct address.

THE GENERAL FIREPROOFING CO.
METAL LATH · CONCRETE REINFORCEMENT
WATERPROOFINGS AND TECHNICAL PAINTS
YOUNGSTOWN, OHIO.
NEW YORK - CHICAGO - PHILADELPHIA - UTICA - BUFFALO - KANSAS-CITY - OMAHA - BOSTON - MINNEAPOLIS - SAN FRANCISCO

article, are the best. These hangers can also be used with the type lintels shown by Figure 1, November article, and Figure 5-A, this article, by cutting in the top of central cell to provide for hook end of hanger, or two separating tile half the thickness of the wall may be used in the course on which the hangers are hooked. (See Figure 7-B).

When the hangers are not used, it is necessary, the same as with brick walls, to frame the ends of joists occurring at cellar windows into a header carried by the joist each side of the window opening, or cut and frame these joists onto a wood lintel carrier built into the wall on top of cellar window frame. Neither of these schemes is as satisfactory as the hangers shown by Figure 7; they entail more work, and if the cellar windows are wide, the former will require a doubling of the joists that are used to carry the header. The other scheme of building wood lintel carriers into the wall should never be used in hollow tile buildings, as it both weakens the wall and throws the tile courses out of line, entailing cutting and fitting of the tile to level up for the courses above.

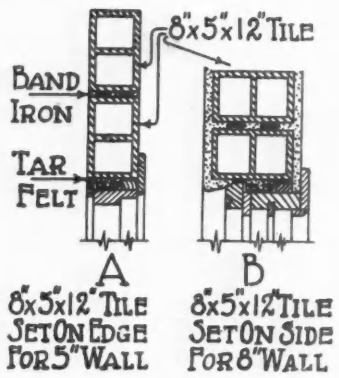


Fig. 9. Showing Method of Reinforcing Walls Over Window Openings with Band Iron, Where Regular Lintels Are Omitted.

Tile Walls Without Lintels

Hollow tile walls for garages, poultry houses; in fact, for all minor farm buildings and other simple structures in which the window openings are small and the walls frequently only 4 inches, 5 inches or 6 inches in thickness, may be built without specially reinforced lintels, if the wall proper is reinforced by band iron bedded in the joints over window openings.

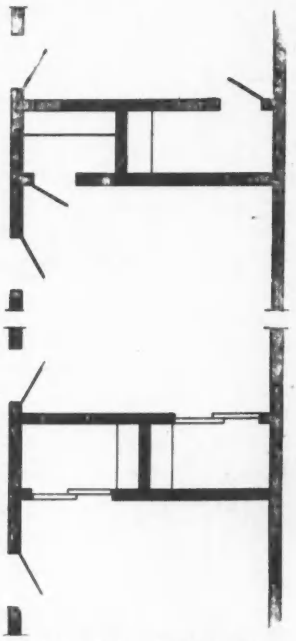
This band iron reinforcement should be placed in two joints—in the one immediately over the wood frame and in the joint above the first course of tile over frame. Band iron should be well bedded in cement mortar of joints thruout its length and extend for at least 18 inches on each side of opening. This band iron reinforcing should be from 16-gauge up to one-eighth inch in thickness and three-fourths inch to an inch in width. Several lines of heavy soft steel wire (4, 6 or 8-gauge) in each joint may be used in similar manner, or the regular woven wire brick reinforcing, shown by Figure 8-B in connection with the tile arch lintels, may be used. Figure 9 shows the use of band iron reinforcing in 5-inch walls of 8 by 5 by 12-inch tile set on edge and 8-inch walls of this same tile laid on the side.

Note the wood strips that are shown nailed onto the back of wood frames and the manner of setting; also that the strip of tar paper is placed over top of frame to prevent any warping from the cement mortar that is deposited onto same.

✣

Sliding and Folding Doors for Closets and Wardrobes

A BUILDER remarked recently that the "only place in a house that has seen no improvement in many years is the closet. They build them now just as they did years ago." When thought is given to that remark, almost every builder will agree to it.

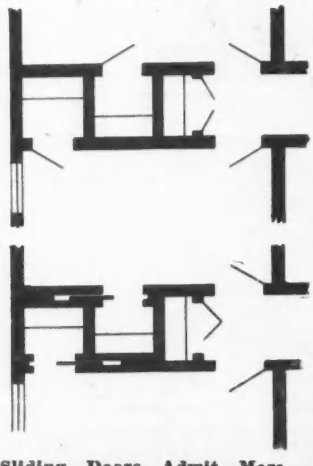


Showing How Sliding Doors Are Fitted to Closets.

There must be closet space in a house. But oftentimes the doors to the closets interfere with the light by swinging in front of a window or make the placing of the furniture inconvenient. A method of getting away from these two inconveniences is by using siding or folding doors for the closets and wardrobes.

Two suggestions for the use of sliding and folding closet doors are given in the accompanying drawings. One shows a wardrobe located at the end of a hall, with bedrooms on either side, and a closet for each room back of the wardrobe. Swinging doors on the wardrobe interfere with the doorways leading to the bedroom. One closet door swings in front of a window, shutting the light from the closet. By putting folding doors on the wardrobe and sliding doors on the closets these building defects are remedied.

The second drawing shows how doors usually are put on deep closets. By this arrangement the rear parts of the closets are not easy to get into, and little light can penetrate to them. By the placing of double sliding doors in these openings the whole of the closets is easily accessible and light can be let into all parts of them.



Sliding Doors Admit More Light to the Closets.

The modern sliding door hardware is efficient and not only permits the doors to slide easily, but holds them on the track and assures easy sailing.

GOODELL-PRATT
1500 GOOD TOOLS

The Goodell-Pratt All Steel Mitre Box

Built like a Steel Bridge

THE carpenter who is seeking a strong, accurate mitre box should study the novel features of this tool.

It is built entirely of steel and trussed like a bridge. This form of construction does away with the risk of breakage from any cause and keeps the box accurate for practically a lifetime. This model of mitre box has been sold for more than ten years, yet the demand for repairs and replacements has been almost nothing.

The saw can be locked at any desired angle. It is held up by a spring lock, which can be released by a slight downward pressure. Stops can be readily regulated to permit sawing to any fixed depth.

Nothing has been spared which would in any way make this tool a better one. It's a tool you can feel proud of.

Ask your dealer to show it to you.

GOODELL-PRATT COMPANY

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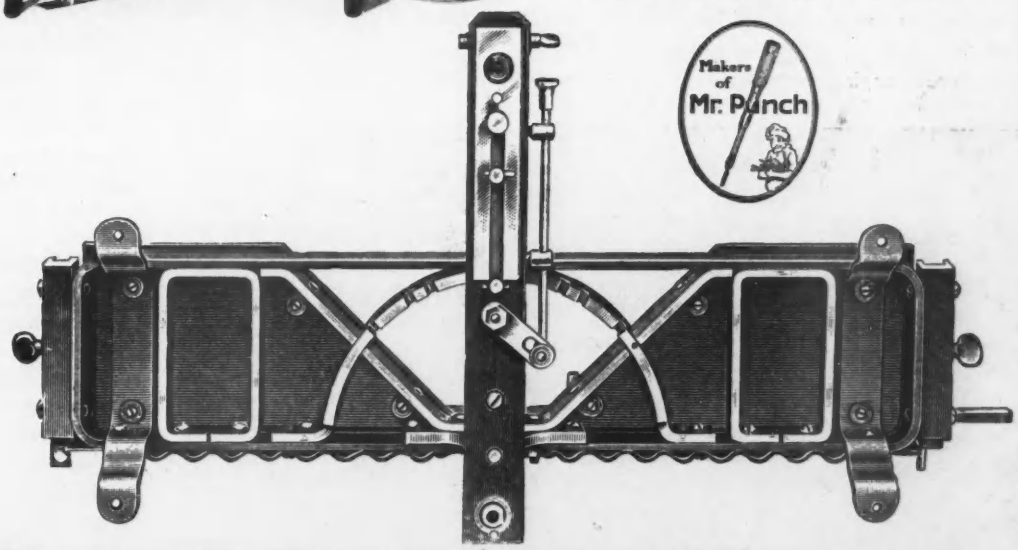
GREENFIELD, MASS., U. S. A.

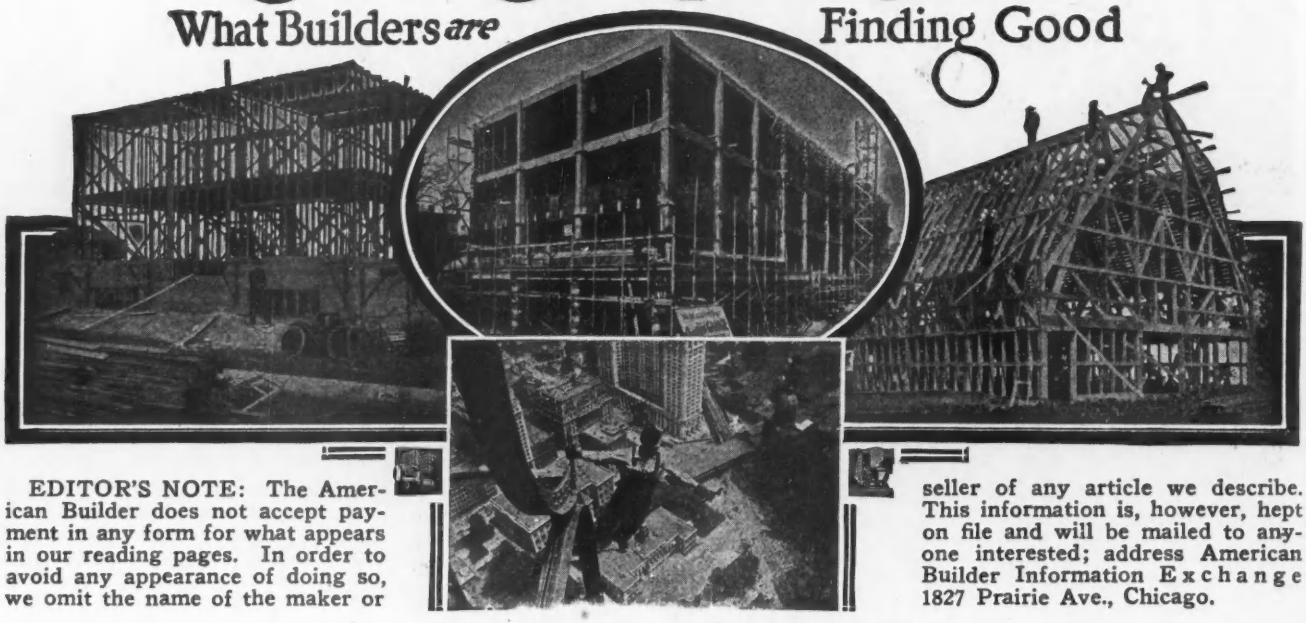
Makers of Mr. Punch



GOODELL-PRATT COMPANY *Toolsmiths* Greenfield, Mass., U.S.A.

OUT ON THE JOB

What Builders are Finding Good



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Power-Driven Belt Conveyor for Handling Materials

The use of power-driven belt conveyors on excavation jobs, and for loading and unloading building materials, such as sand and crushed stone, is comparatively new. However, contractors and material dealers who have had experience with them assert that they make a saving in labor cost of from 50 to 90 per cent.

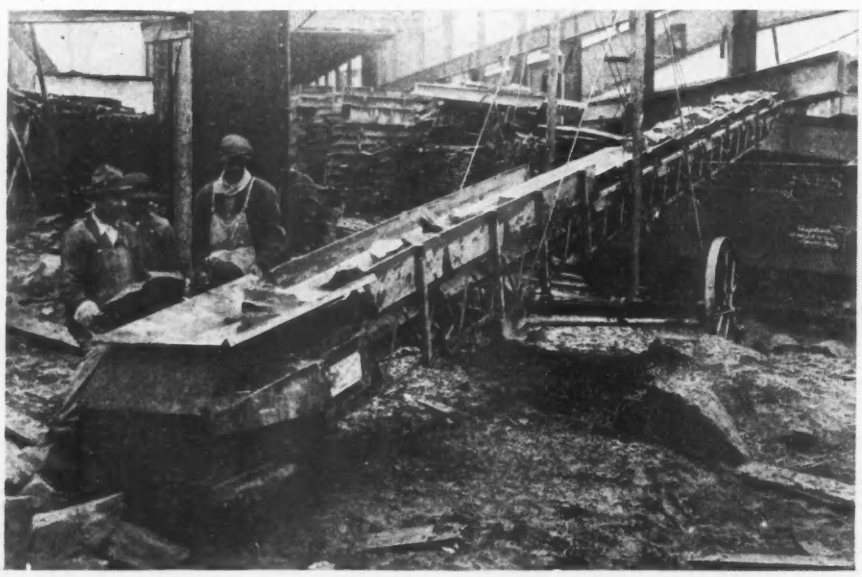
The Linehan & Molo Sand & Gravel Co., Dubuque, Iowa, claim that their conveyor recently was used to load 129 cars of gravel and sand and that the total cost was $120, less than $1 a car. This cost, it is asserted, is remarkably low.

There are many uses about building jobs and in dealers' yards for a portable power-driven belt conveyor. Being readily movable, this piece of equipment can be taken from job to job, or quickly moved from one part of the yard to another.

The accompanying illustration shows a conveyor at work in an excavation at Wheeling, W. Va. The contractor struck a ledge of rock, and the conveyor was used to transport it to railway cars. Some of the pieces weighed as much as 50 pounds. Three men and the conveyor, it is asserted, accomplished as much as 50 men ordinarily would.

The frame of the conveyor is a rigidly braced steel truss. At the hopper end is located an electric motor, varying in capacity from a 2 horse power for an 18-foot conveyor to 7½ horse power for a 60-foot conveyor. When electricity is not available, a gasoline engine is used. The conveyor belt is of specially made rubber or heavily oiled and stitched canvas.

This is a useful labor-saving piece of equipment for contractors and materials dealers.



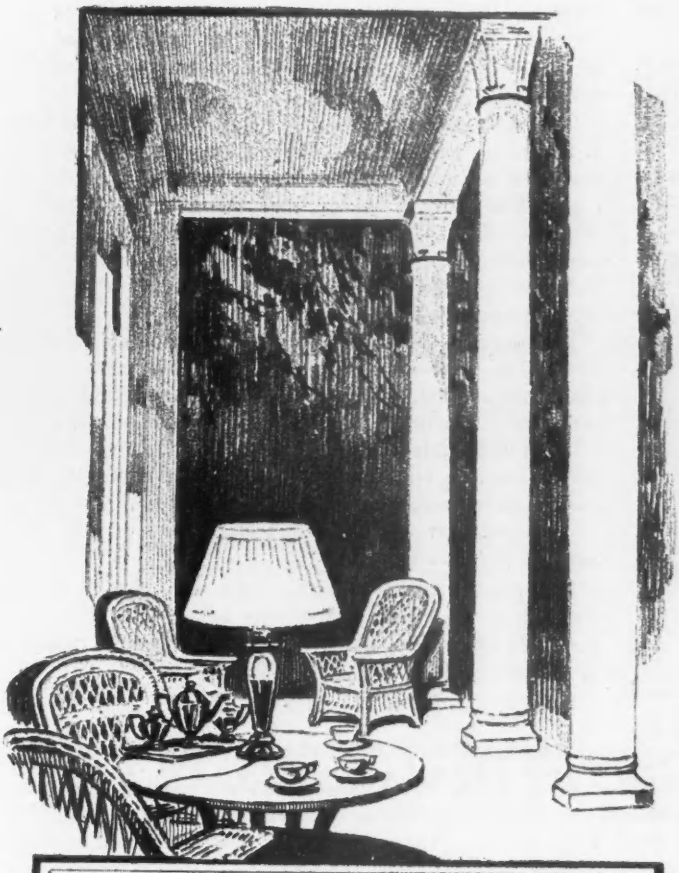
Portable Power-Driven Belt Conveyor Carries Rock Out of a Building Excavation.

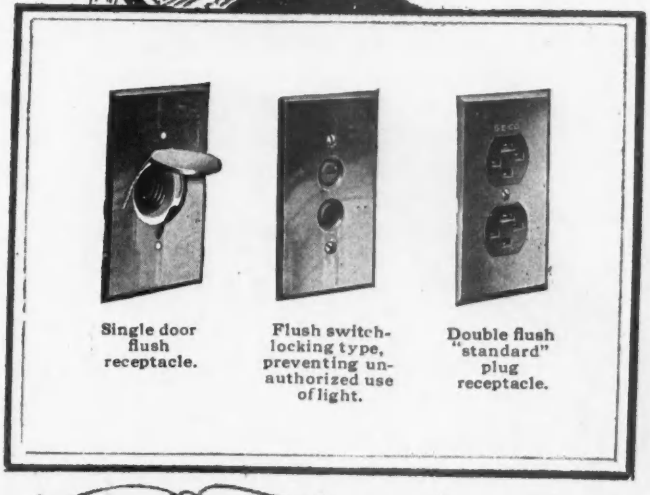
Profit in Baling Cement and Plaster Sacks

It is rapidly approaching "inventory time," when material dealers and contractors will take stock of the materials and equipment they have on hand, preparatory to beginning a new year of business. Then is the time when the empty cement and plaster sacks will be made ready for return to the manufacturers for the usual 10 cents a bag rebate.

Baling empty cement and plaster sacks by hand is an unpleasant job. Also it is a task that few can do satisfactorily. It is to supply this deficiency that a sack baler that will do the baling quickly and well has been devised.

This baler is simple in operation—a boy can do the baling efficiently. The sacks are shaken and laid across the top of the machine. A lever closes the baler fingers around the sacks and presses them into a compact bale. The fingers automatically surround the bale with wires and, while the fingers are locked securely about the bags, the wires are brought





Single door flush receptacle.

Flush switch-locking type, preventing unauthorized use of light.

Double flush "standard" plug receptacle.

The name General Electric Company on an electrical device is a guarantee of quality backed by over a quarter-century's experience in the generation, transmission, distribution and application of electricity.

Electricity on the Porch

HOME-BUILDERS frequently neglect proper provision for electrical convenience on the verandahs and sleeping porches of their dwellings and then regret it later. Porches should be adequately lighted with control switch indoors. A locking switch on the porch also is frequently desirable. Receptacles of a type protected against the weather should also be provided for table lamps, fans or portable cooking devices. This is particularly desirable in suburban homes where outdoor afternoon teas are a popular summertime diversion.

The G-E line includes wiring devices for all such uses. Your electrical contractor or consulting engineer will help you select the ones best suited to the installation.

C-E RELIABLE WIRING DEVICES

can be furnished by any reputable electrical contractor

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities.

41-51

Putting the Empty Sacks Into the Baler.

together and twisted with a pair of pliers. The handle then is tripped and the bale released.

Every dealer in materials and every contractor who uses cement and plaster knows that the empty sacks have a cash value. To turn them into cash it only is necessary to pack them up securely and return them to the manufacturer. The baling machine not only saves time and labor, but bales the sacks so that there will be no argument about the number returned when they reach the manufacturer. They are held together tightly and make a compact, neat bale. The baler is inexpensive, costing little more than the rebate on two bales of sacks.

The Empty Sacks Baled, Ready for Shipment.

✣

A Self-Feeding Wagon Loader

Dealers in building materials rapidly are discarding the costly and slow method of handling crushed stone, sand and gravel by hand, and are substituting the fast, economical equipment that is available. Power loaders and unloaders and conveyors are used, for the simple reason that they cut the cost of doing business.

An unusually efficient piece of equipment for material dealers and contractors is a self-feeding wagon loader. This machine in operation, loading a dump-body motor truck, is shown in the accompanying illustration. The loader is self-propelled, easily operated and besides has a unique feature in that the materials are fed to the buckets attached to the endless belt.

Material dealers say that this loader is a distinct advance in the multiple bucket type of machine. Its great economy in operation is due to the self-feeding device, which does away with the necessity of feeding the buckets by man power. This device consists of two shovel-shaped feeders, which sweep continuously thru the pile to be removed, carrying the materials into the path of the buckets and automatically withdrawing in preparation for the next cut.

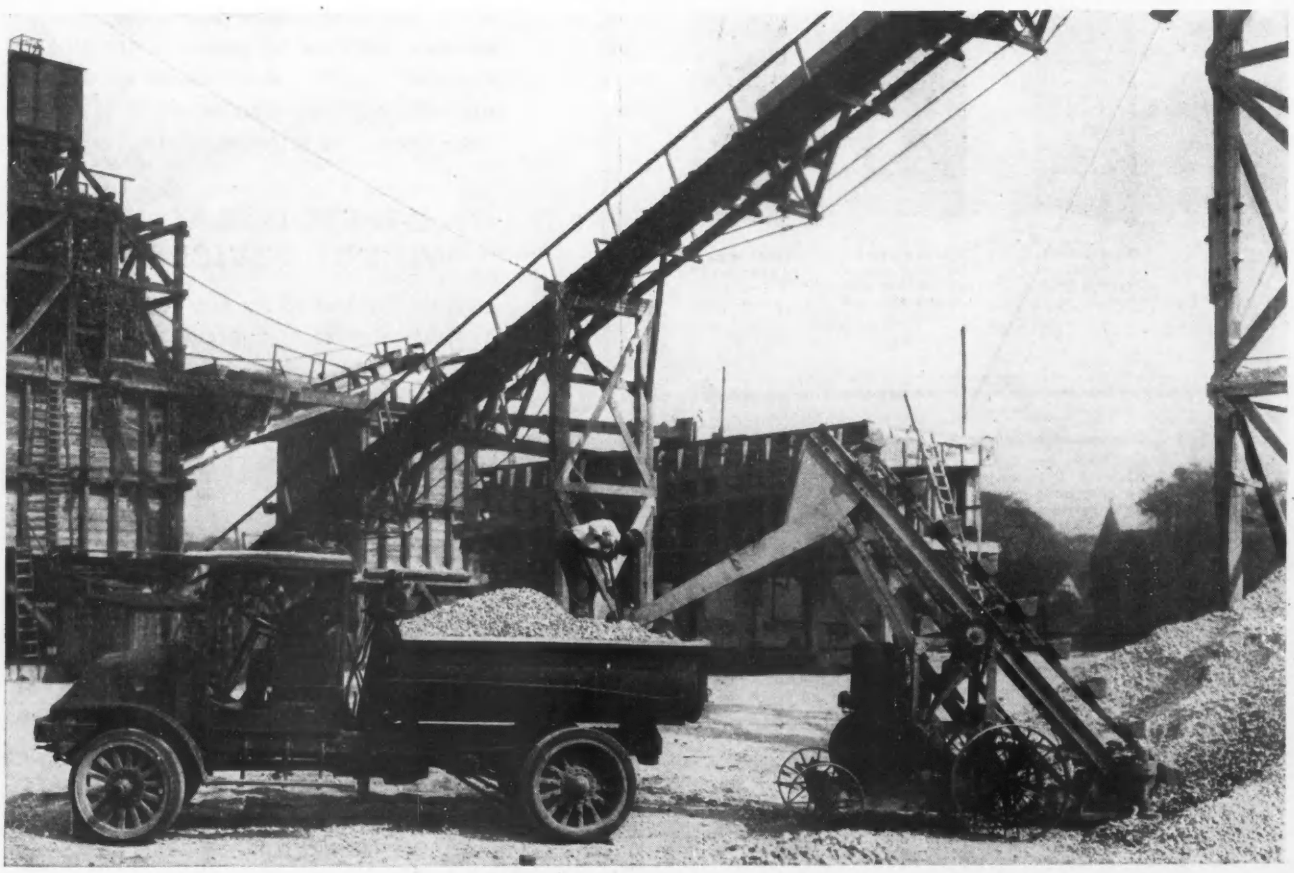
The loader is operated by a 22 h. p. engine of the marine type. The machinery consists of a direct drive chain and gear transmission, giving elevator operation and two-speed and reverse traction. Its speed on the road, traveling under its own power, is seven-eighths of a mile per hour. The operator stands on a platform at the side of the loader and has all levers within easy reach, even the one that steers the front wheels. It will work 70 feet forward and 28 feet into the pile per minute.

The photograph from which the illustration was made was taken while the loader was at work in the material yard. It loaded the truck with four yards of crushed rock in six minutes.

✣

Safe Bracket for All Roofing Jobs

Roofers who work on pitched roofs many times have a considerable problem in constructing safe footholds for use while they are laying the roofs. Different roofing materials require different kinds of footholds. There is, however, a patented bracket for this purpose that is safe and reliable and



Wagon Loader Loading Four Yards of Crushed Rock in an Automobile Truck in Six Minutes. This Machine Is Fitted with One-Cylinder Gasoline Engine, But These Wagon Loaders Are Now Equipped with a Four-Cylinder Heavy Duty Gasoline Engine.

Modernizing The Closets Of American Homes

The closet is the *one* room in most American homes which is *not* modern. It is wastful in space and inefficient for the proper care of the family wardrobe.

The kitchen, the bath room, the living room—all the rooms in the house, from cellar to garret—have answered the call of Twentieth Century progress.

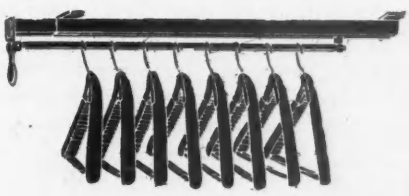
At last a practical equipment has been brought out which makes it possible to build closets which are adapted to the needs of *today*. This equipment is the

KNAPE & VOGT

Garment Care System

"The Knape & Vogt Garment Care System" is the new trade name for the well known and universally popular equipment known as the NUWAY.

The Knape & Vogt Garment Care System makes it possible to build smaller closets. It will save at least $500 in the cost of building a modern ten thousand dollar house; yet these smaller closets will have twice the capacity of the old style closets which they supplant.



The people of America are going to be made acquainted with the advantages of the Knape & Vogt Garment Care System, its saving and its convenience, through a series of attractive advertisements running through the year 1920 in GOOD HOUSEKEEPING MAGAZINE. No woman will feel, in the future, that her home is modern without Knape & Vogt Garment Care System closets.

Architects and builders of the country will be familiarized with the Knape & Vogt Garment Care System through full page advertisements each month in the AMERICAN BUILDER.

With the Knape & Vogt Garment Care System available, there is no longer any justification for the existence in the houses of the future, or in hotels, apartments, clubs, lodges, etc., of the oldtime, dark, disorderly, time-and-space-wasting closets.

We will be glad to cooperate with builders and architects in perfecting building plans to include the Knape & Vogt Garment Care System. Each of our offices is prepared to give the fullest measure of service. Call, phone or write.

Knape & Vogt Manufacturing Co.

Grand Rapids, Michigan

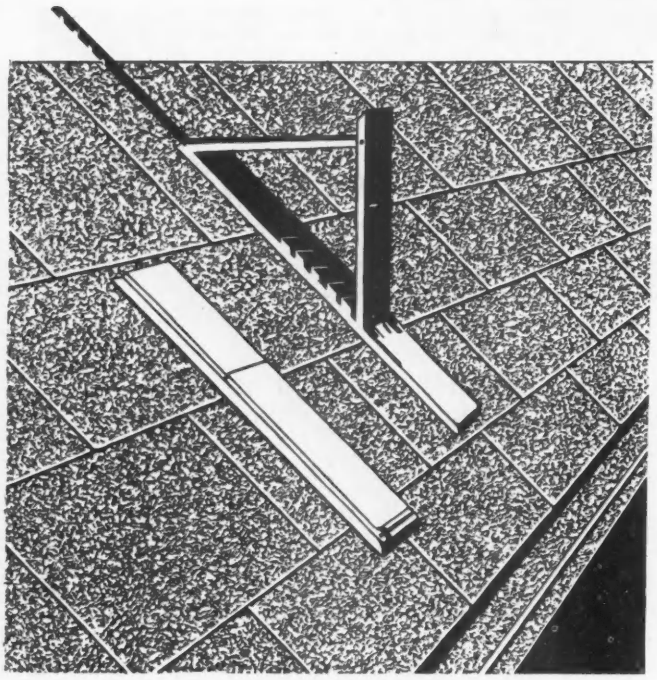
NEW YORK
168 Church St.

CHICAGO
546 Washington St.

ST. LOUIS
Title Guarantee Bldg.

BOSTON
86 High Street

SAN FRANCISCO
Rialto Bldg.



Bracket for Roofers Attached to Roof on Which Asphalt Shingles Are Being Applied.

can be used in constructing any sort of roof—slate, tile, asbestos, asphalt, or any of the various types of roofs.

A bracket that slides on a notched piece of iron supports the board or platform that generally is used. How it is applied to an asphalt roof is shown in the accompanying illustration. The bracket is light, compact and easily carried; it is strong, durable and simple in construction; it is adjustable to any pitch of roof; it is easily attached to and detached from the roof, and it is absolutely safe. This bracke: has been in use among roofers for ten years and is claimed to be one of the most efficient methods a roofer can employ.

✣

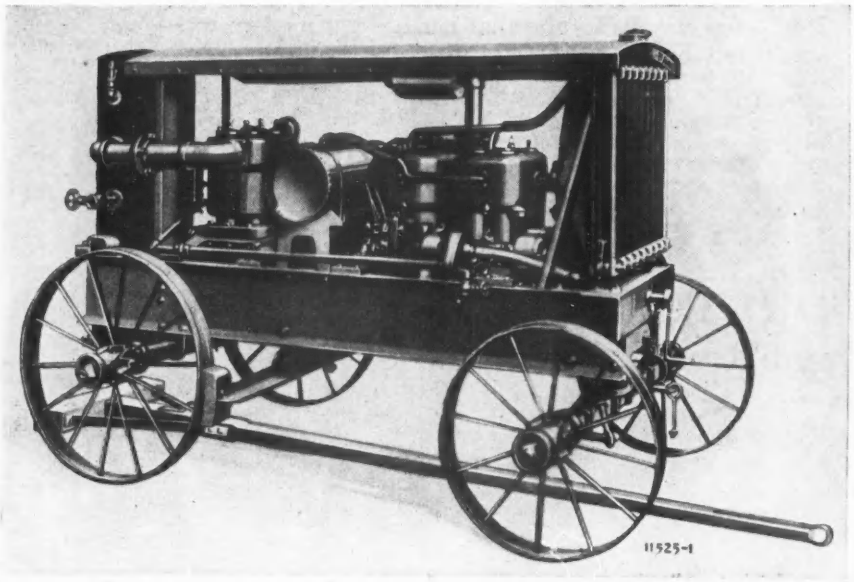
A New Portable Air Compressor

The only thing that, for years, kept the contractor from equipping his men with all sorts of pneumatic labor saving devices, was the trouble and expense of installing an air power plant on his short-time job. Despite the advantages incident upon the use of air operated tools, he found it difficult to justify the costly transport of a cumbersome stationary machine and the building of a shelter, the setting up of a steam boiler, perhaps, and the laying of a pipe line for only temporary use. Then, too, he had to count on tearing down the plant when the job was complete.

The coming of the portable type of air compressor was a great boon, tho quite often, "portable" was somewhat of a misnomer, and meant merely "mounted on wheels." Portable air power equipment, however, did away with the expensiveness of compressed air on temporary jobs and soon became an indispensable part of the contractor's equipment. Portable outfits of many varieties have been developed in the few years just past, each successive design bettering the one which preceded it; and now there appears a new type.

There has recently been introduced a light-weight gasoline engine driven unit, built in two sizes.

These are all-steel outfits, from their sheet steel canopy to the broad tired steel wheels. The power plant of each consists of a duplex, vertical compressor driven, at high speed, by a four cylinder, four cycle, tractor type gasoline motor. It is pointed out that the outfit, being designed especially for portable use, has had unnecessary weight eliminated, and affords maximum air power output per unit weight. The larger machines, of 210 cubic feet capacity weighs only 6,000 lbs., and the 118 cubic feet unit 4,000 lbs. The latter is shown in the accompanying illustration. A point is also made of the fact that gasoline motor drive provides power in economical form and in a mechanism that can be confidently entrusted to the average operator, for men familiar with gasoline engines are everywhere available and make thoroly competent engineers.



Portable Air Compressor with a Capacity of 118 Cubic Feet. This Outfit Makes Possible the Use of Compressed Air Tools on the Job.

✣

POROUS and semi-porous terra-cotta is made by mixing sawdust with the clay, the sawdust being destroyed by the action of the heat, leaving the material light and porous.

✣

THE thickness of the foundation wall is usually governed by that of the walls above, and also by the depth of the wall.

Nearly all building regulations require that the thickness of the foundation wall, to the depth of 12 feet below the grade line, shall be 4 inches greater than the wall above for brick and 8 inches for stone, and for every additional 10 feet or part thereof deeper, the thickness shall be increased 4 inches. In all large cities the thickness of the walls is controlled by law.

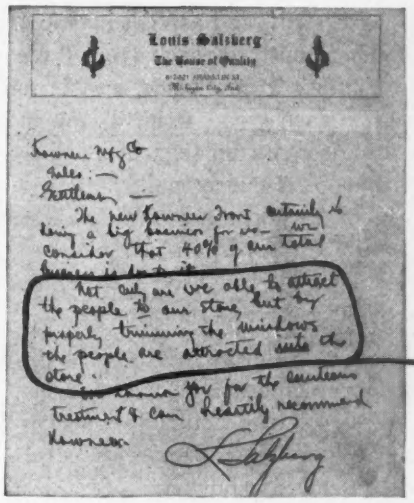
✣

FLITCH plate girders are beams composed of two wooden beams of the same breadth and depth with a wrought-iron or steel plate of the same length and depth as the wooden beams bolted between them. Such beams are much stronger and stiffer than a wooden beam of the same depth, and may often be used in the place of steel beams, where the latter are difficult to obtain.

✣

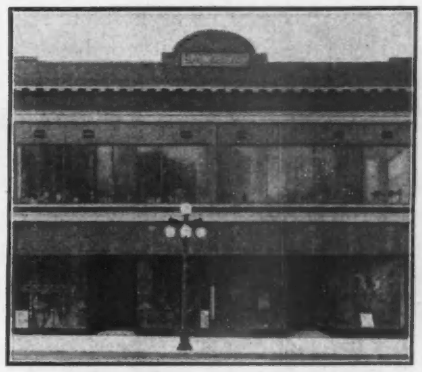
TERRA-COTTA is made from clay by mixing with water into a plastic mass, shaping the same into the form and shape desired and baking at high temperature in kilns. For the usual structural form the shaping is generally done by forcing the plastic mass thru a special die by means of machinery. Ornamental terra-cotta must generally be shaped by hand.

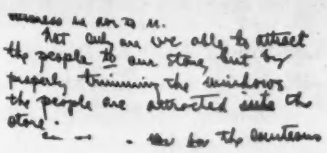
Kawneer
STORE FRONTS


Louis Salsberg
The House of Quality

Kawneer Mfg Co
Niles: —
Gentlemen: —
The new Kawneer front certainly is doing a big business for us — we consider that 40% of our total business is due to it.
But only are we able to attract the people to our store, but by properly trimming the windows the people are attracted into the store.
Thanking you for the courteous treatment & Can heartily recommend Kawneer
L. Salsberg

Investigate This Profitable Work for 1920





Let Satisfied Kawneer Customers Build Prestige For You!

CONTRACTORS and Builders everywhere are making good profits installing Kawneer All Metal Store Fronts. They are not only making money, but are building valuable prestige in their locality. Every Kawneer Store Front Job they install is a reputation-building advertisement for them.

Good Profits in Kawneer Work

There is a lot of store remodeling work in your locality. Seven out of ten stores in your town are prospects.

Any contractor who can build a house or store building can install a Kawneer System All Metal Store Front.

Cash in on This Work in 1920

We are prepared to show you how a connection with the pioneer and recognized leader of store front manufacturers will be profitable to you in 1920.

Fill out the coupon and mail it to us today.

Send This Coupon Today!

KAWNEER MFG. CO.
2426 Front Street, NILES, MICH.

KAWNEER MFG. CO.
2426 Front Street, NILES, MICH.

Please send me Full Information about Kawneer Store Fronts.

Name.....

Address.....

How to Save 25 Per Cent on Sheathing

PATENTED COMBINATION OF BOARDS AND INSULATING MATERIALS ENABLE BUILDERS TO SUBSTANTIALLY REDUCE BUILDING COSTS

A METHOD of sheathing buildings by which 25 per cent or more of the cost of materials and labor may be saved has been successfully tried out during the last few years. That per cent makes a substantial saving on a building. And having been thoroly tested and found to be as good if not better than the ordinary method, it is well worth study and consideration by every contractor and builder.

The saving is accomplished by using a patented sheathing board of ingenious construction. This board is a combination of wood fibre board and asphalt mastic, reinforced by heavy wood strips. The wood fibre board first is waterproofed; then it is coated with asphalt mastic; one-half-inch wood strips, spaced one-half or one-fourth inch, are placed in the asphalt and put in a hydraulic press. The wood is pressed into the mastic, which hardens and holds the strips securely.

Sheathing is Applied Directly to the Studs

This sheathing board is made in sheets 48 inches wide, 25 feet long, containing 100 square feet. It is applied directly to the studs, with the wooden strips out. The fibre board and asphalt surfaces make an extremely efficient insulation, while the wood strips act as furring, providing a dead air space between the siding and the insulating material. The siding is nailed directly to the sheathing, as in ordinary construction.

The saving by the use of this sheathing is secured in two ways. The cost of the patented sheathing is less than that of sheathing boards; the time required to put it on is considerably less. These combined, many contractors have found, reduce the cost of sheathing from 25 to 37 per cent, those being minimum and maximum figures given by different builders.

The sheathing is applied to the weather side of the studs, with the wood strips and asphalt mastic exposed. A piece of sufficient length to reach from the eaves to the foundation is hoisted into place, and is nailed at the top, one nail to each wood strip, driven into each stud. The sheathing is put on regardless of openings. After the sheathing is securely nailed, then it is cut out the full size of the opening, cutting close to the opening sides of the studs. The piece cut out is saved for use in the gables and elsewhere. This method has been found best and most economical.

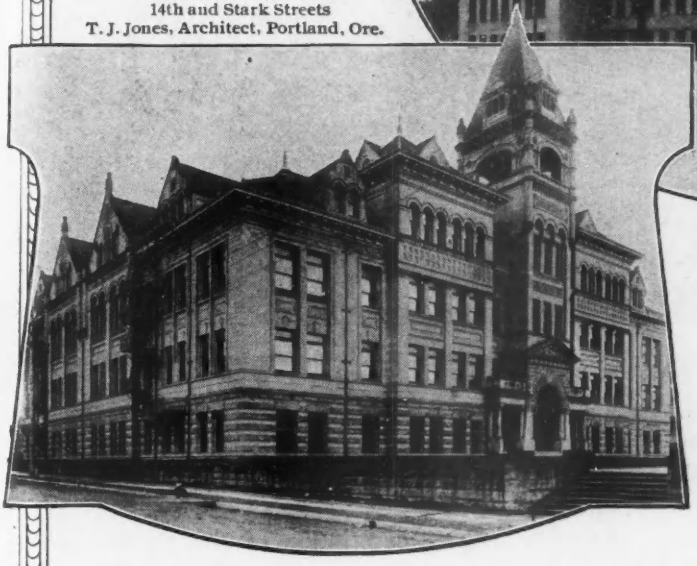
Government Used Material in Housing Projects

Contractors who erected hundreds of houses for the government and large manufacturing concerns during the war, used this sheathing board extensively. The accompanying illustrations show two of these housing projects. The photographs were taken in both instances after the sheathing had been applied, the openings cut out, and the work of putting on the weather boards begun.

There are other uses to which this sheathing has been put most successfully. One is as a substitute for roofing boards, while another is for sub-flooring. In both instances the board is applied in the same manner as when it is used for sheathing.

Three Houses Sheathed Ready for the Siding. This Picture Shows How the Sheathing Board Is Applied in Strips, Which Cuts the Labor Cost from 25 to 35 Per Cent

South Park High School
Green & Wicks, Architects
Buffalo, N. Y.



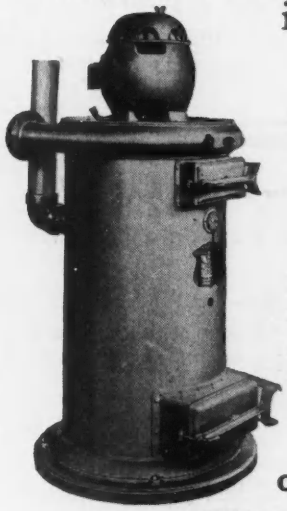
Washington High School
14th and Stark Streets
T. J. Jones, Architect, Portland, Ore.

Schoolroom Air Must Be *Clean* Air

IT is no longer necessary to preach the vital importance of fresh air for schoolrooms. But fresh air, to be pure, must be *clean* air free from dust.

Dr. J. Gordon Ogden, an eminent professor of physics and chemistry, says: *"More than half of all the deaths in the world are due to the distribution and breathing of dust."*

Air that is already laden with dust may be admitted through open windows or ventilators. Or, it may pick up the chalk dust from blackboard mouldings and the germ infested floor dust tracked in by many feet and whirl it into the throats and lungs of pupils and teachers. The answer to the problem "How to keep fresh air *clean*" is furnished by



TUEC Stationary Cleaners

In schools and college buildings everywhere, as in hospitals, public buildings, theatres, churches, office buildings and industrial plants, apartment houses, residences and other buildings of every kind, TUEC Vacuum Cleaning Plants outnumber all others. Write for catalog.

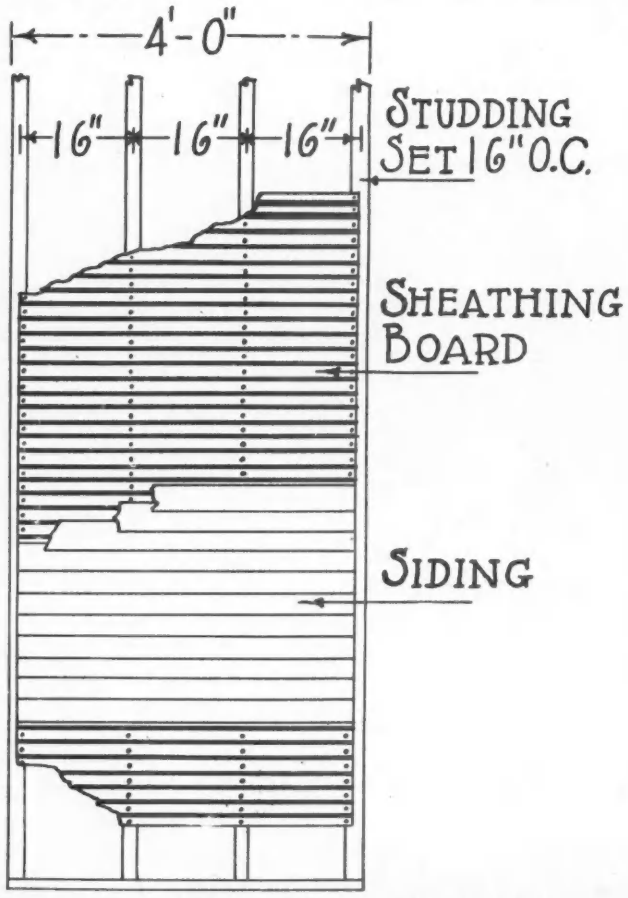
THE UNITED ELECTRIC COMPANY

Canadian Plant—Toronto, Ont. CANTON, OHIO

Industrial Housing Project Where Patented Fibre Board, Asphalt and Wood Strip Sheathing Was Used. The House in the Foreground Has Been Sheathed, Shingle Siding Is on Under the Eaves and Board Siding Is in Place Above the Sill Course.

In using this sheathing under brick veneer, no wall ties are needed. The spaces between the wood strips provide a mortar lock that holds the veneer wall firmly.

A stucco board manufactured in exactly the same manner as the sheathing board provides the same material for sheathing a stucco house. The stucco board has wood strips that are wider at the outside surface, sloping to the asphalt and fibre board backing. This forms an open, triangular space, which locks the stucco securely.



Showing How the Patent Sheathing Board Is Nailed to the Studs and Covered with Siding.

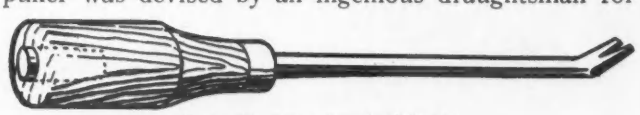
From this brief description of the sheathing and stucco boards the advantages of both can be readily understood. They have advantages that recommend them to every builder—saving in cost of materials and labor, and efficiency and durability. They have been tested thoroly and have been proven successful. Contractors and builders who are on the lookout for methods of saving $$ in the cost of construction without sacrificing quality of their work will find it to their advantage to investigate these materials.

✣

Architect's Tack Hammer and Puller

By F. H. SWEET

IN architectural offices any appliance to minimize labor is welcomed. A thumb-tack hammer and puller was devised by an ingenious draughtsman for just such a purpose and has won a permanent place in his office.



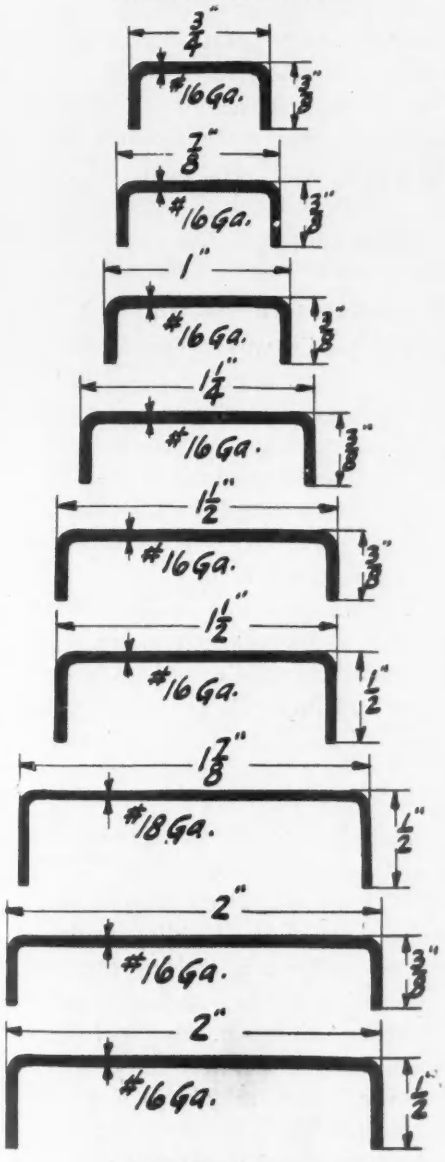
Tack Hammer for Architects.

An old screw driver was bent as shown and the blade slotted, the better to pry stubborn tacks. The handle was bored out and a hardened steel core driven in so about ⅛ inch projected beyond the end of the handle. The steel was previously magnetized at a nearby electrical shop.

Thus a tack can be picked up by means of the magnet; driven in the required position upon the drawing board and later removed; all by means of the same tool.

Sharon Cold Formed Channels Stonger--Lighter--More Rigid

Stock Sizes End View



Specifications:

"Above are illustrations showing stock sizes (end view) of the Sharon Cold Formed Channel. This channel may be had in stock lengths of 12, 14, 16, 18 and 20 feet in ⅜" or ½" legs, as indicated on the above cut. Standard 16 guage will be furnished except in case of 1⅞" ½" size unless otherwise specified. This channel can be furnished in 14 or 18 gauge on special order.

"Perforated Channels of various widths can be secured in 18 gauge when desired and full information regarding width of web and height of legs will be furnished on application."

The cold formed channel lessens fire risks when used in place of wood studs. These channels provide the best possible method for the speedy erection of metal lath and are being specified in plans of the leading architects and contractors.

Our Cold Formed process forms the corners perpendicular to the back and the corners are exceptionally strong. Weight for weight, the tensile strength of Youngstown Pressed Steel Company's Cold Formed Channels, is greater than the tensile strength of hot rolled channels. Uniform thickness throughout also helps to make it more rigid than a hot rolled channel. In most sizes the Sharon Cold Formed Channels have less than half the weight per thousand lineal feet of the same size of hot rolled channels.

Plain Channel Stock Lengths 12 to 20 ft.

Ask your dealer for Sharon Cold Formed Channels

The Youngstown Pressed Steel Co.

Youngstown, Ohio

Makers of

Ideal Metal Lath
Mahoning Metal Lath
Youngstown Metal Lath
Youngstown Prong Lock Studding
Crimped Metal Furring
American Corner Bead
Youngstown Expanded Metal
Parker Corner Bead
Sharon Cold Formed Channels
Sharon Perforated Cold Formed Channels

Advertising the Wedge That Starts Building

HOW THE BUILDING INDUSTRY IN A NEW JERSEY CITY USED THIS MODERN FORCE TO START THE CONSTRUCTION OF HOMES

By George Wilfred Wright

WHEN the Government, last year, requested the holding up of all building contracts, not directly concerned with the war, few predicted we would face such a crisis, as that which threatened the country ten months ago. It was essential that the energies which were directed to private enterprise in the building line be turned toward the aims and objects of this nation which was deeply engaged in the international struggle; and because of the whole-hearted support of the building and construction industry, together with the willingness of everyone affected by the building trades, it has proven to be no small factor in the quick conclusion of the war.

Nearly everyone was so glad when peace came, that the general idea of a rapid return to normal conditions was prevalent. The contractors and builders expected building to start at once. Plans which had been delayed for many months were again brought forth and new estimates submitted. "By the first of January or February," they said, here in Northern New Jersey, "You'll see things begin to hum in the building line." But January passed, February passed, and March came and passed, and the "hum" seemed as far off as at any time previous.

In Elizabeth, New Jersey, a city of nearly 100,000 people, every kind of building work reached a flat stand-still. Not because there was no work to do, for it was estimated that 2,000 houses were sorely needed to house the people, but the cost of materials was so far above the prices which the prospective builder expected to pay that he sat tight on his bank account and calmly told the builder and the architect he would "wait a while."

We all knew that the building of homes, stores or any other kind of structures was an indication of community progress; but no one believed it had such a far-reaching effect as that which developed last spring. The retail stores began to feel the effects, and the largest and strongest business establishments were anxious over the bad prospects. The board of trade was doing what it could to stir things up, and every business man was either urging some one to start something, or asking when it was to be started.

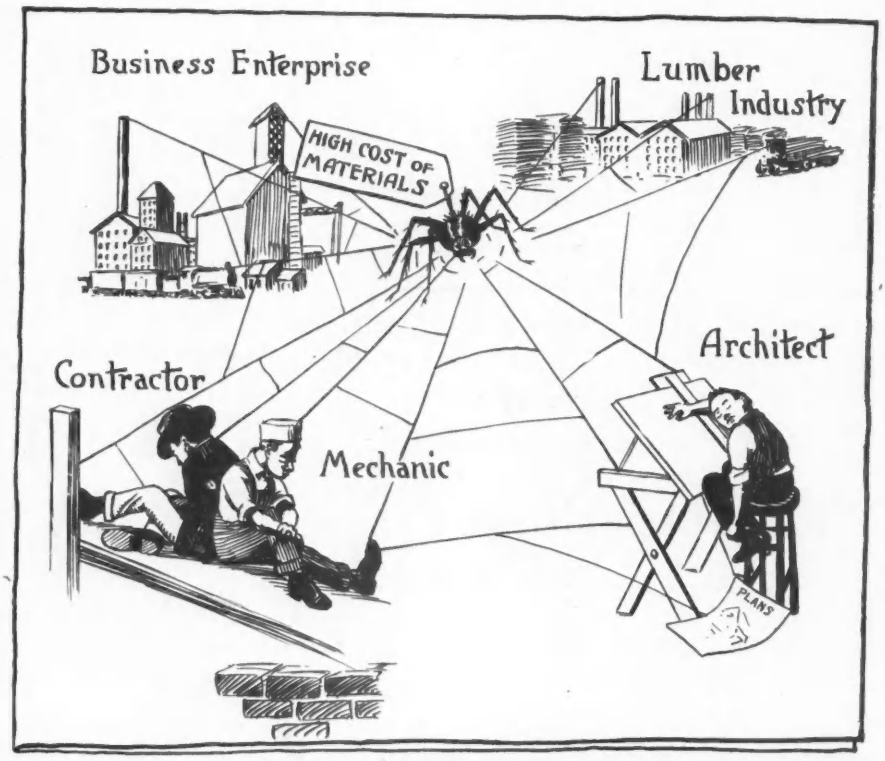
The Public Had Decided "to Wait"

In the meantime the public was becoming settled in the opinion that to start any building, no matter of what class, was positively foolish. "Prices for material will surely drop, and then we will be willing to go ahead," was the ultimatum; and all the personal argument and appeal that any single individual could utter to a prospective builder was always met with that reply and it was considered final.

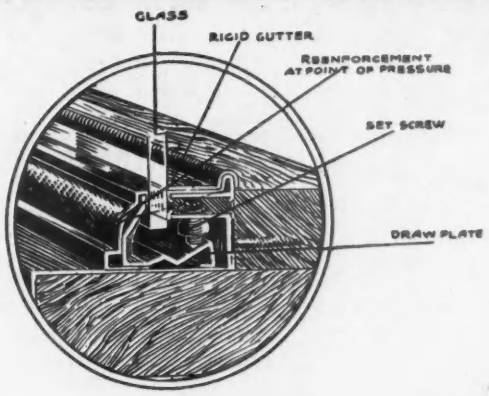
At this stage of the situation, the lumber dealers, the architects and builders, the contractors, and a few merchants who were unwilling to allow things to stand this way, met together and formed a committee which were to discuss ways and means to divert public opinion from the erroneous idea, to a knowledge of the true state of affairs as they actually existed in the building material and labor market.

"If we could tell all the people the facts of the building trades as they really are, and as they will continue to be, the prospective builder will soon see the folly of waiting until later to erect his house," they said. So from this thought the advertising campaign was born and nurtured until completed and carried out.

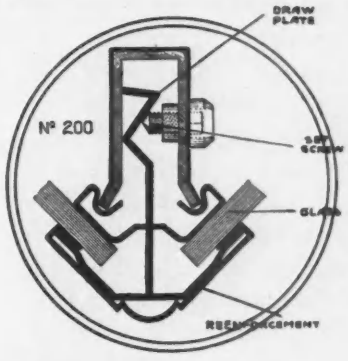
The newspaper men suggested great page advertisements with costly illustration and copy prepared by a New York specialist. When this expert presented his figures for the campaign, they exceeded those decided upon by the publicity committee by about forty per cent. He was summarily dismissed; and the publicity committee, inexperienced as they were with aggressive advertising, decided to go it alone rather



When Conditions Seemed to be Against the Members of the Building Industry, Advertising Was Called Into Use and Building Awoke with a Start.



Full Size Socket Key for Setting Zouri Safety Bar



Specify ZOURI

Safety Store Front Construction

The Only Absolutely Safe Store Front Construction

ZOURI Safety Store Front Construction has proved beyond question its superiority over all others. It is today acknowledged by the highest authorities to be the only real safety construction.

Records show that 70 per cent of all store window breakages are from unknown causes. In the hundreds of ZOURI installations in Chicago alone, many of them in the most unprotected locations, ***there has not been one single instance of mysterious breakage.***

A Few Vital ZOURI Safety Features

Note these ZOURI Safety patented superiorities. Each one is patented. They can be secured in absolutely no other type of construction. They are an absolute protection against breakage.

In ZOURI Safety Construction, contact is attained between metal and glass by reason of the patented ZOURI Safety key-set feature. With this key-set feature the sense of touch enables one to know the moment the point of contact has been reached. It is, therefore, absolutely impossible to get a glass distorting pressure, which is one of the primary causes of breakage.

ZOURI SAFETY STORE FRONT CONSTRUCTION

Of equal importance is ZOURI Safety Indirect Screw Pressure. With this Indirect Screw Pressure the glass is not distorted at any screw point of contact.

Another improvement is the ZOURI Safety Self-Adjusting Setting Block. The cushion of this setting block moves as the pressure is exerted in getting contact. This insures perfect contact with the back rabbet, or gutter. Thus it eliminates any possible distortion of the glass.

These are but a few of the many ZOURI Safety improvements that should make you recommend ZOURI Safety Key-Set construction. To list them all here is impossible. Our illustrated catalog explains to you in details how ZOURI is the only construction that offers you a rigid back gutter. How ZOURI Safety scientific reinforcement distributes the pressure equally on a rigid rabbet. You should know all these facts.

Free Catalog and Portfolio

Write today for our free catalog. Every builder should have this remarkable book. It is the most complete book of its kind ever published.

We have also prepared for builders a special portfolio of ZOURI Safety details and construction. You will find these invaluable in making your plans.

All this will be sent you ***absolutely free*** upon request. Simply fill in the coupon on the bottom of this page, and send it to us NOW.

SEND FOR FREE BOOK TO-DAY

Gentlemen:
Please send me without any obligation a copy of your free catalog. Also your special architect's portfolio.

Name_____

Address_____

City_____ State_____

A-B

ZOURI DRAWN METALS COMPANY

Factory and General Offices: Chicago Heights, Ill.

Makers Also of the Famous International Store Front Construction

(5)

than let their cherished plan fall thru.

Architect Headed the Committee of Builders

They called another meeting. A New York architect, who resided in Elizabeth, a very able executive, was chosen permanent chairman. It was decided at this meeting that in a few days they all meet again and each bring some advertising material and formulate a definite plan. In the meanwhile, the assistant to the chairman contracted for 1,500 inches of space to be used in each of the local daily papers. The committee met as agreed. It consisted of three architects, three building contractors, a representative of the biggest lumber concern, several merchants, of which the two most active were a hardware man, and a shoe dealer. At this particular meeting I refer to, everything proceeded nicely until the actual work of writing the advertising in such a manner that would suit the different ones present. The newspaper men were not on hand. No one present had ever been engaged in work of this kind, and the matter was difficult to get around or overcome.

Suddenly it dawned on the hardware man that they were trying to do work that was entirely out of their province, and he very emphatically declared the fact. "Well, what are you going to do about it?" was the query. "Get an advertising man," was his reply. "Where?" they asked. "Get me a car and I will get one." No more urging was needed. It was late, everyone was getting tired and almost discouraged. The hardware man went directly to the home of his advertising agent, a man of several years' experience, who knew the city perfectly, and was thoroly acquainted with local conditions. After some persuasion he got him to come to the meeting, altho late at night, and hear the story and run this campaign for them.

Prospective Builders Were Shown That There Was No Profit in Hoarding Their Money, Waiting for Conditions to Change.

When the plan was laid before the advertising man, he did some hard thinking. It was a case of turning public opinion from a channel to one diametrically opposite, and to write a series of advertisements which would do this work in three weeks time was a job of no small proportions. A more eager lot of men never met to discuss advertising than this committee; they fairly urged and pleaded with the agent in whom they felt confidence to go ahead. He agreed; and asked for three days to study the problem and prepare three advertisements for their approval.

It should be mentioned that one of the Governmental departments at Washington had published a considerable amount of literature on the resumption of building and construction, and a good sized lot was handed to the advertising man, together with some lumber association circulars, ideas written out on paper of various members of the committee, various suggestions, and thoughts of all shades and types. On returning home that night he had an armful of the most diversified material imaginable from which to build a series of advertisements.

Newspaper Advertising Did the Business

The committee was on hand the third day, as agreed; they were shown a full four-column newspaper advertisement with a strong bold headline and center display line. The text matter referred to the plain facts of the conditions the city was in, due to the lack of houses and why it was unwise to wait longer. The chairman wanted this advertisement to be "Bulletin No. 1" and each successive one to be numbered up to 18. They liked the style and the way the facts were presented. The advertising man was told to go ahead and work out his own ideas. The first bulletin appeared Friday night when the paper was read very thoroly. Each day for the next three weeks a new advertisement appeared. The first week's series treated on the civic interest which the prospective builders should take in their city; comparisons were adroitly drawn from the progressiveness of other cities. In every copy the facts were hammered home on why it cost more to build now than a few years ago and why the cost would not decrease in the next few years. The folly of waiting until later to build was sharply pointed out and abundant proof was given in each bulletin of the cause of the labor shortage, and the ascending scale of prices.

The second week the advertisements were directed to the rent payer. The first one was headed, "Mr. Rent Payer, Why Don't You Build Now?" In another, a practical example was worked out on a fifteen year basis, showing just what could be saved by owning a home. "Terrors of the Rent Payer" was a heading on one that stirred up much comment. It was based on the actual investigation of housing conditions in New York, made by representatives of the *New York Tribune* and published in that paper. The fact was cleverly pointed out that New York people would decide to move to Jersey where rents were more reasonable; and what would happen to rents in Elizabeth could be clearly guessed.

Building More Than Doubles in a Month

Things began to happen at the beginning of the third week, and the real estate men were doing a whale of a business. The recorders of deeds in the Court House had the time of their life to keep up with their work.

One of the last week's bulletins appealed to the young people. A letter from "old John Wise" to his son Henry, who was about to take his bride to a "rented house" made a hit. Another bulletin that produced much comment was the presentation of "Four-

teen Points on Building and Construction in Elizabeth." This idea of Fourteen Points was suggested from the President's famous document and the application was clinched by the urging of the formation of a "League of Home Builders" whose members were to organize "Thrift Bands," save money, buy a lot, and build a home.

When the last day arrived, the advertising man asked for a summing up of results. It was shown that the Building Department permits for January and February were less than $100,000. In April and May after the campaign had been running, the totals were above $375,000, and many new contracts were in sight. The architects were swamped with work and the contractors were trying to get men to dig cellars and sewers. Neither the committee nor the advertising agent indulged in boasting, but they all quietly said the publicity from the carefully written bulletins had made a big change in minds of the people. One wealthy man who defied any argument to move him to begin a big development early in the season, because prices did not suit, loosened up and ordered his work "full-speed ahead." He never admitted what started him, but he saw the newspaper every day, and knew what was being published. The newspapers co-operated splendidly in this campaign, and every factor worked together harmoniously after the movement was started and intelligently directed. The total cost of this advertising was less than $1,500. And the good effects are still being felt. Builders are still busy, prices are still high, but work is going on. All the public wanted to know, apparently, was the true conditions and that nothing was being "put over on them." Once their confidence was won it was easy to get action.

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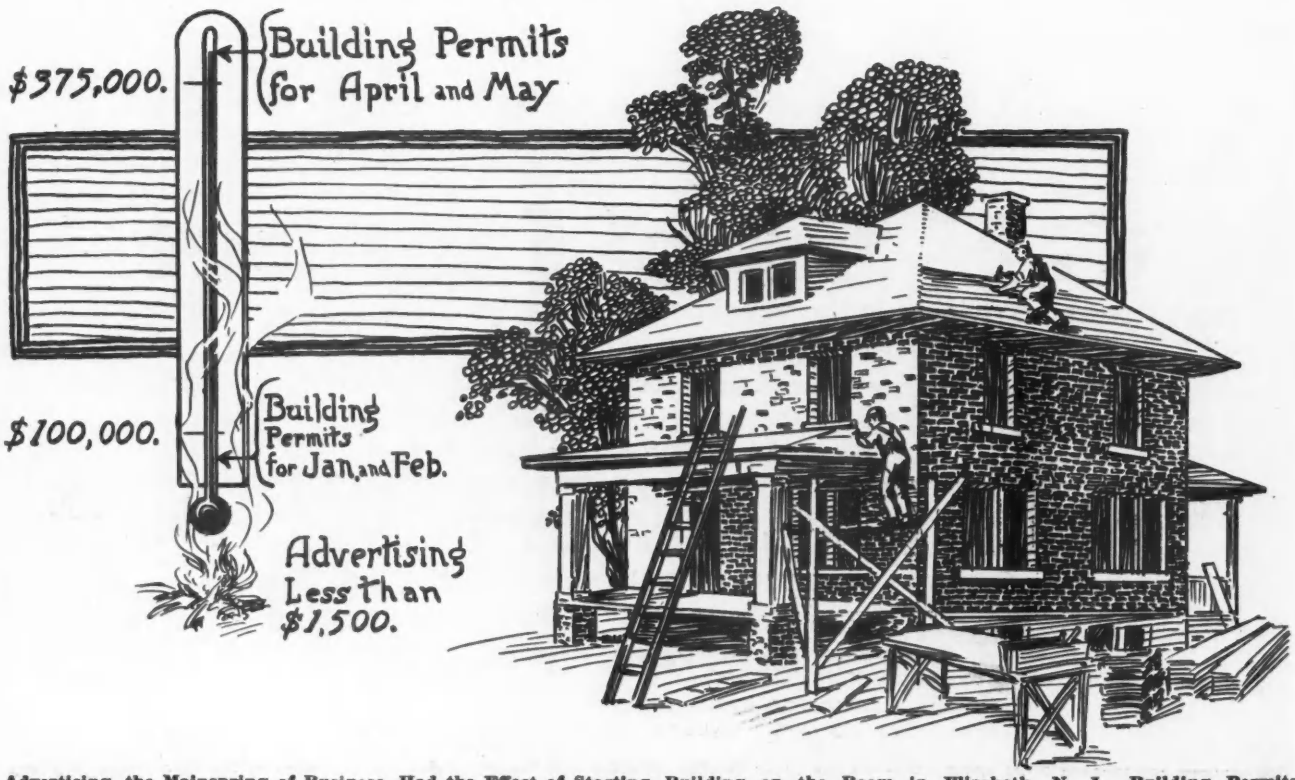
Pictures or Windows?

By EVELYN M. WATSON

IF there is a question of wall space and the one who is building thinks that he is benefiting himself by leaving the wall solid, let him consider, would he rather have a beautiful picture on the wall, or place a window there and have a more beautiful picture, sunlight streaming in?

The psychology of windows is an obvious one—light means health for all of us; the sun is our source of light, heat, and power. Human beings who love nature and truly appreciate the value of her highest physical glory, the sun, have about them an illumination of spirit, warmth, and power that is absent from those who live in darkness and gloom. Even bright pictures do not take the place of direct contact, physical as well as inspirational, with natural beauties. We must have both pictures and nature, and if we cannot have both, we must do without pictures—without the sun we cannot do. Scenery itself may be denied us and our windows look out on brick walls,—all the more must there be windows so that the source of all scenery, the sun itself, may be giving us physical strength to endure, for it is in this way the unfavorable forces are driven out and soothing, healing light, warmth and power are allowed to enter our homes, and our lives.

If there is a logical question of wall space, let the decision be—a window. Even a wee window, looking towards the blue sky or tides of air, is the best sort of picture.



Advertising, the Mainspring of Business, Had the Effect of Starting Building on the Boom in Elizabeth, N. J. Building Permits Jumped $275,000 in a Month, on an Expenditure of $1,500 by Contractors, Lumber Dealers and Other Live Business Men.

Flex-a-Tile

House Tops

QUICK and INEXPENSIVE

A roof to be covered quickly with a Dependable, Low-Cost, Fire-Resisting, Waterproof roofing! A hurry call to the Flex-a-Tile dealer and Flex-a-Tile Roll Shingle Roofing is on its way. After that, it's simply a question of having a handy man roll it on and nail it down.

Satisfactory Roofing

The man who buys this roofing not only gets an economical roof—he gets all the enduring qualities of higher-priced roofings—he gets the Flex-a-Tile unvarying Standard, and the element of beauty. The 5″ x 10″ Shingle Butts are so raised by our patented process that they can actually be felt, and the result is unusually pleasing, simulating very cleverly a shingled roof.

Whatever the Roofing Job there is satisfaction to owner and contractor in this remarkable product.

Not Common Roofing---Uncommon Flex-a-Tile

Think of the Saving:

Roll it on and Nail. **There could be no simpler way of roofing than the Flex-a-Tile Roll Shingle Way. It rolls over old shingles or new sheathing boards with perfect ease. And when it is nailed down it is there to stay, whatever the weather conditions. No cracks—no unlooked for wearing out.**

The saving on labor is very great, for no skilled workmanship is required—it can be done quickly and successfully with no waste. It saves on insurance, being in Class "C" as approved by the Fire Underwriters' Laboratories.

Very Low Cost---Positively No Upkeep

Write us your particular roofing problems. There is a Flex-a-Tile solution for all of them. Send for Bulletins A 23 and 1511.

HEPPES ROOFING DIVISION

THE RICHARDSON CO., 4500 Fillmore Street, CHICAGO, ILL.

Mills at: Chicago Lockland, (Cincinnati) Ohio Rutherford, New Jersey Dept. L

Training Carpenters at Iowa State College

HOW THE UNIVERSITY TEACHES THE PRINCIPLES AND PRACTICE OF CONSTRUCTION WORK

By A. W. Turner

"WELL, sir, boys, the only way to settle this home question is for each of you to submit a house plan, and the one chosen will be the one we will build," was the decision handed down by Prof. Charles Miller, instructor of wood work in the Agricultural Department at Ames, Iowa, to his class in carpentry for the final exercise of the year.

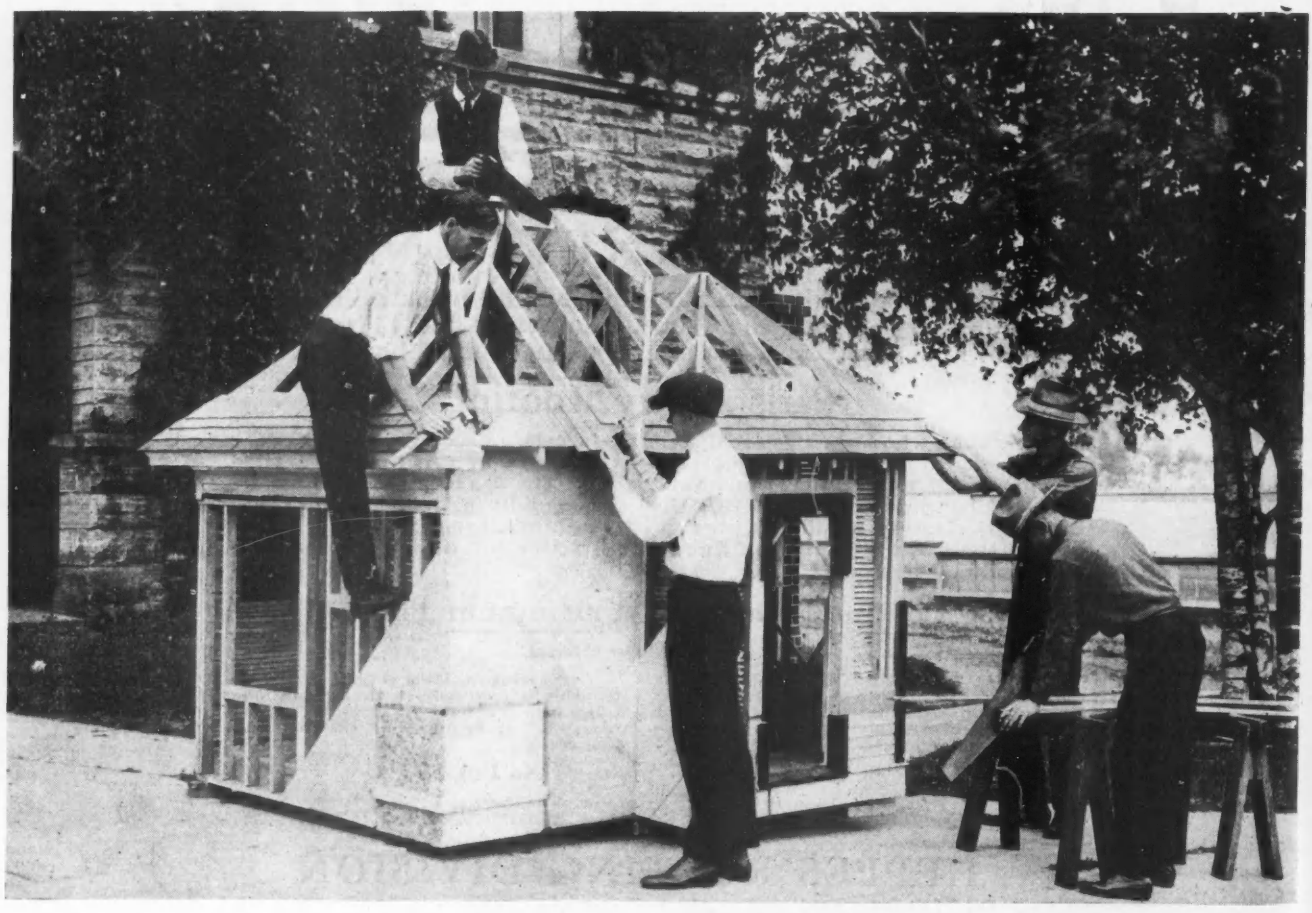
Some limitations had to be placed on the design of the house in order that all plans would be somewhat similar. The house was to be for a young couple of very moderate means and was to consist of one good living room, bath, kitchenette and sleeping accommodations for two. The house could, in addition, have an "L" on one side.

During the following period the floor plan shown here was selected from those submitted and work started on the "model house." Timber, builder's hardware and tools soon made their appearance on the location of the new building. Each man started to work on some part of the house and before many days passed the immediate vicinity took on the appearance of a community building a church. There seemed to be insufficient room for the carpenters to work, so some became "ground helpers" for the rest, and work progressed even faster than before.

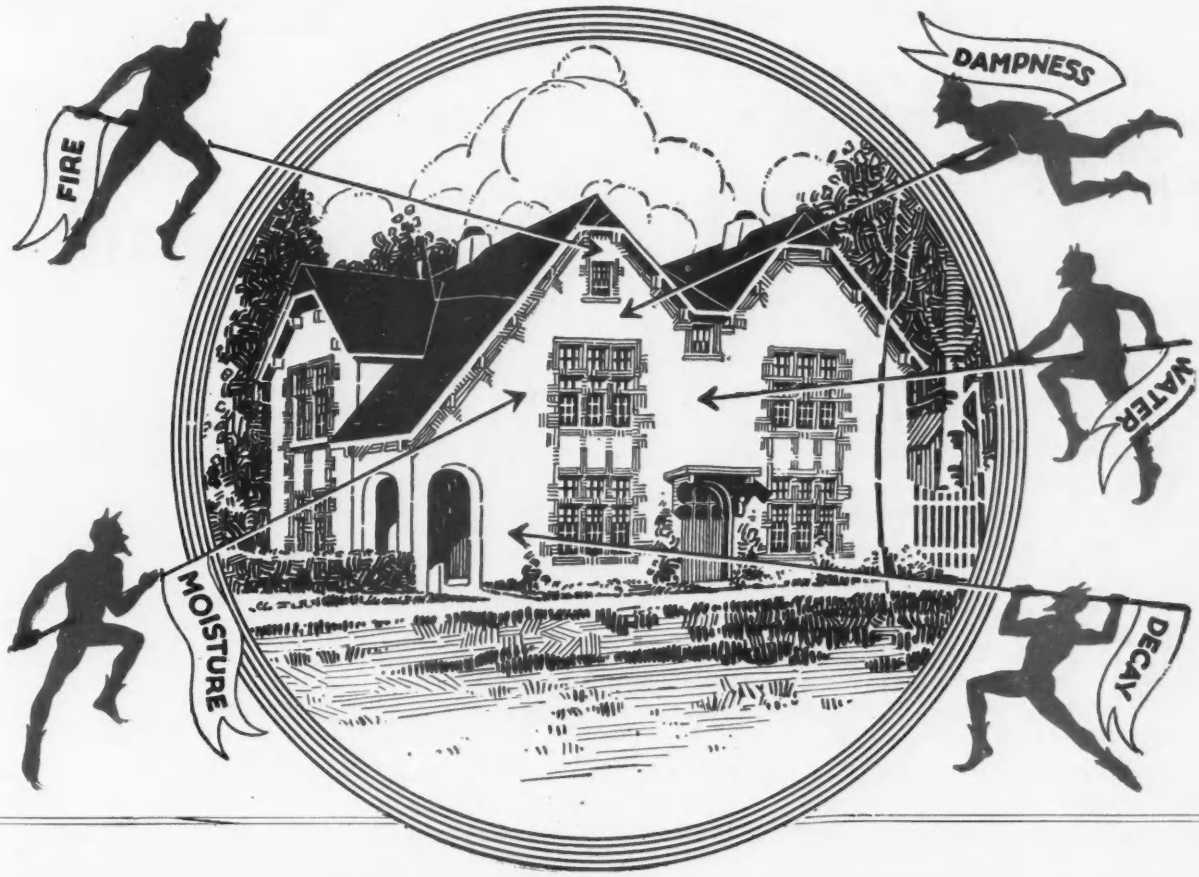
House Tests Knowledge of Students

Being the final exercise of the year, the house was to be in the nature of an examination and therefore each kind of construction they had used heretofore was applied. The house contained the following: Six types of rafters, common, hip, valley, hip jack, valley jack, cripple jack and the various types of tails; two types of bridged joists; two types of girders; two types of sub-floor, straight finish and 45 degree angle; two forms of top flooring, plain and quarter-sawed oak; sheathing, 45 degrees and horizontal; five methods of enclosure, bevel and drop siding, shingles, troweled magnesite stucco and pebble dash; four types of corner posts and sills, window and door frames left open to show construction; four types of sheathing paper and three grades of shingles. In addition two forms of flashing and hips were used. The lathing was done so as to leave the jointing exposed, after which the smooth and sand-finished plaster were applied. The chimney was built so as to show the means of applying non-combustible material to prevent fire.

The course in carpentry for architectural engineers is the smaller of the two courses offered in wood work. The other course, "farm carpentry," is offered to all agricultural students, in which the following work is



The Model House Under Construction at Iowa State College, Ames, Iowa, Each Student Is Doing His Part. This View Shows Different Kinds of Sheathing and the Stucco Siding, Plain and Pebble Dashed



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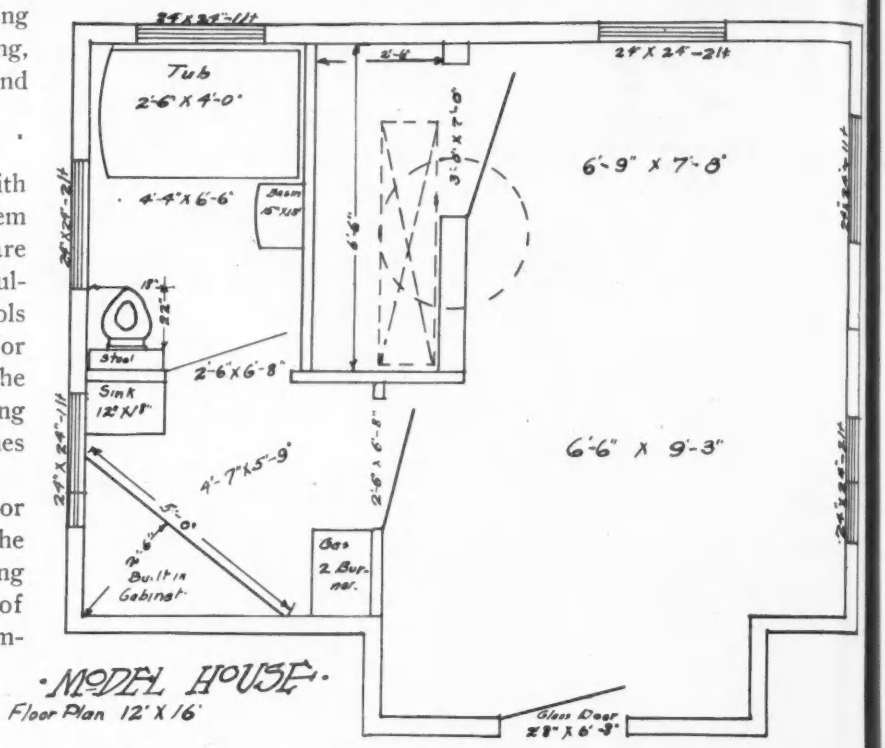
taken up: the care, use and sharpening of tools, joining, framing, rafter cutting, splices, glue joints, wood lathe work and the building of modern barn frames.

Many Barn Frames Built

The barn roof frames are labeled with the name of the student building them and at the close of the school year are shipped to the various county agricultural agents and consolidated schools where they can be used as models for persons desirous of building along the latest designs. The models are coming into great demand and all the good ones are soon shipped out.

The course in advanced carpentry, or known rather as "the house," starts the student with locating the lot, figuring excavations and fills, estimating cost of the various parts of construction, recommending the kind and percentage of foundation, the design, cost of the super-structure, even to the paint and paper bill. It is a very practical course for architectural engineers and the number taking the course is increasing.

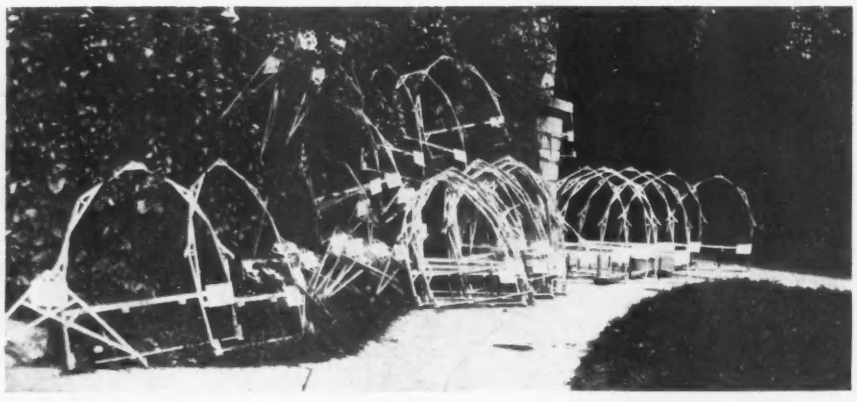


Floor Plan of the Model House Built by the Students at Iowa State College, Ames, Iowa.

University Has Well-Equipped Shop

Some 3,000 men in all are taking wood work at Ames and Professor Miller says that his shop is full from early until late. The shop will accommodate 40 men at a time, there being 40 bench vises and that many sets of tools. The tools include all those essential to the modern carpenters. In addition the shop is electrically equipped with a band saw, circular saw, planer, four wood lathes, grind stone, emery wheel and other large equipment.

In addition to the regular exercises some special work has been turned out as inlays, Indian clubs of 15 different woods, besides large vases. But of all the single pieces of work the house stands as a stimulus for the oncoming freshman, who dreamingly misses the nail and pounds his finger.



Some of the Barn Roof Trusses Made by the Students of the School of Carpentry, Iowa State College, Ames, Iowa. These Trusses Are Shipped to County Agents to be Used as Models.

How to Layout Floor Framing

BEFORE the size of the timber can be determined, it will be necessary to know the span of the joists, and, if there are openings in the floor, or the floor-joists have to support longitudinal partitions, a framing plan should be made, showing the floor area that will be supported by each beam, and also the position of partitions or special loads. When the floor is to be supported by posts and girders the position of these should also be accurately indicated on the framing plan.

If the floor-beams are supported entirely by walls or partitions, the span of the beams will be fixed by the plan of the building. If the distance between walls and partitions is too great for a single span, there may be a question as to the best location of the posts and girders.

When wooden floor-beams are to be used, it is important to keep in mind how the floors are to be framed, and particularly the span. The span of wooden beams should be kept under 25 feet, if practical. If the distance between the supporting walls is greater than 30 feet, girders should be placed so that the maximum span of the joists will not exceed 24 feet for light buildings or 16 to 18 feet for warehouses.

School buildings should have rooms at least 27 feet wide, so, in this class of buildings, the joists usually have a span of from 27 to 30 feet. For a span of 30 feet, however, 16-inch joists should be used, and as these are expensive, and often difficult to obtain, it is much better and more economical to make the schoolrooms 27 by 32 or 34 feet, than to make them 30 feet square.

A schoolroom 27 feet wide by 32 to 34 feet long, with windows on the long side of the room only, is the most economical and satisfactory, as it permits of using 3 inch by 14 inch joists, 28 feet long, and also gives the most satisfactory lighting.

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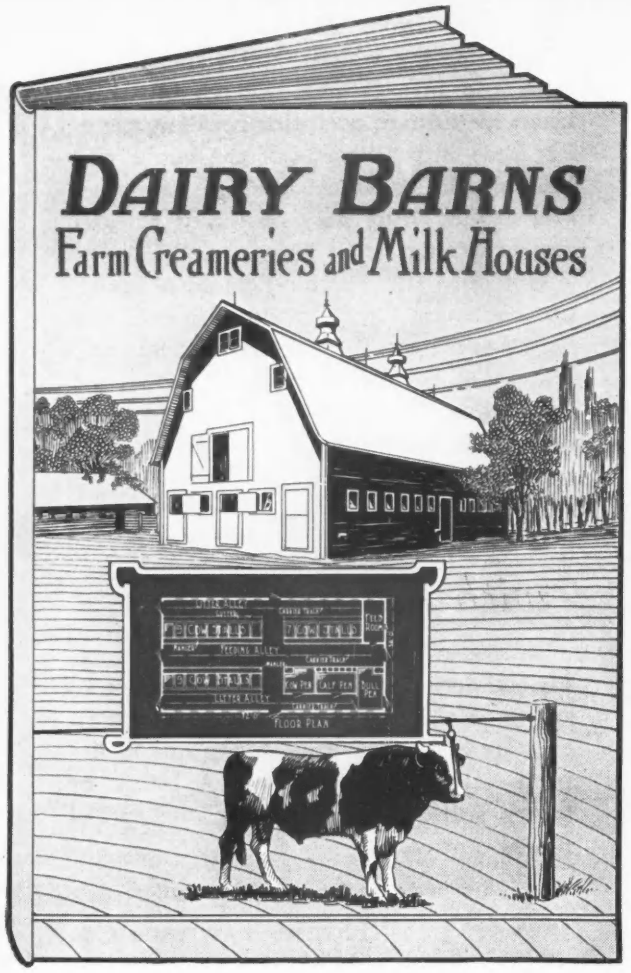

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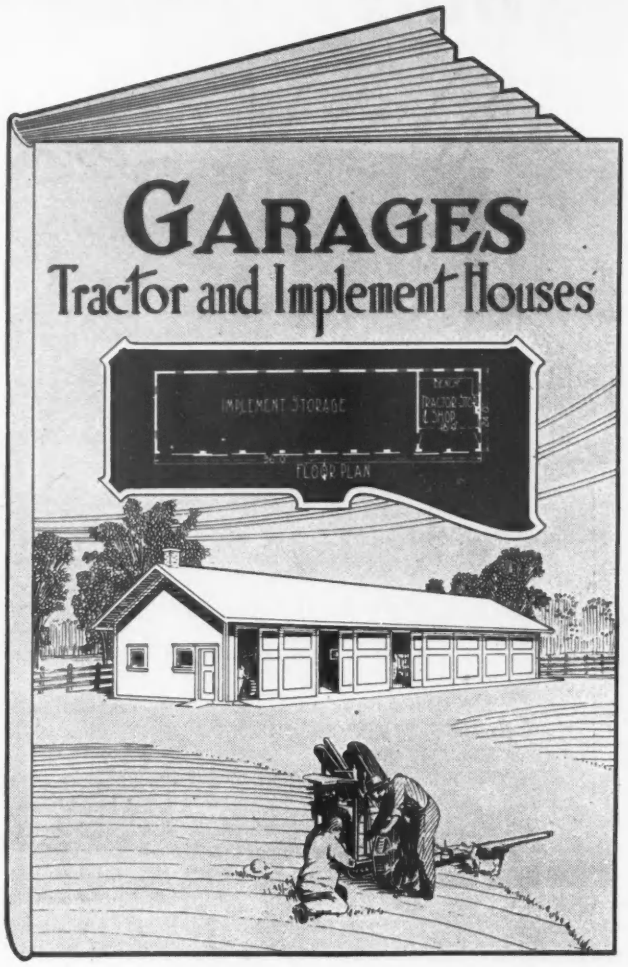

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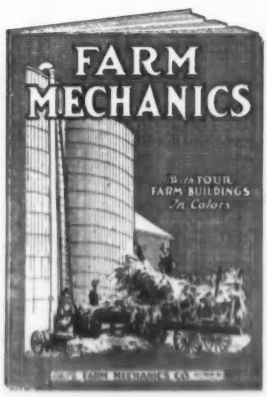

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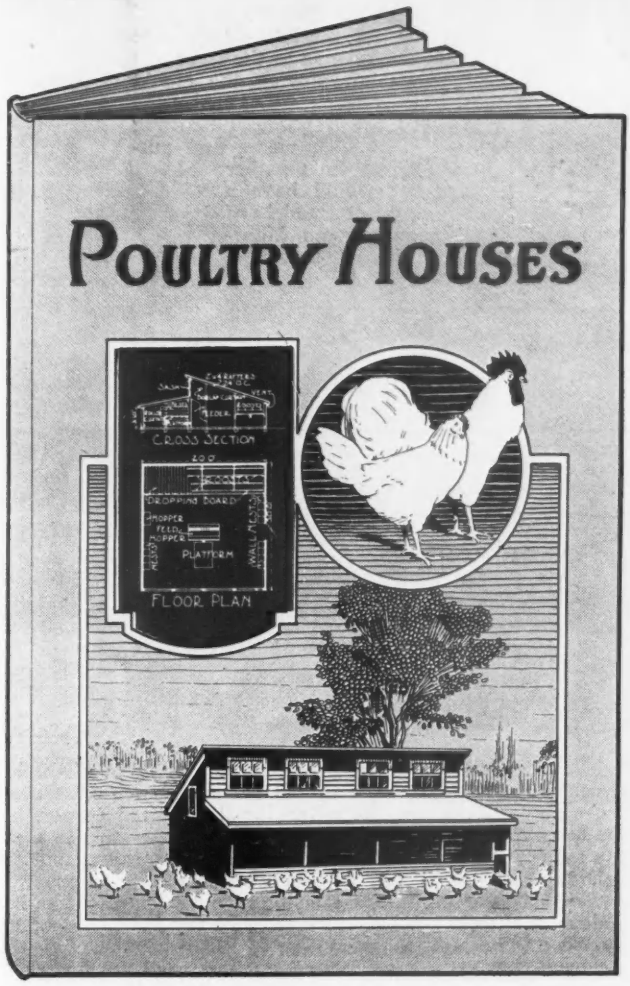

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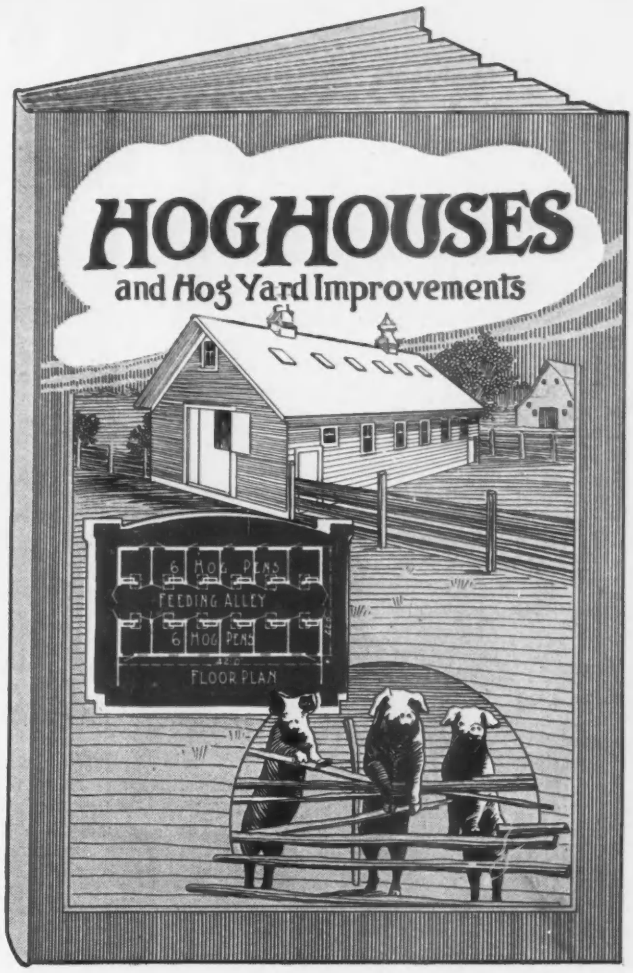

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Possibilities of the Steel Square

Illustrating the Ground Work or Governing Points in the Development of Corresponding Curved Rafters

By A. W. Woods

IN the last number of this magazine we talked on the formation of the rafters for an irregular vaulted ceiling, and as we did not say all that we wanted to say, we have thought it would be a good idea to carry the subject a little further by applying the same principle to curved roof rafters, but in this we will go a little further in illustrating how the formation may be determined by the use of the circle and right-angled triangle, the latter being formed by the manipulation of the steel square.

In Fig. 1 is shown the section of a half round mould which we will let represent a semi-circular roof, that is, the curve representing the shape of the common rafters. The next thing is to find or rather develop the corresponding shape for the hip rafter. Now, there are numerous ways of arriving at the required curve, but it is not our purpose to show the usual diagrams resorted to in finding this curve, but back of it all, no matter what form of diagram used, they must conform to the universal rule as determined by the divisions of the circle and the square in their relation to one another.

In the plan of this figure are shown the octagon, square and equilateral triangle along with their respective curves for the hip.

Now, if this mould was put in a mitre box and cut on the O or the 180-degree line the end would represent the curve of the common rafters.

If cut on the 22½-degree line, it would, when looking square at it, represent the required curve for the corresponding octagon hip. If cut on the 45-degree line it would represent the hip for the square corner, and if cut on the 60-degree line would represent the hip for triangle. The elevations of these rafters, in connection with the plan, are shown in comparison with that for the common rafter.

It might be well while we are at this point to explain what determines the angle that the seat of the hip rests from that of the common rafter. Briefly it is this: As the seat of the common rafter rests on the 180-degree line, the desired angle may be readily found by dividing the 180 by the number of sides representing the polygon. Thus the octagon would rest at 22½, the square at 45, and the triangle at 60 degrees, respectively.

In connection with this figure the relation of the steel square is shown to these angles. The interesting points are given in decimals.

In Fig. 2 is shown a different shape of mould. Suppose we put this mould in a mitre box and cut on the O line the end would show as in the section and would represent the curve of the common rafter for any shape the building may have, but if cut on the 22½-degree line and reverse to the other side without moving the mould and make another cut on the 22½-degree line and cutting eight such pieces and putting them together we would have a perfect model of an octagon Moorish shaped roof.

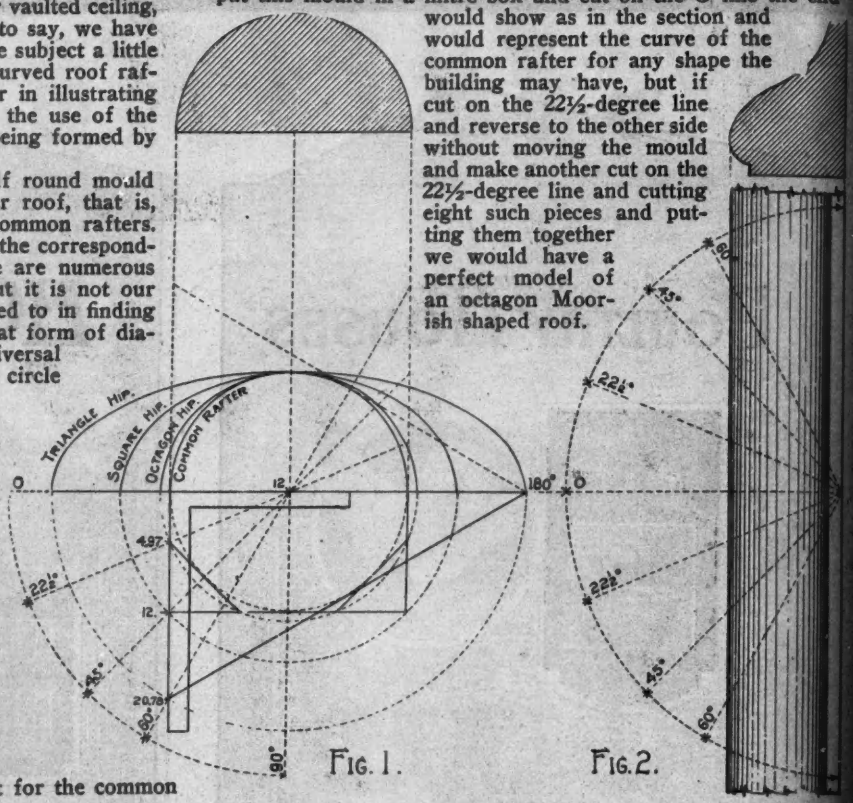

FIG. 1. FIG. 2.

The cut having taken care of the required curve of the hip which, of course, would be true if the mould was cut on any other angle that gives the mitre for the desired corner, but the question is, how to transfer this on a large scale to make the same practical in roof framing. Since we cannot put the full size roof in a mitre box, a workable solution must be arrived at by diagram to obtain the required shape of the hip. As far as the circular roof is concerned this may be obtained by the trammel, as shown in Fig. 3. In connection with this we have shown the steel square, but this need not bother, in case the length of half the axis exceeds the limits of the arms of the square as in that case a couple of straight-edge pieces of any required length set at right angles to each other on a level surface will answer the same purpose. The trammel can also be of wood with pins or brads set at "a" and "b" and with pencil or marker at "c" and by swinging the bar so as to keep the points at "a" and "b" snug up to the straight-edge pieces, the pencil point at "c" will delineate the required curve.

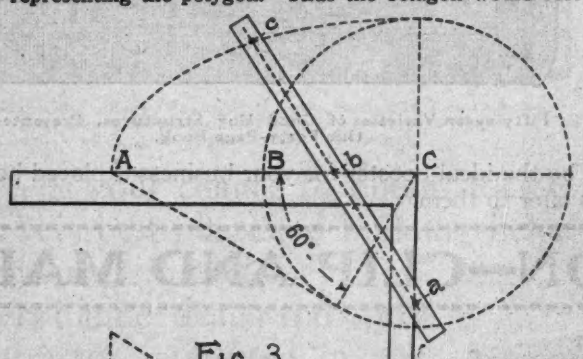

FIG. 3.

These points are equal to like points, A B and C of the plan. A C represents one-half of the major axis and represents the run of the hip. B C the same for the minor axis and also represents the rise of the roof. A B represents the difference between the two axes, however, in this example the hip resting at 60 degrees from the common rafter. A B and B C are of equal length, or, in other words, the run of the hip for the triangle is just twice that for the corresponding common rafter.

Now, by letting the points "a" and "b" move along the tongue and blade of the square the pencil point at "c" will delineate the required curve for the hip to coincide with the curve of the common rafter. But this does not readily apply to any other shape than a true circular roof. In the case of compound curves, as shown in Fig. 2, the trammel could not be used with sufficient accuracy, besides the operation would be too complicated for practical use.

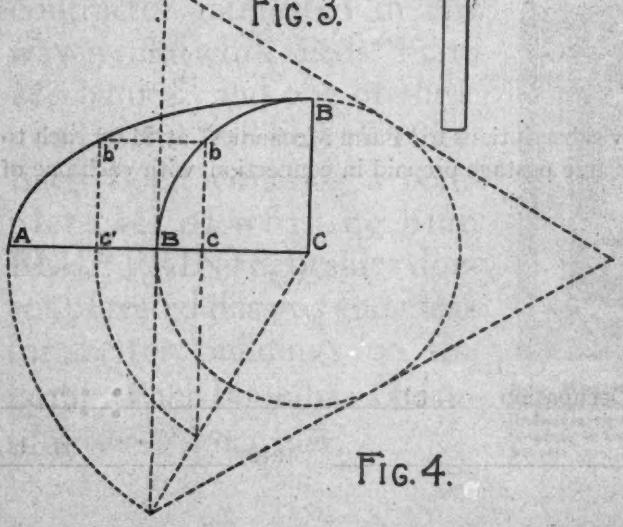

FIG. 4.

In Fig. 4 is shown the same problem as in the previous figure, but in connection with the triangle which gives a better idea of the relative shape of the rafters showing intermediate points taken on the rafters; in other words, that part of the hip bounded by A b' c' when set up in proper place will coincide with that part of the common rafter bounded by like letters.

With this we close, but as there are still some points we would like to bring out in connection with compound curves we will take up the subject again in the next number.


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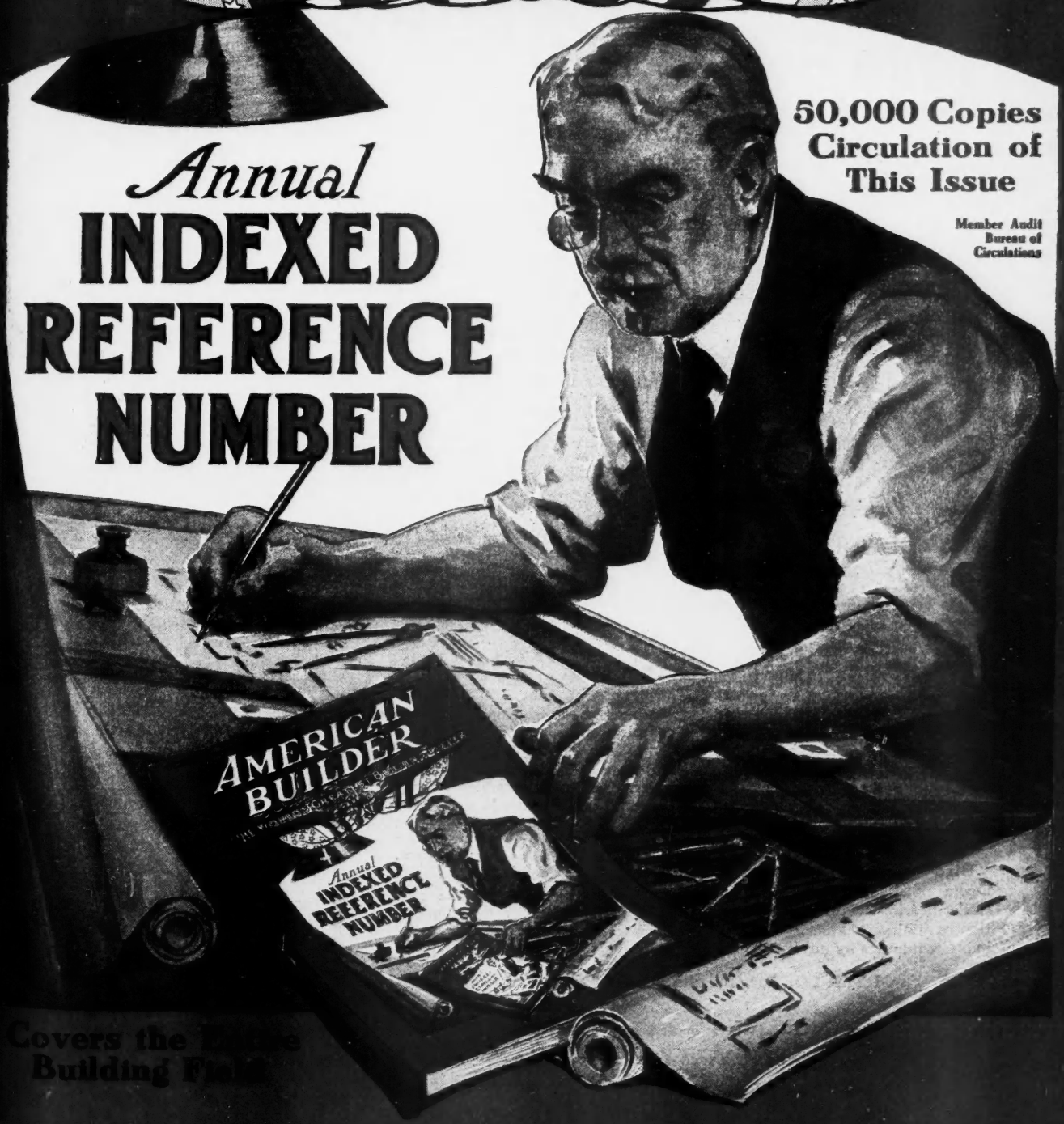

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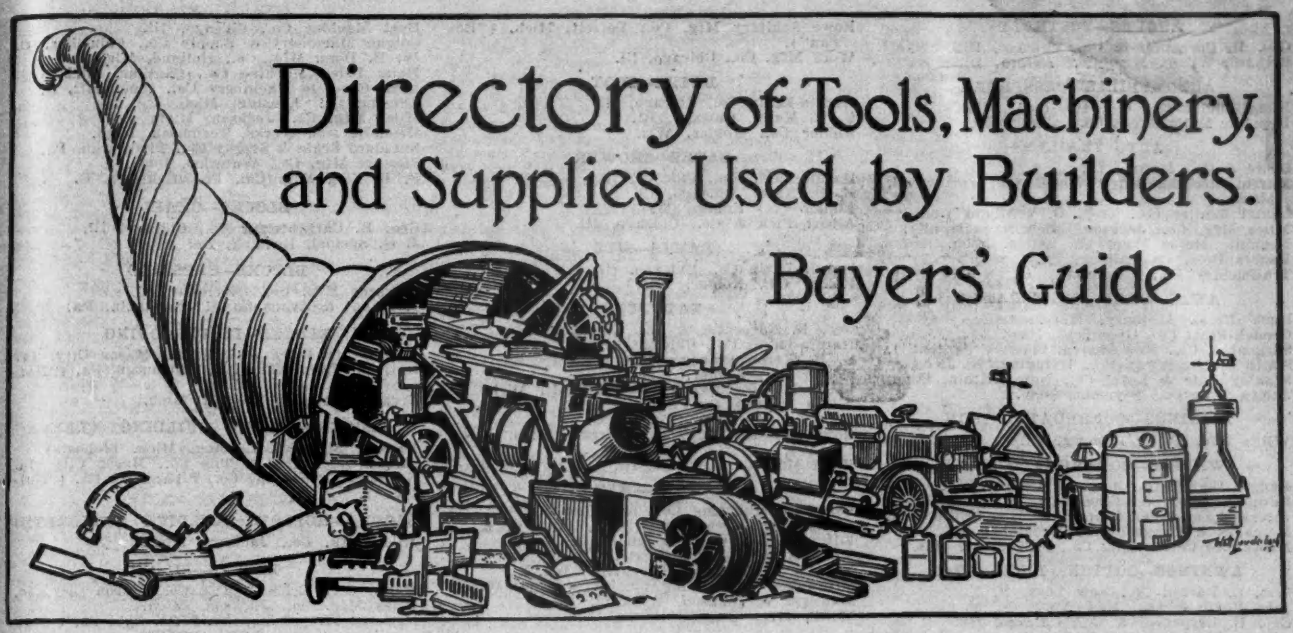

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THE Publishers of the AMERICAN BUILDER present this Directory with the hope that it will prove really useful to its readers. While it is as complete as our limited space has permitted, no doubt some first-rate concerns and some important products have been overlooked; nevertheless, it does cover the principal offerings of the most substantial and enterprising of the manufacturing concerns catering to the building field. We can vouch for the responsibility of every one of the concerns whose goods are listed in this Directory, and we recommend them to our readers. Builders, dealers in building materials, architects, contractors and carpenters in writing to any of these concerns can feel that they will receive most prompt and courteous attention, and that their business will be appreciated.

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This Directory makes it easy to compare the range of offerings in any particular line you are interested in. Do not hesitate to write for catalogs and circular matter pertaining to any goods new to you, or in which you are especially interested.

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If you fail to find in this Directory any item or line of goods in which you are interested, write the AMERICAN BUILDER, and we will immediately send you the information and put you in touch with the best concerns who are in a position to furnish what you need. We are glad to serve you in every way we can.

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BANDSAW MACHINERY

American Sawmill Machinery Co., New York, N. Y.
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Silver Mfg. Co., Salem, O.
J. D. Wallace & Co., Chicago, Ill.

BAR BENDERS

Geo. B. Carpenter & Co., Chicago, Ill.
Joseph T. Ryerson & Son, Chicago, Ill.
T. L. Smith Co., Milwaukee, Wis.
Standard Scale & Supply Co., Pittsburgh, Pa.

BARN EQUIPMENT

James Mfg. Co., Fort Atkinson, Wis.
Louden Machinery Co., Fairfield, Iowa.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
Mast, Foos & Co., Springfield, O. ("Buckeye").
F. E. Myers & Bros., Ashland, O.
J. E. Porter Co., Ottawa, Ill., ("Porter").
Stanley Swift Mfg. Co., Cuba, N. Y.
Willis Mfg. Co., Galesburg, Ill.

BARS—CARPENTERS' PRY

Geo. B. Carpenter & Co., Chicago, Ill.
Albert Pick & Co., Chicago, Ill.
Smith & Hemenway Co., Irvington, N. J.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

BASE—SANITARY (FIREPROOF)

Bostwick Steel Lath Co., Niles, O.
Knickerbocker Slate Corp., New York, N. Y.
National Kellastone Co., Chicago, Ill.

BASEBOARDS—MARBLE

Albert Pick & Co., Chicago, Ill.

BASEBOARDS—SLATE

Knickerbocker Slate Corp., New York, N. Y.
F. C. Sheldon Slate Co., Granville, N. Y.
Slatington Slate Co., Slatington, Pa. (Clear black and natural slate).

BASE MOULDING

Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" brand Southern pine base moulding).

BATHROOM OUTFITS

Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis.
Albert Pick & Co., Chicago, Ill.
Rowe Sanitary Mfg. Co., Detroit, Mich. ("Ro-San").
Wolff Mfg. Co., Chicago, Ill.

BATHS—FOOT

Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis.

BATHS—SHOWER

Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis.
Albert Pick & Co., Chicago, Ill.

BATHS—SITZ

Hardin-Lavin Co., Chicago, Ill.
Kohler Co., Kohler, Wis.

BATHTUBS

Geo. B. Carpenter & Co., Chicago, Ill.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis.
Leech Metallic Bathtub Co., Detroit, Mich.
Albert Pick & Co., Chicago, Ill.
Robinson Mfg. Co., Toledo, O.
Rowe Sanitary Mfg. Co., Detroit, Mich. ("Ro-San").
Wolff Mfg. Co., Chicago, Ill.

BATTENS—METAL

Badger Corrugating Co., La Crosse, Wis.
Philip Bernard Co., Sioux City, Ia. ("O. K.").
Edwards Mfg. Co., Cincinnati, O.
F. D. Kees Mfg. Co., Beatrice, Neb.
Metallic Batten Co., Owensville, Ind.
Milwaukee Corrugating Co., Milwaukee, Wis.
Shrauger & Johnson, Atlantic, Ia.
Willis Mfg. Co., Galesburg, Ill.

BEADERS

Stanley Rule & Level Co., New Britain, Conn.

BEADS—CORNER (METAL)

Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O.
Bostwick Steel Lath Co., Niles, O.
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O.
F. D. Kees Mfg. Co., Beatrice, Neb.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
North Western Expanded Metal Co., Chicago, Ill. ("Nemco").
Willis Mfg. Co., Galesburg, Ill.
Youngstown Pressed Steel Co., Youngstown, O.

BEDS—DOOR

Murphy Door Bed Co., Chicago, Ill.

BELLS—DOOR AND HOUSE

Albert Pick & Co., Chicago, Ill.
Sargent & Co., New Haven, Conn.

BENCHES—MANUAL TRAINING

Richards-Wilcox Mfg. Co., Aurora, Ill.

BENCH STOPS

Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Chas. Morrill, Inc., New York, N. Y.

BEVELS

Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Goodell-Pratt Co., Greenfield, Mass.
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.

BINS—STORAGE

J. M. Preston Co., Lansing, Mich. ("Preston-Lansing" vitrified tile storage bins).
Ransome Concrete Machinery Co., Dunellen, N. J. (Concrete bins).

BITS—AUGER

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Lebanon Machine Co., Lebanon, N. H. ("Open-Zenter").
Progressive Mfg. Co., Torrington, Conn.
Sidney Machine Tool Co., Sidney, O.
Smith & Hemenway Co., Irvington, N. J.
James Swan Co., Seymour, Conn.

BITS—SCREWDRIVER

Buck Bros., Millbury, Mass.
Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Lebanon Machine Co., Lebanon, N. H.
North Bros. Mfg. Co., Philadelphia, P. ("Yankee").
Albert Pick & Co., Chicago, Ill.
Smith & Hemenway Co., Irvington, N. J. ("Red Devil").
Stanley Rule & Level Co., New Britain, Conn.
James Swan Mfg. Co., Seymour, Conn.
Syracuse Twist Drill Co., Syracuse, N. Y.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

BLACKBOARDS

Beaver Board Companies, Buffalo, N. Y.
Cadillac Lumber Co., Cadillac, Mich.
Knickerbocker Slate Corp., New York, N. Y.
Natural Slate Blackboard Co., Pen Argyl, Pa.
F. C. Sheldon Slate Co., Granville, N. Y.
Structural Slate Co., Pen Argyl, Pa.

BLOCK MACHINES—CONCRETE

American Cement Machine Co., Keokuk, Iowa ("Everybody's").
Brandell Co., Cincinnati, O. ("Brandell All-Automatic").
Buhl Machine Co., Chicago, Ill.
Colgan Machinery & Supply Co., Columbus, O.
W. E. Dunn Mfg. Co., Holland, Mich.
Helm Brick Machine Co., Cadillac, Mich.
Ideal Concrete Machinery Co., Cincinnati, O.
Lansing Co., Lansing, Mich.
Miles Mfg. Co., Jackson, Mich.
Republic Iron Works, Tecumseh, Mich.
Standard Scale & Supply Co., Pittsburgh, Pa.
Stewart Mfg. Co., Waterloo, Iowa.
F. B. Zieg Mfg. Co., Fredericktown, O.

BLOCKS—CHAIN

Geo. B. Carpenter & Co., Chicago, Ill.
J. G. Speidel, Reading, Pa.

BLOCKS—CRESTING

Edwards Mfg. Co., Cincinnati, O.
Merchant & Evans Co., Philadelphia, Pa.

BLOCKS—FIREPROOFING

Mason City Brick & Tile Co., Mason City, Ia.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").
Truscon Steel Co., Detroit, Mich.

BLOCKS—HOLLOW BUILDING (CLAY)

Lansing Silo Co., Lansing, Mich. (Jobbers).
Mason City Brick & Tile Co., Mason City, Ia.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").

BLOCKS—HOLLOW BUILDING (CONCRETE)

Miles Mfg. Co., Jackson, Mich.

BLOCKS—SILO

Mason City Brick & Tile Co., Mason City, Ia.
Miles Mfg. Co., Jackson, Mich.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").
J. M. Preston Co., Lansing, Mich. ("Preston-Lansing" vitrified tile).

BLOCKS AND TACKLES

Geo. B. Carpenter & Co., Chicago, Ill.
Lane Bros., Poughkeepsie, N. Y.

BLUE PRINT MACHINES

Wickes Bros., Saginaw, Mich. ("Wickes").

BOILER AND PIPE COVERING

Architectural Service Corp., Philadelphia, Pa.
Philip Carey Co., Lockland, Cincinnati, Ohio ("Air Cell," "Argentum," "Carocel," "Impervo," "85% Magnesia," "Perfecto," "Proecto," "Multi-ply," "Pyrex," underground system of insulation).
Geo. B. Carpenter & Co., Chicago, Ill.
Hardin-Lavin Co., Chicago, Ill.
H. W. Johns-Manville Co., New York, N. Y. (Refrigeration and cold-water lines, brine and ammonia built-up insulation; anti-sweat pipe insulation, cork pipe insulation, zero pipe insulation for extremely hot surfaces, asbestos sponge felt insulation, 85% magnesia insulation, vitribestos insulation, asbestocel insulation, aircell insulation, fire-felt insulation, thermo fire-felt insulation, underground system of pipe insulation for steam and hot water pipes).
B. B. Karol, Chicago, Ill.
Keasbey & Mattison Co., Ambler, Pa.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Williamson Heater Co., Cincinnati, O.

BOILERS—HEATING PLANT

Geo. B. Carpenter & Co., Chicago, Ill.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Williamson Heater Co., Cincinnati, O.

BOLTS—DOOR AND WINDOW

Architectural Service Corp., Philadelphia, Pa.
Griffin Mfg. Co., Erie, Pa.
Albert Pick & Co., Chicago, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn. ("Sargent").
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.

BOLTS AND NUTS

Joseph T. Ryerson & Son, Chicago, Ill.

BOOKS—BUILDING

Radford Publications, Chicago, Ill.

BORERS—VERTICAL

Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Sidney Machine Tool Co., Sidney, O.

BORING MACHINES

American Saw Mill Machinery Co., New York, N. Y.
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Grand Rapids Hardware Co., Grand Rapids, Mich.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Smith & Hemenway Co., Irvington, N. J.
James Swan Co., Seymour, Conn.

BRACES—BIT

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
North Bros. Mfg. Co., Philadelphia, Pa.
Stanley Rule & Level Co., New Britain, Conn.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

BRACES—CORNER

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
F. D. Kees Mfg. Co., Beatrice, Neb.
Sargent & Co., New Haven, Conn.
Stanley Rule & Level Co., New Britain, Conn.

BRACKETS

Curtis Companies, Clinton, Ia. (Wood exterior, roof and ornamental).
Elite Mfg. Co., Ashland, O.
Griffin Mfg. Co., Erie, Pa.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Steel Scaffolding Co., Evansville, Ind.

BRICK MACHINES—CEMENT

W. E. Dunn Mfg. Co., Holland, Mich.
Helm Brick Machine Co., Cadillac, Mich.
Ideal Concrete Machinery Co., Cincinnati, O.
Lansing Co., Lansing, Mich.
Standard Scale & Supply Co., Pittsburgh, Pa.
F. B. Zieg Mfg. Co., Fredericktown, O.

BRICK—COMMON

Mason City Brick & Tile Co., Mason City, Ia.

BRICK CLEANING MACHINES

Fuller Brick Cleaner Co., New Bedford, Mass.

BRICK—ENAMELED

American Face Brick Association, Chicago, Ill.
Chas. F. Lorenzen & Co., Chicago, Ill.

BRICK—FACE

American Face Brick Association, Chicago, Ill.
Miles Mfg. Co., Jackson, Mich.
Western Brick Co., Danville, Ill.

BRICK—FIRE

Chas. F. Lorenzen & Co., Chicago, Ill.

BUCKETS—DREDGING AND EXCAVATING

Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Lakewood Engineering Co., Cleveland, O.

BUCKETS—HOISTING AND DUMPING

Archer Iron Works, Chicago, Ill.
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Lakewood Engineering Co., Cleveland, O.
Ransome Concrete Machinery Co., Dunellen, N. J.

BUILDING PLANS

G. W. Ashby, Chicago, Ill. (Schoolhouse).
Permanent Buildings Society, Chicago, Ill.
Radford Architectural Co., Chicago, Ill.

BULLETIN BOARDS

Chas. F. Lorenzen & Co., Chicago, Ill.

BURNISHERS

Fox Supply Co., Brooklyn, Wis.

CABINETS—BATHROOM

Geo. Angell Co., Detroit, Mich.
Hess Warming & Ventilating Co., Chicago, Ill. ("Hess" white enameled).
Albert Pick & Co., Chicago, Ill.

CABINETS—BATH (VAPOR)

Robinson Mfg. Co., Toledo, O.

CABINETS—STORAGE

Hart & Hutchinson Co., New Britain, Conn.

CABLE

Architectural Service Corp., Philadelphia, Pa.
Geo. B. Carpenter & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y. (Asbestos station).
Sasgen Derrick Co., Chicago, Ill.
Wright Wire Co., Worcester, Mass.

CAFETERIA OUTFITTERS

Albert Pick & Co., Chicago, Ill.

CALIPERS

Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Lufkin Rule Co., Saginaw, Mich. ("Lufkin").
L. S. Starrett Co., Athol, Mass.

CANVAS

John Boyle & Co., New York, N. Y.
Wm. L. Barrell Co., New York, N. Y.
Philip Carey Co., Cincinnati, O. (pipe-covering canvas).
Geo. B. Carpenter & Co., Chicago, Ill.

CAPITALS—CARVED WOOD

Hartmann-Sanders Co., Chicago, Ill.

CAPITALS—COMPOSITION

Hartmann-Sanders Co., Chicago, Ill.

CAPITALS—SHEET METAL

Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
Willis Mfg. Co., Galesburg, Ill.

CARS—INDUSTRIAL

Archer Iron Works, Chicago, Ill.
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Lakewood Engineering Co., Cleveland, O.
Standard Scale & Supply Co., Pittsburgh, Pa.
Standard Electric & Elevator Co., Evansville Ind.
Stewart Mfg. Co., Waterloo, Iowa.

CARTS—CONCRETE

American Cement Machine Co., Keokuk, Iowa ("Boss" Hyatt-bearing).
Archer Iron Works Chicago, Ill.
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Deere & Co., Moline, Ill.
Lansing Co., Lansing, Mich.
Lakewood Engineering Co., Cleveland, O.
Ransome Concrete Machinery Co., Dunellen, N. J.
Standard Scale & Supply Co., Pittsburgh, Pa.
Sterling Wheelbarrow Co., Milwaukee, Wis.

CARTS—HAND

Lansing Co., Lansing, Mich.

CASEMENT ADJUSTERS

Architectural Service Corp., Philadelphia, Pa.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Yale & Towne Mfg. Co., New York, N. Y.

CASEMENT WINDOW FASTENERS

Architectural Service Corp., Philadelphia, Pa.
Cadillac Lumber Co., Cadillac, Mich.
Griffin Mfg. Co., Erie, Pa.
Albert Pick & Co., Chicago, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Yale & Towne Mfg. Co., New York, N. Y.

CASEMENT WINDOW HARDWARE

Architectural Service Corp., Philadelphia, Pa.
Cadillac Lumber Co., Cadillac, Mich.
Eveleth Mfg. Co., River Forest, Ill. ("Eveleth" in-swinging weatherstrip).
Griffin Mfg. Co., Erie, Pa.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Yale & Towne Mfg. Co., New York, N. Y.

CASING

Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" brand Southern pine casings).

CASTINGS TO ORDER

International Steel & Iron Co., Evansville, Ind.
Lebanon Machine Co., Lebanon, N. H.
National Lead Co., New York, N. Y.
Sager Lock Co., North Chicago, Ill.
Silver Mfg. Co., Salem, O.
Sterling Foundry Co., Sterling Ill.
Western Iron & Foundry Co., Wichita, Kan.

CATCHES—DOOR AND WINDOW

Architectural Service Corp., Philadelphia, Pa.
Allith-Prouty Co., Danville, Ill.
F. D. Kees Mfg. Co., Beatrice, Neb.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
Albert Pick & Co., Chicago, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.

CEILINGS—METAL

American Sheet & Tin Plate Co., Pittsburgh, Pa.
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O. ("Classik").
Edwards Mfg. Co., Cincinnati, O.
W. C. Hopson Co., Grand Rapids, Mich.
International Steel & Iron Co., Evansville, Ind.
Merchant & Evans Co., Philadelphia, Pa.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill.

CEILINGS—WOOD

Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" brand Southern pine ceiling stock).

CELLAR WINDOW SETS

Caldwell Mfg. Co., Rochester, N. Y.
Griffin Mfg. Co., Erie, Pa.
F. D. Kees Mfg. Co., Beatrice, Neb.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.

CEMENT—PORTLAND

Architectural Service Corp., Philadelphia, Pa.
Alpha Portland Cement Co., Easton, Pa.
Atlas Portland Cement Co., New York, N. Y.
Sandusky Cement Co., Cleveland, O. ("Medusa").

CEMENT—PORTLAND (WHITE)

Atlas Portland Cement Co., New York, N. Y.
Sandusky Cement Co., Cleveland, O. ("Medusa").

CHIMNEY CAPS

Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
International Steel & Iron Co., Evansville, Ind.
Lebanon Machine Co., Lebanon, N. H.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Sterling Foundry Co., Sterling Ill.

CHIMNEY TOPS

Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
Sterling Foundry Co., Sterling, Ill.

CHISELS—CARPENTERS'

Buck Bros., Millbury, Mass.
Geo. B. Carpenter & Co., Chicago, Ill.
Mack & Co., Rochester, N. Y.
Stanley Rule & Level Co., New Britain, Conn.
James Swan Co., Seymour, Conn.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.
L. & I. J. White Co., Buffalo, N. Y.

CHISELS—FLOOR

Buck Bros., Millbury, Mass.
Stanley Rule & Level Co., New Britain, Conn.

CHISELS—HOLLOW MORTISING

American Cement Machine Co., Keokuk, Ia. ("Boss").
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Sidney Machine Tool Co., Sidney, O.

CHUTES—CONCRETE

Archer Iron Works, Chicago, Ill.
Lakewood Engineering Co., Cleveland, O.

CHUTES—FOUNDATION WALL

Edwin A. Jackson & Bro., New York, N. Y.

CISTERN COVERS

Badger Corrugating Co., La Crosse, Wis.
Drew Carrier Co., Waterloo, Wis.
Majestic Co., Huntington, Ind (Covers and rings).
Robinson Mfg. Co., Toledo, O.
Sterling Foundry Co., Sterling, Ill.
Wagner Mfg. Co., Cedar Falls, Ia.
Western Iron & Foundry Co., Wichita, Kan.
Willis Mfg. Co., Galesburg, Ill.

CLAMPS—BRICK

Donley Bros. Co., Cleveland, O.

CLAMPS—CARPENTERS'

Geo. B. Carpenter & Co., Chicago, Ill.
Luther Grinder Mfg. Co., Milwaukee, Wis.
James L. Taylor Mfg. Co., Poughkeepsie, N. Y.

CLAMPS—COLUMN

Geo. B. Carpenter & Co., Chicago, Ill.
Hunt, Helm, Ferris & Co., Harvard, Ill.
Sterling Wheelbarrow Co., Milwaukee, Wis.
James L. Taylor Mfg. Co., Poughkeepsie, N. Y.

CLAMPS—CONCRETE CONSTRUCTION

Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Sterling Wheelbarrow Co., Milwaukee, Wis.
James L. Taylor Mfg. Co., Poughkeepsie, N. Y.

CLAMPS—DOOR

Sargent & Co., New Haven, Conn.
James L. Taylor Mfg. Co., Poughkeepsie, N. Y.

CLAMPS—FORM

Geo. B. Carpenter & Co., Chicago, Ill.
Metal Forms Corp., Milwaukee, Wis.
Sterling Wheelbarrow Co., Milwaukee, Wis.
James I. Taylor Mfg. Co., Poughkeepsie, N. Y.

CLAMPS—SAW

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Henry Disston & Sons, Philadelphia, Pa.
Parks Ball Bearing Machine Co., Cincinnati, O.
Smith & Hemenway Co., Irvington, N. J.
Stover Mfg. & Engine Co., Freeport, Ill.

CLIPS—SIDING (METAL)

Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
F. D. Kees Mfg. Co., Beatrice, Neb.

CLOSETS—CHEMICAL AND SANITARY

Comfort Chemical Closet Co., Toledo, O.
B. B. Karol, Chicago, Ill.
Dail Steel Products Co., Lansing, Mich.
Leech Metallic Bathtub Co., Detroit, Mich.
Night Commander Lighting Co., Jackson, Mich. ("Purity Waterless Toilet").
Rowe Sanitary Mfg. Co., Detroit, Mich. ("Ro-San").
Sanitary Mfg. & Supply Co., Grand Rapids, Mich.
Sheldon Engine & Sales Co., Waterloo, Iowa ("Sheldon").
Superior Churn & Mfg. Co., Northville, Mich.
Waterman-Waterbury Co., Minneapolis, Minn.

CLOTHES POSTS—STEEL

Newark Steel Post Co., Newark, N. J. ("Remove-able").

CLUTCHES—FRICTION

American Cement Machine Co., Keokuk, Iowa ("Boss").
W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
H. W. Johns-Manville Co., New York, N. Y. (Non-Burn asbestos brake lining, asbestos-metallic brake blocks).
Keasbey & Mattison Co., Ambler, Pa. (Friction lining).
Merchant & Evans Co., Philadelphia, Pa.
Sheldon Engine & Sales Co., Waterloo, Iowa.
Standard Electric & Elevator Co., Baltimore, Maryland.

COAL CHUTES

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Badger Corrugating Co., La Crosse, Wis.
Canton Foundry & Machine Co., Canton, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Donley Bros. Co., leveland, O.
International Steel & Iron Co., Evansville, Ind.
Edwin A. Jackson & Bro., New York, N. Y.
Kewanee Mfg. Co., Kewanee, Ill. ("Kewanee" All-Steel).

Lansing Co., Lansing, Mich.
Majestic Co., Huntington, Ind.
Standard Scale & Supply Co., Pittsburgh, Pa.
Sterling Foundry Co., Sterling, Ill.
Stover Mfg. & Engine Co., Freeport, Ill.
Wagner Mfg. Co., Cedar Falls, Iowa.
Western Iron & Foundry Co., Wichita, Kans.
Willis Mfg. Co., Galesburg, Ill.

COAL HANDLING MACHINERY

Atlas Engineering Co., Milwaukee, Wis.
Buhl Machinery Co., Chicago, Ill.
A. F. Meyer Mfg. Co., Morton, Ill. ("Meyer").

COATINGS—CEMENT (COLORS)

Samuel Cabot, Inc., Boston, Mass.
Ceresit Waterproofing Co., Chicago, Ill.
Devoe & Reynolds Co., New York, N. Y. ("Devoe" flat colors).
General Fireproofing Co., Youngstown, O. ("GF").
Ideal Concrete Machinery Co., Cincinnati, O.
Eugene E. Nice, Philadelphia, Pa.
Toch Bros., New York, N. Y. ("R. I. W.").

COATINGS—ROOF

Philip Carey Co., Cincinnati, O. (Black asphalt paint, magnesia coating, fibre coating).
Devoe & Reynolds Co., New York, N. Y. ("Devoe" carbon and metallic paints).
General Fireproofing Co., Youngstown, O. ("GF").
H. W. Johns-Manville Co., New York, N. Y. ("Regal" roof coating, asbestos roof putty, fibrous enamel).
Eugene E. Nice, Philadelphia, Pa.
Pyramid Products Co., Bay City, Mich. ("Gumlastic" roof coating for recoating composition or metallic roofs).
Toch Bros., New York, N. Y. ("R. I. W.").

COLUMN BASES

Badger Corrugating Co., La Crosse, Wis.
Donley Bros. Co., Cleveland, O.
Hartmann-Sanders Co., Chicago, Ill.
International Steel & Iron Co., Evansville, Ind.
Majestic Co., Huntington, Ind.

COLUMNS—METAL

Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
J. E. Porter Co., Ottawa, Ill. ("Porter" concrete-filled).
Truscon Steel Co., Detroit, Mich.

COLUMNS—WOOD

Cadillac Lumber Co., Cadillac, Mich.
Carr, Ryder & Adams Co., Dubuque, Ia.
Crex Patent Column Co., Chicago, Ill.
Curtis Companies, Clinton, Ia.
Hartmann-Sanders Co., Chicago, Ill.

CONCRETE BOND

The Living-Stone Co., Baltimore, Md. ("Living-Stone").

CONCRETE SPOUTING

Ransome Concrete Machinery Co., Dunellen, N. J.
T. L. Smith Co., Milwaukee, Wis.

CONTROL

General Electric Co., Schenectady, N. Y. (Automatic pressure regulators, float switches, push-button stations).

CONVEYING MACHINERY

Atlas Engineering Co., Milwaukee, Wis.
Buhl Machine Co., Chicago, Ill.
W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
T. L. Smith Co., Milwaukee, Wis.
Standard Electric & Elevator Co., Baltimore, Maryland.
Stewart Mfg. Co., Waterloo, Iowa.

CONVEYORS—BELT

Atlas Engineering Co., Milwaukee, Wis.
Standard Electric & Elevator Co., Baltimore, Maryland.

CONVEYORS—CLAMP

James L. Taylor Mfg. Co., Poughkeepsie, N. Y.

CONVEYORS—PORTABLE

Atlas Engineering Co., Milwaukee, Wis.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Standard Electric & Elevator Co., Baltimore, Maryland.

COPING

Architectural Service Corp., Philadelphia, Pa.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").
Sterling Foundry Co., Sterling, Ill.

COPPER—ROLL

Edwards Mfg. Co., Cincinnati, O.
C. G. Hussey & Co., Pittsburgh, Pa. (Sheets, plates and rolls, corrugated copper conductor pipe, copper nails and rivets, copper eaves trough, etc.).
Merchant & Evans Co., Philadelphia, Pa.
Willis Mfg. Co., Galesburg, Ill.

CORNCRIBS—METAL

Thomas & Armstrong Co., London, O. ("Buckeye" corncribs and grain bins).

CORNERS—BUILDING (METAL)

Badger Corrugating Co., La Crosse, Wis.
Philip Bernard Co., Sioux City, Ia. ("O. K.").
Bostwick Steel Lath Co., Niles, O.
Edwards Mfg. Co., Cincinnati, O.
F. D. Kees Mfg. Co., Beatrice, Neb.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill.

CORNICES—SHEET METAL

Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
National Sheet Metal Roofing Co., Jersey City N. J.
Milwaukee Corrugating Co., Milwaukee, Wis.
Thomas & Armstrong Co., London, O.
Willis Mfg. Co., Galesburg, Ill.

COUNTERSINKS

Buck Bros., Millbury, Mass.
Goodell-Pratt Co., Greenfield, Mass.
North Bros. Mfg. Co., Philadelphia, Pa. ("Yankee").
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.
Syracuse Twist Drill Co., Syracuse, N. Y.

COUPLINGS—CUT-OFF

W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
Standard Electric & Elevator Co., Baltimore, Maryland.

CRANES—HAND-POWER

Canton Foundry & Machine Co., Canton, O.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sasgen Derrick Co., Chicago, Ill.
J. G. Speidel, Reading, Pa.
Standard Electric & Elevator Co., Baltimore, Maryland.

CRAYONS—LUMBER

A. S. Aloe Co., St. Louis, Mo.
Geo. B. Carpenter & Co., Chicago, Ill.
Jos. Dixon Crucible Co., Jersey City, N. J.
Kolesch & Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
Warren-Knight Co., Philadelphia, Pa.

CRESTINGS AND FINIALS

Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill.

CRUSHERS AND PULVERIZERS

T. L. Smith Co., Milwaukee, Wis.

CUTLERY

Albert Pick & Co., Chicago, Ill.

DAMPERS—FIREPLACE

Architectural Service Corp., Philadelphia, Pa.
Donley Bros. Co., Cleveland, O.
Edwin A. Jackson & Bros., New York, N. Y.
Stover Mfg. & Engine Co., Freeport, Ill.

DAMPPROOFING

Philip Carey Co., Cincinnati, O. ("Percoproof").
Ceresit Waterproofing Co., Chicago, Ill.
General Fireproofing Co., Youngstown, O. ("GF").
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" system of waterproofing and damppproofing).
S. O. S. Mfg. Co., Kansas City, Mo. ("S. O. S.").
Toch Bros., New York, N. Y.
Truscon Steel Co., Detroit, Mich.

DERRICKS—CIRCLE-SWING

Geo. B. Carpenter & Co., Chicago, Ill.
Sasgen Derrick Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

DERRICKS—HAND-POWER

Geo. B. Carpenter & Co., Chicago, Ill.
Helm Brick Machine Co., Cadillac, Mich.
La Plant-Choate Mfg. Co., Cedar Rapids, Iowa.
Sasgen Derrick Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

DERRICKS—LUMBERYARD

Geo. B. Carpenter & Co., Chicago, Ill.
Sasgen Derrick Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

DERRICKS—STIFF-LEG

Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
La Plant-Choate Mfg. Co., Cedar Rapids, Iowa.
Sasgen Derrick Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

DERRICKS—TRIPOD

Geo. B. Carpenter & Co., Chicago, Ill.
La Plant-Choate Mfg. Co., Cedar Rapids, Iowa.
Sasgen Derrick Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

DERRICKS—TRUCK

Republic Motor Trucks Co., Alma, Mich.
Sasgen Derrick Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

DIMENSION STOCK

Great Southern Lumber Co., Bogasusa, La. ("Bogalusa" brand Southern pine dimension stock).

DOOR BEDS

Murphy Door Bed Co., Chicago, Ill.

DOOR BUTTS

Architectural Service Corp., Philadelphia, Pa.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Griffin Mfg. Co., Erie, Pa.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Stanley Works, New Britain, Conn.
Yale & Towne Mfg. Co., New York, N. Y.

DOOR CHECKS

Architectural Service Corp., Philadelphia, Pa.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Yale & Towne Mfg. Co., New York, N. Y.

DOORS—CLEAN-OUT

Majestic Co., Huntington, Ind.

DOOR HANGERS—BARN AND GARAGE

Allith-Prouty Co., Danville, Ill.
Drew Carrier Co., Waterloo, Wis. ("Drew").
Edwards Mfg. Co., Cincinnati, O.
Hunt, Helm, Ferris & Co., Harvard, Ill.
Lane Bros. Co., Poughkeepsie, N. Y.
Louden Machinery Co., Fairfield, Ia.
F. E. Myers & Bros., Ashland, O.
National Mfg. Co., Sterling, Ill.
J. E. Porter Co., Ottawa, Ill. ("Hummer," "Double V," "Straightaway").
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sargent & Co., New Haven, Conn.
Stanley Works, New Britain, Conn.
Wagner Mfg. Co., Cedar Falls, Iowa.

DOOR HANGERS—HOUSE

Allith-Prouty Co., Danville, Ill.
Lane Bros. Co. Poughkeepsie, N. Y.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sargent & Co., New Haven, Conn.
Wagner Mfg. Co., Cedar Falls, Iowa.

DOOR HARDWARE

Allith-Prouty Co., Danville, Ill.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Cadillac Lumber Co., Cadillac, Mich.
Chicago Spring Butt Co., Chicago, Ill.
Griffin Mfg. Co., Erie, Pa.
Louden Machinery Co., Fairfield, Ia.
Merchant & Evans Co., Philadelphia, Pa.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Albert Pick & Co., Chicago, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Yale & Towne Mfg. Co., New York, N. Y.
Warren-Knight Co., Philadelphia, Pa.

DOOR HOLDERS

Architectural Service Corp., Philadelphia, Pa.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Caldwell Mfg. Co., Rochester, N. Y.
Griffin Mfg. Co., Erie, Pa.
National Mfg. Co., Sterling, Ill.
McKinney Mfg. Co., Pittsburgh, Pa.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Sterling Foundry Co., Sterling, Ill.
Yale & Towne Mfg. Co., New York, N. Y.

DOOR LOCK MORTISERS

Colgan Machinery & Supply Co., Columbus, O.
Albert W. Miller Mfg. Co., Cincinnati, O.

DOOR KNOCKERS

Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Yale & Towne Mfg. Co., New York, N. Y.

DOOR OPENERS—ELECTRIC

Richards-Wilcox Mfg. Co., Aurora, Ill.

DOOR PULLS

Allith-Prouty Co., Danville, Ill.
Griffin Mfg. Co., Erie, Pa.
McKinney Mfg. Co., Pittsburgh, Pa.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Stover Mfg. & Engine Co., Freeport, Ill.
Wagner Mfg. Co., Cedar Falls, Ia.
Yale & Towne Mfg. Co., New York, N. Y.

DOOR STOPS

Chicago Spring Butt Co., Chicago, Ill.
Griffin Mfg. Co., Erie, Pa.
Hunt, Helm, Ferris & Co., Harvard, Ill.
Louden Machinery Co., Fairfield, Ia.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Yale & Towne Mfg. Co., New York, N. Y.

DOOR SPRINGS

Allith-Prouty Co., Danville, Ill. (Screen doors).

Architectural Service Corp., Philadelphia, Pa.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Spring Butt Co., Chicago, Ill.
Lawson Mfg. Co., Chicago, Ill. ("Lawson").
National Mfg. Co., Sterling, Ill.
Sargent & Co., New Haven, Conn. ("Sargent").
Wagner Mfg. Co., Cedar Falls, Ia.

DOORS—BRONZE AND IRON

Architectural Service Corp., Philadelphia, Pa.
A. C. Chesley & Co., Inc., New York, N. Y.
International Steel & Iron Co., Evansville, Ind.
Wright Wire Co., Worcester, Mass.

DOORS—CELLAR (METAL)

A. C. Chesley & Co., Inc., New York, N. Y.
International Steel & Iron Co., Evansville, Ind.

DOORS—CLEAN-OUT

Donley Bros. Co., Cleveland, O. (For ashpits).
Sterling Foundry Co., Sterling, Ill.
Majestic, Huntington, Ind.

DOORS—COPPER-COVERED

Architectural Service Corp., Philadelphia, Pa.
A. C. Chesley & Co., Inc., New York, N. Y.
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.

DOORS—FIREPROOF (METAL-COVERED)

Architectural Service Corp., Philadelphia, Pa.
A. C. Chesley & Co., Inc., New York, N. Y.
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
Lane Bros. Co., Poughkeepsie, N. Y.
Merchant & Evans Co., Philadelphia, Pa.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Willis Mfg. Co., Galesburg, Ill.

DOORS—FIREPROOF (HOLLOW METAL)

Architectural Service Corp., Philadelphia, Pa.
International Steel & Iron Co., Evansville, Ind.
Richards-Wilcox Mfg. Co., Aurora, Ill.

DOORS—GRAIN ELEVATOR

Philip Bernard Co., Sioux City, Ia.
Edwards Mfg. Co., Cincinnati, O.

DOORS—HARDWOOD AND VENEERED

Brown Co., Portland, Me. ("Brownco").
Cadillac Lumber Co., Cadillac, Mich.
Carr, Ryder & Adams Co., Dubuque, Ia.
Curtis Companies, Clinton, Ia.
International Woodworking Co., Evansville, Ind.
Northern Hemlock & Hardwood Mfrs. Assn., Oshkosh, Wis.

DOORS—IRON AND STEEL

Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
Merchant & Evans Co., Philadelphia, Pa.
Truscon Steel Co., Detroit, Mich.
Western Iron & Foundry Co., Wichita, Kan.
Wright Wire Co., Worcester, Mass.

DOORS—SCREEN

Cadillac Lumber Co., Cadillac, Mich. ("No-Sag").

DOORS—SIDEWALK

American 3-Way Prism Co., Chicago, Ill.
Canton Foundry & Machine Co., Canton, O.
Western Iron & Foundry Co., Wichita, Kan.
Willis Mfg. Co., Galesburg, Ill.

DOORS—STORM

Cadillac Lumber Co., Cadillac, Mich.
Carr, Ryder & Adams Co., Dubuque, Ia.

DRAFTING TABLES

A. S. Aloe Co., St. Louis, Mo.
Devoe & Reynolds Co., Inc., New York, N. Y. ("Devoe").
Eugene Ditzgen Co., Chicago, Ill.
International Correspondence Schools, Scranton, Pennsylvania.
International Woodworking Co., Evansville, Ind.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
New York Blue Print Paper Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
Warren-Knight Co., Philadelphia, Pa.

DRAFTSMEN'S SCALES

A. S. Aloe Co., St. Louis, Mo.
Devoe & Reynolds Co., Inc., New York, N. Y. ("Devoe").
Eugene Ditzgen Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
New York Blue Print Paper Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
Warren-Knight Co., Philadelphia, Pa.

DRAFTING—INSTRUCTION IN

Chief Draftsman, Chicago, Ill.

DRAPERIES

Albert Pick & Co., Chicago, Ill.

DRAWING BOARDS

A. S. Aloe Co., St. Louis, Mo.
Devoe & Reynolds Co., New York, N. Y. ("Devoe").
Eugene Ditzgen Co., Chicago, Ill.
International Correspondence Schools, Scranton, Pennsylvania.
New York Blue Print Paper Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
Warren-Knight Co., Philadelphia, Pa.

DRAWING INSTRUMENTS

A. S. Aloe Co., St. Louis, Mo.
Devoe & Reynolds Co., New York, N. Y. ("Devoe").
Eugene Ditzgen Co., Chicago, Ill.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
New York Blue Print Paper Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
L. S. Starrett Co., Athol, Mass.
David White Co., Milwaukee, Wis. ("White").

DRAW KNIVES

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Buck Bros., Millbury, Mass.
Geo. B. Carpenter & Co., Chicago, Ill.
Mack & Co., Rochester, N. Y.
L. & I. J. White Co., Buffalo, N. Y.

DRILLS—BREAST AND HAND

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
North Bros. Mfg. Co., Philadelphia, Pa. ("Yankee").
Stanley Rule & Level Co., New Britain, Conn.
U. S. Expansion Bolt Co., New York, N. Y. ("Star").
Wisconsin Electric Co., Racine, Wis. ("Dumore").

DRILLS—CHAIN

Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Luther Grinder Mfg. Co., Milwaukee, Wis.
North Bros. Mfg. Co., Philadelphia, Pa.
Smith & Hemenway Co., Irvington, N. J.
Whisler Mfg. Co., Gibson, Ia. (Chucks).

DRILLS—TWIST

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Sidney Machine Tool Co., Sidney, O.
Syracuse Twist Drill Co., Syracuse, N. Y.

DUCK—COTTON

Wm. L. Barrell Co., New York, N. Y.
John Boyle & Co., New York, N. Y.

DUMBWAITERS

Architectural Service Corp., Philadelphia, Pa.
Highwood Dumbwaiter Co., Leonia, N. J.
International Steel & Iron Co., Evansville, Ind.
Kimball Bros. Co., Council Bluffs, Ia.
Sedgwick Machine Works, New York, N. Y. ("Sedgwick").
Sidney Elevator Co., Sidney, O.
J. G. Speidel, Reading, Pa.
Standard Electric & Elevator Co., Baltimore, Md.
Storm Mfg. Co., Newark, N. J. (Hand and electric).
Warner Elevator Mfg. Co., Cincinnati, O.
York Automatic Dumbwaiter Works, York, Pa.

DUMPCARTS

Standard Scale & Supply Co., Pittsburgh, Pa.

EDGERS—DOUBLE

American Saw Mill Machinery Co., New York, N. Y.
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Chicago Machinery Exchange, Chicago, Ill.
Sidney Machine Tool Co., Sidney, O.

EDGERS—GANGWAY

American Saw Mill Machinery Co., New York, N. Y.
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Chicago Machinery Exchange, Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Sidney Machine Tool Co., Sidney, O.

ELEVATORS—BUILDING MATERIAL

American Cement Machine Co., Keokuk, Iowa. ("Boss," "All Oak").
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
Lansing Co., Lansing, Mich.
Novo Engine Co., Lansing, Mich. ("Novo").
O. K. Clutch & Machinery Co., Columbia, Pa.
Oshkosh Mfg. Co., Oshkosh, Wis.
Sasgen Derrick Co., Chicago, Ill.
Sedgwick Machine Works, New York, N. Y.
T. L. Smith Co., Milwaukee, Wis.
Standard Electric & Elevator Co., Baltimore, Md.
Standard Scale & Supply Co., Pittsburgh, Pa.
Stewart Mfg. Co., Waterloo, Iowa.

ELEVATORS—FREIGHT

International Steel & Iron Co., Evansville, Ind.
Kimball Bros. Co., Council Bluffs, Iowa.
Sidney Elevator Co., Sidney, O.
J. G. Speidel, Reading, Pa.
Standard Electric & Elevator Co., Baltimore, Md.
Standard Scale & Supply Co., Pittsburgh, Pa.
Storm Mfg. Co., Newark, N. J. (Hand and electric).
Warner Elevator Mfg. Co., Cincinnati, O.
Western Iron & Foundry Co., Wichita, Kan.

ELEVATORS—PASSENGER

Kimball Bros. Co., Council Bluffs, Iowa.
Warner Elevator Mfg. Co., Cincinnati, O.

ELEVATORS—SIDEWALK

Geo. B. Carpenter & Co., Chicago, Ill.
Kimball Bros. Co., Council Bluffs, Iowa.
Sedgwick Machine Works, New York, N. Y. ("Sedgwick." Also automobile and invalid elevators).
Sidney Elevator Co., Sidney, O. ("Sidney").
J. G. Speidel, Reading, Pa.
Standard Electric & Elevator Co., Baltimore, Md.
Storm Mfg. Co., Newark, N. J. (Hand and electric).
Western Iron & Foundry Co., Wichita, Kan.

ENAMELS—ARCHITECTURAL

Devoe & Raynolds Co., New York, N. Y. ("Devoe" Roman, "Devoe" Holland enamel).
S. C. Johnson & Son, Racine, Wis. ("Johnson's").
Eugene E. Nice, Philadelphia, Pa.
Patton Paint Co., Milwaukee, Wis.
Pitcairn Varnish Co., Milwaukee, Wis.
Toch Bros., New York, N. Y.
Wadsworth, Howland & Co., Boston, Mass.

ENGINES—GASOLINE

American Cement Machine Co., Keokuk, Iowa. ("Mandt").
American Saw Mill Machinery Co., New York, N. Y.
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Ideal Engine Co., Lansing, Mich.
B. B. Karol, Chicago, Ill.
Kewanee Private Utilities Co., Kewanee, Ill.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
A. F. Meyer Mfg. Co., Morton, Ill. ("Bull Dog").
Milwaukee Air Power Pump Co., Milwaukee, Wis.
Novo Engine Co., Lansing, Mich. ("Novo").
O. K. Clutch & Machinery Co., Columbia, Pa.
Ottawa Mfg. Co., Ottawa, Kan.
Phelps Light & Power Co., Rock Island, Ill.
Rider-Ericsson Engine Co., Walden, N. Y.
Sheldon Engine & Sales Co., Waterloo, Iowa. ("Sheldon").
Sheldon Mfg. Co., Nehawka, Neb.
T. L. Smith Co., Milwaukee, Wis.
Standard Scale & Supply Co., Pittsburgh, Pa.
Witte Eng. Works, Kansas City, Mo. ("Witte").

ENGINES—KEROSENE

American Cement Machine Co., Keokuk, Iowa. ("Mandt").
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Deere & Co., Moline, Ill.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Milwaukee Air Power Pump Co., Milwaukee, Wis.
Novo Engine Co., Lansing, Mich. ("Novo").
Ottawa Mfg. Co., Ottawa, Kan.
O. K. Clutch & Machinery Co., Columbia, Pa.
Rider-Ericsson Engine Co., Walden, N. Y.
Sheldon Engine & Sales Co., Waterloo, Iowa. ("Sheldon").
Standard Scale & Supply Co., Pittsburgh, Pa.
Witte Engine Works, Kansas City, Mo.

ENGINES—STEAM

Geo. B. Carpenter & Co., Chicago, Ill.
Standard Electric & Elevator Co., Baltimore, Md.
Standard Scale & Supply Co., Pittsburgh, Pa.

ENGINEERING AND SURVEYING INSTRUMENTS

A. S. Aloe Co., St. Louis, Mo.
L. Beckmann Co., Toledo, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Eugene Dietzgen Co., Chicago, Ill.
Geier & Bluhm, Troy, N. Y. ("G. & B.").
International Correspondence Schools, Scranton, Pa.
Keuffel & Esser Co., Hoboken, N. J.
New York Blue Print Paper Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y. ("Peerless").
Spaulding-Moss Co., Boston, Mass.
Warren-Knight Co., Philadelphia, Pa.

EXCAVATOR AND LOADER

F. C. Austin Co., Inc., Chicago, Ill.
T. L. Smith Co., Milwaukee, Wis.
Warren-Knight Co., Philadelphia, Pa.

EXHAUST EQUIPMENT

Standard Electric & Elevator Co., Baltimore, Md.

EXPANSION BOLTS

Ankyra Mfg. Co., Philadelphia, Pa. ("Ankyra").
Geo. B. Carpenter & Co., Chicago, Ill.
National Lead Co., New York, N. Y.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Joseph T. Ryerson & Son, Chicago, Ill.
Standard Mfg. Co., Springfield, Mass. ("Little Giant").
U. S. Expansion Bolt Co., New York, N. Y. ("U. S. E.").

FACING—CONCRETE

Crown Point Spar Co., New York, N. Y. (Facing for cement).

FANS—VENTILATING
Standard Electric & Elevator Co., Baltimore, Md.

FEED CARRIERS
Drew Carrier Co., Waterloo, Wis. ("Drew").
Hunt, Helm, Ferris & Co., Harvard, Ill.
James Mfg. Co., Ft. Atkinson, Wis.
Louden Machinery Co., Fairfield, Iowa.
Mast, Foos & Co., Springfield, O. ("Buckeye").
J. E. Porter Co., Ottawa, Ill. ("Porter").
Silver Mfg. Co., Salem, O.

FELTS—DEADENING
Geo. B. Carpenter & Co., Chicago, Ill.
C. B. Hewitt & Bros., New York, N. Y. ("No Noise").
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" wood deadening felt, "Keystone" hair insulator, "Weathertite" building paper).

FENCE POST MACHINES—CEMENT
American Cement Machine Co., Keokuk, Iowa. ("Bull Dog").
W. E. Dunn Mfg. Co., Holland, Mich.
Helm Brick Machine Co., Cadillac, Mich.
Ideal Concrete Machinery Co., Cincinnati, O.
Lansing Co., Lansing, Mich.
Sheldon Mfg. Co., Nehawka, Neb.
F. B. Zieg Mfg. Co., Fredericktown, O.

FENCES—IRON AND STEEL
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O. ("Trussit" or "Self-Sentering").
Wright Wire Co., Worcester, Mass.

FENCES—WOVEN WIRE
Gilbert & Bennett Mfg. Co., Chicago, Ill.
New Jersey Wire Cloth Co., Trenton, N. J.
Ottawa Mfg. Co., Ottawa, Kan.
Wright Wire Co., Worcester, Mass.

FILES AND RASPS
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Simonds Mfg. Co., Fitchburg, Mass. ("Simonds")

FIRE DOOR HARDWARE
Allith-Prouty Co., Danville, Ill.
Lane Bros. Co., Poughkeepsie, N. Y.
Merchant & Evans Co., Philadelphia, Pa.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sargent & Co., New Haven, Conn.
Wagner Mfg. Co., Cedar Falls, Iowa.
Willis Mfg. Co., Galesburg, Ill.

FIRE ESCAPES
Western Iron & Foundry Co., Wichita, Kan.

FIRE EXTINGUISHERS
Geo. B. Carpenter & Co., Chicago, Ill.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" one-quart fire extinguisher, "Success" 2½-gallon soda and acid upset type, chemical fire engine, calcium chloride non-freezing).

FIREPLACES
Chas. T. Lorensen & Co., Chicago, Ill.

FIREPLACE FURNISHINGS
Architectural Service Corp., Philadelphia, Pa.
Edwin A. Jackson & Bro., New York, N. Y. (Andirons, Franklin stoves, gaslogs, grates for fireplaces).
Chas. F. Lorenzen & Co., Chicago, Ill.
Stover Mfg. & Engine Co., Freeport, Ill.

FLAG POLES—STEEL
Newark Steel Post Co., Newark, N. J.

FLOOR FINISH
Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y. ("Devoe" shellac marble floor finish, hard wax).
S. C. Johnson & Son, Racine, Wis. ("Johnson's" paste wood filler and prepared wax).
Eugene E. Nice, Philadelphia, Pa.
Patton Paint Co., Milwaukee, Wis. ("Pitcairn" aged floor spar).
Toch Bros., New York, N. Y.
Wadsworth, Howland & Co., Boston, Mass.

FLOOR HARDENERS
Ceresit Waterproofing Co., Chicago, Ill.
General Fireproofing Co., Youngstown, O. ("GF").
Living-Stone Co., Baltimore, Md. ("Lithotex").
Truscon Steel Co., Detroit, Mich.
Wadsworth, Howland & Co., Boston, Mass.

FLOOR SCRAPER BLADES
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Henry Disston & Sons, Philadelphia, Pa.
Fox Supply Co., Brooklyn, Wis.
Sargent & Co., New Haven, Conn. ("Sargent").
Stanley Rule & Level Co., New Britain, Conn.

FLOORING—CANVAS
Wm. L. Barrell Co., New York, N. Y.

FLOORING—COMPOSITION
Construction Materials Co., Chicago, Ill. ("Velvetile").
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" asphalt mastic flooring").
Franklyn R. Muller Co., Waukegan, Ill. ("Asbestone").
National Kellastone Co., Chicago, Ill. ("Kellastone").

FLOORING—FACTORY
Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" brand Southern pine factory flooring").

FLOORING—FIREPROOF
General Fireproofing Co., Youngstown, O. ("GF" steel tile and steel lumber),
International Steel & Iron Co., Evansville, Ind.
Johns-Manville Co., New York, N. Y. ("Johns-Manville" asphalt mastic flooring).
Franklyn R. Muller Co., Waukegan, Ill. ("Asbestone").

FLOORING—HARDWOOD
Brown Co., Portland, Me. ("Brownco").
Cadillac Lumber Co., Cadillac, Mich. ("Cobbs & Mitchell").
Carr, Ryder & Adams, Dubuque, Iowa.
Curtis Companies, Clinton, Iowa.
Northern Hemlock & Hardwood Mfrs. Asso., Oshkosh, Wis.
Oak Flooring Mfrs. Asso., Chicago, Ill.
Wood Mosaic Co., New Albany, Ind.

FLOORING—MOSAIC
Chas. F. Lorenzen & Co., Chicago, Ill.

FLOORING—PARQUETRY
Curtis Companies, Clinton, Iowa.
Wood Mosaic Co., New Albany, Ind.

FLOORING—SANITARY
Art Stone Co., Waynesboro, Pa.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" asphalt mastic flooring").
Chas. F. Lorenzen & Co., Chicago, Ill.
Franklyn R. Muller & Co., Waukegan, Ill.
National Kellastone Co., Chicago, Ill. ("Kellastone").
Structural Slate Co., Pen Argyl, Pa. (Slate).

FLOORING—WOOD
Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine wood-block flooring).

FLOORING—WOOD BLOCK
Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine wood-block flooring).

FLUE LINING
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" Vitribestos stack, breeching and flue lining; "Thermo" fire felt, "Vitro" fire felt).
National Fireproofing Co., Pittsburgh, Pa. (Fire clay).

FOOT SCRAPERS
F. D. Kees Mfg. Co., Beatrice, Neb.
National Mfg. Co., Sterling, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sargent & Co., New Haven, Conn.
Sterling Foundry Co., Sterling, Ill.
Wagner Mfg. Co., Cedar Falls, Iowa.

FORMS—CURB AND SIDEWALK
F. B. Zieg Mfg. Co., Fredericktown, O.

FORMS—WALL
Metal Forms Corp., Milwaukee, Wis.
Northfield Iron Co., Northfield, Minn. ("Northfield" collapsible culvert).
North Western Expanded Metal Co., Chicago, Ill.
M. L. Schleuter, Chicago, Ill.
F. B. Zeig Mfg. Co., Fredericktown, O.

FOUNTAINS—DRINKING
Philip Bernard Co., Sioux City, Iowa. ("O. K.").
Drew Carrier Co., Waterloo, Wis. ("Drew").
Hardin-Lavin Co., Chicago, Ill.
Hunt, Helm, Ferris & Co., Harvard, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis.
J. E. Porter Co., Ottawa, Ill. "Porter" gravity and automatic).
Shrauger & Johnson, Atlantic, Iowa.
Wolff Mfg. Co., Chicago, Ill.

FURNITURE—HOTEL, CLUB AND RESTAURANT
Albert Pick & Co., Chicago, Ill.

GARAGE HARDWARE
Architectural Service Corp., Philadelphia, Pa.
Cadillac Lumber Co., Cadillac, Mich.
Griffin Mfg. Co., Erie, Pa.
Lane Bros. Co., Poughkeepsie, N. Y.
Louden Machinery Co., Fairfield, Iowa.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Wagner Mfg. Co., Cedar Falls, Iowa.

GARAGES—PUBLIC AND PRIVATE
International Steel & Iron Co., Evansville, Ind.

GARBAGE BURNERS
Hardin-Lavin Co., Chicago, Ill.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Wright Wire Co., Worcester, Mass.

GARBAGE RECEIVERS
Donley Bros. Co., Cleveland, O.
Edwin A. Jackson & Bro., New York, N. Y.
Majestic Co., Huntington, Ind.
Willis Mfg. Co., Galesburg, Ill.

GARMENT HANGERS
Knape & Vogt Mfg. Co., Grand Rapids, Mich. ("Garment Care System").

GAS LOGS
Edwin A. Jackson & Bro., New York, N. Y.

GAS MACHINES—GASOLINE
Parks Ball Bearing Machine Co., Cincinnati, O.

GATES—DRIVE
Hartmann-Sanders Co., Chicago, Ill.
Wright Wire Co., Worcester, Mass.

GAUGES—AUGER BIT
Geo. B. Carpenter & Co., Chicago, Ill.
Sidney Machine Tool Co., Sidney, O.
James Swan Co., Seymour, Conn.
Syracuse Twist Drill Co., Syracuse, N. Y.

GAUGES—BUTT
Goodell-Pratt Co., Greenfield, Mass.
F. D. Kees Mfg. Co., Beatrice, Neb.
Stanley Rule & Level Co., New Britain, Conn.

GAUGES—HATCHET
F. D. Kees Mfg. Co., Beatrice, Neb.
L. A. Sayre Co., Newark, N. J.

GAUGES—MORTISE
Stanley Rule & Level Co., New Britain, Conn.

GAUGES—SHINGLING
L. A. Sayre Co., Newark, N. J.

GLASS—ART
Curtis Companies, Clinton, Iowa.
International Woodworking Co., Evansville, Ind.
Spaulding-Moss Co., Boston, Mass.

GLASS—BRICK
Chas. F. Lorenzen & Co., Chicago, Ill.

GLASS—LEADED
Curtis Companies, Clinton, Iowa.
International Woodworking Co., Evansville, Ind.

GLASS—PLATE
International Woodworking Co., Evansville, Ind.

GLASS—WIRE
American 3-Way Prism Co., Cicero, Ill.
Architectural Service Corp., Philadelphia, Pa.
Curtis Companies, Clinton, Iowa.
International Woodworking Co., Evansville, Ind.
Willis Mfg. Co., Galesburg, Ill.

GLUE POTS—ELECTRIC
General Electric Co., Schenectady, N. Y.

GOUGES—WOOD
Geo. B. Carpenter & Co., Chicago, Ill.
Mack & Co., Rochester, N. Y.
James Swan Co., Seymour, Conn.
L. & I. J. White Co., Buffalo, N. Y.

GRAIN ELEVATORS—BUILT-IN
Deere & Co., Moline, Ill.
A. F. Meyer Mfg. Co., Morton, Ill.
Meadows Mfg. Co., Pontiac, Ill.

GRANITE—ARTIFICIAL
Art Stone Co., Waynesboro, Pa. ("Artisto" concrete marbles and granites).

GRATES—FIREPLACE
Edwin A. Jackson & Bro., New York, N. Y.

GRILLES—STEEL AND WIRE
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
New Jersey Wire Cloth Co., Trenton, N. J.
Wright Wire Co., Worcester, Mass.

GRINDERS—DISK
Crescent Machine Co., Leetonia, O.
M. L. Schleuter, Chicago, Ill.

GRINDERS—TOOL
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Luther Grinder Mfg. Co., Milwaukee, Wis.
Richards-Wilcox Mfg. Co., Aurora, Ill.

GRINDSTONES
Geo. B. Carpenter & Co., Chicago, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Whisler Mfg. Co., Gibson, Iowa. (Power grindstone shafts).

GROUNDS
Bostwick Steel Lath Co., Niles, O.
General Fireproofing Co., Youngstown, O. ("GF").
Willis Mfg. Co., Galesburg, Ill.

GUARDS—JAMB AND CORNER
Bostwick Steel Lath Co., Niles, O.
Donley Bros. Co., Cleveland, O.
International Steel & Iron Co., Evansville, Ind.
Willis Mfg. Co., Galesburg, Ill.

GUARDS—SAFETY
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Crescent Machine Co., Leetonia, O.
Fox Supply Co., Brookyn, Wis.
New Jersey Wire Cloth Co., Trenton, N. J.

GUARDS—WINDOW
Edwards Mfg. Co., Cincinnati, O.
Gilbert & Bennett Mfg. Co., Chicago, Ill.
International Steel & Iron Co., Evansville, Ind.
New Jersey Wire Cloth Co., Trenton, N. J.
Sargent & Co., New Haven, Conn.
Willis Mfg. Co., Galesburg, Ill.

HAMMERS

Geo. B. Carpenter & Co., Chicago, Ill.
Griffith Tool Works, Philadelphia, Pa.
Merchant & Evans Co., Philadelphia, Pa.
Albert Pick & Co., Chicago, Ill.
Sargent & Co., New Haven, Conn.
Stanley Rule & Level Co., New Britain, Conn.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

HANGERS—EAVES TROUGH

Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrupating Co., Milwaukee, Wis.
Willis Mfg. Co., Galesburg, Ill.

HANGERS—JOIST

Geo. B. Carpenter & Co., Chicago, Ill.
International Steel & Iron Co., Evansville, Ind.
Lane Bros. Co., Poughkeepsie, N. Y.
Joseph T. Ryerson & Son, Chicago, Ill.
Willis Mfg. Co., Galesburg, Ill.

HANGERS—PIPE

Badger Corrugating Co., La Crosse, Wis.
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
F. D. Kees Mfg. Co., Beatrice, Neb.
Merchant & Evans Co., Philadelphia, Pa.

HANGERS—SLIDING PARTITION

Lane Bros. Co., Poughkeepsie, N. Y.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Wagner Mfg. Co., Cedar Falls, Iowa.

HARDENERS—CEMENT

Ceresit Waterproofing Co., Chicago, Ill.
General Fireproofing Co., Youngstown, O. ("GF")
Patton Paint Co., Milwaukee, Wis.
Toch Bros., New York, N. Y. ("R.I.W.").
Truscon Steel Co., Detroit, Mich.
Wadsworth, Howland & Co., Boston, Mass.

HATCHETS—LATHING

Geo. B. Carpenter & Co., Chicago, Ill.
Griffith Tool Works, Philadelphia, Pa.
Mack & Co., Rochester, N. Y.
L. A. Sayre Co., Newark, N. J.

HAY CARRIERS

Drew Carrier Co., Waterloo, Wis. ("Drew").
Louden Machinery Co., Fairfield, Iowa.
O. K. Clutch & Machinery Co., Columbia, Pa.
J. E. Porter Co., Ottawa, Ill. ("Porter," "Meadow Lark," "Meadow King").

HAY TRACK

Drew Carrier Co., Waterloo, Ia. ("Drew").
Louden Machinery Co., Fairfield, Iowa.
F. E. Meyers & Bros., Ashland, O.
J. E. Porter Co., Ottawa, Ill. ("Porter," "Columbian").

HEADS—CUTTER

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").

HEADS—DADO

American Cement Machine Co., Keokuk, Iowa. ("Boss").
E. C. Atkins & Co., Indianapolis, Ind. "Atkins").
Crescent Machine Co., Leetonia, O.
Henry Disston & Sons, Philadelphia, Pa.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.

HEADS—JOINTER

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Crescent Machine Co., Leetonia, O.
Henry Disston & Sons, Philadelphia, Pa.
Whisler Mfg. Co., Gibson, Iowa.

HEADS—SHAPER

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Crescent Machine Co., Leetonia, O.

HEAT REGULATORS

Architectural Service Corp, Philadelphia, Pa.
Hardin-Lavin Co., Chicago, Ill.
Haynes-Langenberg Mfg. Co., St. Louis, Mo. ("Front Rank").
Homer Furnace Co., Homer, Mich.
Williamson Heater Co., Cincinnati, O.

HEATERS—GARAGE

Edwards Mfg. Co., Cincinnati, O.
Hardin-Lavin Co., Chicago, Ill.
Haynes-Langenberg Mfg. Co., St. Louis, Mo. ("Front Rank").
Homer Furnace Co., Homer, Mich.
Standard Heating Co., Chicago, Ill.

HEATERS—ROOM

Architectural Service Corp., Philadelphia, Pa.
The Beckwith Co., Dowagiac, Mich.
Haynes-Langenberg Mfg. Co., St. Louis, Mo. ("Front Rank").
Hero Furnace Co., Chicago, Ill. (For schools).
Hess Warming & Ventilating Co., Chicago, Ill. ("Hess" welded steel).
Homer Furnace Co., Homer, Mich.
B. B. Karol, Chicago, Ill.
Chas. F. Lorenzen & Co., Chicago, Ill. (For fireplaces).
L. J. Mueller Furnace Co., Milwaukee, Wis.
Albert Pick & Co., Chicago, Ill.
Standard Heating Co., Chicago, Ill.
Waterman-Waterbury Co., Minneapolis, Minn.
Williamson Heater Co., Cincinnati, O.

HEATING PLANTS—PIPELESS FURNACES

American Bell & Foundry Co., Northville, Mich.
The Beckwith Co., Dowagiac, Mich.
Bovee Furnace Works, Waterloo, Iowa. ("Bovee").
Geo. B. Carpenter & Co., Chicago, Ill.
Haynes-Langenberg Mfg. Co., St. Louis, Mo. ("Front Rank").
Hero Furnace Co., Chicago, Ill.
Hess Warming & Ventilating Co., Chicago, Ill. ("Hess" welded steel).
Homer Furnace Co., Homer, Mich.
B. B. Karol, Chicago, Ill.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Majestic Co., Huntington, Ind.
Standard Heating Co., Chicago, Ill.
Waterman-Waterbury Co., Minneapolis, Minn.
Williamson Heater Co., Cincinnati, O.
F. B. Zieg Mfg. Co., Fredericktown, O.

HEATING PLANTS—STEAM (BLOWER)

Williamson Heater Co., Cincinnati, O.

HEATING PLANTS—STEAM (DIRECT RADIATION

Geo. B. Carpenter & Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Williamson Heater Co., Cincinnati, O.

HEATING PLANTS—VAPOR SYSTEM

B. B. Karol, Chicago, I..
L. J. Mueller Furnace Co., Milwaukee, Wis.
Williamson Heater Co., Cincinnati, O.

HEATING PLANTS—WARM AIR FURNACE

American Bell & Foundry Co., Northville, Mich.
The Beckwith Co., Dowagiac, Mich.
Bovee Furnace Works, Waterlooñ Iowa. ("Bovee").
Haynes-Langenberg Mfg. Co., St. Louis, Mo. ("Front Rank").
Hero Furnace Co., Chicago, Ill.
Hess Warming & Ventilating Co., Chicago, Ill. ("Hess' welded steel).
Holland Furnace Co., Holland, Mich.
Homer Furnace Co., Homer, Mich.
B. B. Karol, Chicago, Ill.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Majestic Co., Huntington, Ind.
Waterman-Waterbury Co., Minneapolis, Minn.
Williamson Heater Co., Cincinnati, O.
F. B. Zieg Mfg. Co., Fredericktown, O.

HINGES—BLIND AND SHUTTER

McKinney Mfg. Co., Pittsburgh, Pa.
Sargent & Co., New Haven, Conn.
Stanley Works, New Britain, Conn.

HINGES—BUTT

Architectural Service Corp., Philadelphia, Pa.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Cadillac Lumber Co., Cadillac, Mich.
Chicago Spring Butt Co., Chicago, Ill.
Griffin Mfg. Co., Erie, Pa.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Yale & Towne Mfg. Co., New York, N. Y.

HINGES—FLOOR

Allith-Prouty Co., Danville, Ill.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Cadillac Lumber Co., Cadillac, Mich.
Chicago Spring Butt Co., Chicago, Ill.
Lawson Mfg. Co., Chicago, Ill. ("Lawson").
National Mfg. Co., Sterling, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stover Mfg. & Engine Co., Freeport, Ill.

HINGES—SCREEN DOOR

Architectural Service Corp., Philadelphia, Pa.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Cadillac Lumber Co., Cadillac, Mich.
Chicago Spring Butt Co., Chicago, Ill.
Griffin Mfg. Co., Erie, Pa.
Lawson Mfg. Co., Chicago, Ill. ("Lawson").
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Stover Mfg. & Engine Co., Freeport, Ill.

HINGES—SPRING

Allith-Prouty Co., Danville, Ill.
Architectural Service Corp., Philadelphia, Pa.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Chicago Spring Butt Co., Chicago, Ill.
Lawson Mfg. Co., Chicago, Ill. ("Lawson").
Sargent & Co., New Haven, Conn. ("Sargent").
Shelby Spring Hinge Co., Shelby, O.
Stover Mfg. & Engine Co., Freeport, Ill.

HINGES—STRAP AND T

Architectural Service Corp., Philadelphia, Pa.
Cadillac Lumber Co., Cadillac, Mich.
Geo. B. Carpenter & Co., Chicago, Ill.
Drew Carrier Co., Waterloo, Wis. ("Drew").
Griffin Mfg. Co., Erie, Pa.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Sargent & Co., New Haven, Conn.
Stanley Works, New Britain, Conn.

HINGES—SURFACE

Architectural Service Corp., Philadelphia, Pa.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Chicago Spring Butt Co., Chicago, Ill.
Griffin Mfg. Co., Erie, Pa.
McKinney Mfg. Co., Pittsburgh, Pa. "McKinney").
National Mfg. Co., Sterling, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Yale & Towne Mfg. Co., New York, N. Y.

HOISTS—ELECTRIC

American Cement Machine Co., Keokuk, Iowa. ("Boss").
American Saw Mill Machinery Co., New York, N. Y.
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
O. K. Clutch & Machinery Co., Columbia, Pa.
Standard Electric & Elevator Co., Baltimore, Md.
Standard Scale & Supply Co., Pittsburgh, Pa.
Warner Elevator Mfg. Co., Cincinnati, O.
Yale & Towne Mfg. Co., New York, N. Y.

HOISTS—GASOLINE

American Cement Machine Co., Keokuk, Iowa.
American Saw Mill Machinery Co., New York, N. Y.
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Ideal Engine Co., Lansing, Mich. (Light and heavy duty single and double-drum hoists).
Jaeger Machine Co., Columbus, O.
Knickerbocker Co., Jackson, Mich. ("Knicker bocker").
Lansing Co., Lansing, Mich.
Louden Machinery Co., Fairfield, Iowa. (Power).
Novo Engine Co., Lansing, Mich. ("Novo").
O. K. Clutch & Machinery Co., Columbia, Pa.
J. E. Porter Co., Ottawa, Ill. ("Jepco," no engine furnished).
T. L. Smith Co., Milwaukee, Wis.
Standard Scale & Supply Co., Pittsburgh, Pa.

HOISTS—HAND- POWER

American Saw Mill Machinery Co., New York, N. Y.
Archer Iron Works, Chicago, Ill. (For motor trucks).
Canton Foundry & Machine Co., Canton, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Louden Machinery Co., Fairfield, Iowa.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sasgen Derrick Co., Chicago, Ill.
Sedgwick Machine Works, New York, N. Y. ("Sedgwick").
Shrauger & Johnson, Atlantic, Iowa.
J. G. Speidel, Reading, Pa.
Standard Electric & Elevator Co., Baltimore, Md.
Standard Scale & Supply Co., Pittsburgh, Pa.
Warner Elevator Mfg. Co., Cincinnati, O.
Yale & Towne Mfg. Co., New York, N. Y.

HOISTS—ROPE

Geo. B. Carpenter & Co., Chicago, Ill.
Hunt, Helm, Ferris & Co., Harvard, Ill.
Lane Bros. Co., Poughkeepsie, N. Y.
Sasgen Derrick Co., Chicago, Ill.
Sedgwick Machine Works, New York, N. Y. ("Sedgwick").
Standard Electric & Elevator Co., Baltimore, Md.
Standard Scale & Supply Co., Pittsburgh, Pa.

HOISTS—STEAM

Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

HOOP FASTENERS

W. E. Caldwell Co., Louisville, Ky. ("Caldwell").

ICE CHESTS

Herrick Refrigerator Co., Waterloo, Iowa.
Albert Pick & Co., Chicago, Ill.

INSERTS—CONCRETE

Geo. B. Carpenter & Co., Chicago, Ill.
Donley Bros. Co., Cleveland, O.
Living-Stone Co., Baltimore, Md.
Miles Mfg. Co., Jackson, Mich.
Truscon Steel Co., Detroit, Mich.

INSTRUCTION BY CORRESPONDENCE

Chicago Technical College, Chicago, Ill.
Chief Draftsman, Chicago, Ill. (Draftsmanship).
International Correspondence Schools, Scranton, Pa.

INTERIOR TRIM—HARDWOOD

Cadillac Lumber Co., Cadillac, Mich. ("Cadillac" gray elm).
Carr, Ryder & Adams Co., Dubuque, Iowa.
Curtis Companies, Clinton, Iowa.
International Woodworking Co., Evansville, Ind.
Northern Hemlock & Hardwood Mfrs. Asso., Oshkosh, Wis.

INSULATION—COLD STORAGE

Architectural Service Corp., Philadelphia, Pa.
Samuel Cabot, Boston, Mass. ("Cabot's Quilt").
Herrick Refrigerator Co., Waterloo, Iowa.
International Insulation Co., St. Paul, Minn.
H. W. Johns-Manville Co., New York, N. Y.

("Johns-Manville" cork insulation, built-in brine and ammonia insulation).

INTERIOR TRIM—METAL

Architectural Service Corp., Philadelphia, Pa.

INTERIOR TRIM—WOOD

Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine interior trim).

IRON—ARCHITECTURAL

International Steel & Iron Co., Evansville, Ind.
Lebanon Machine Co., Lebanon, N. H.
Western Iron & Foundry Co., Wichita, Kan.

IRON WORK—BUILDERS

International Steel & Iron Co., Evansville, Ind.
Western Iron & Foundry Co., Wichita, Kan.

JACKS—HOUSE MOVING

Geo. B. Carpenter & Co., Chicago, Ill.
Elite Mfg. Co., Ashland, O.
LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa.

JOINTERS—MASONS AND CEMENT WORKERS

Abram Cement Tool Co., Detroit, Mich. ("Abram").
Geo. B. Carpenter & Co., Chicago, Ill.
Sidney Machine Tool Co., Sidney, O.

JOINTERS—WOODWORKING

American Saw Mill Machinery Co., New York, N. Y.
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Parks Ball Bearing Machine Co., Cincinnati, O.
Silver Mfg. Co., Salem, O.
J. D. Wallace & Co., Chicago, Ill.
Woodworker Mfg. Co., Detroit, Mich.

JOISTS—WOOD

Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine joists).

JOISTS AND STUDS—PRESSED STEEL

Truscon Steel Co., Detroit, Mich.

KALSOMINE

Devoe & Raynolds Co., New York, N. Y. ("Devoe" hot and cold water).
M. Ewing Fox Co., New York, N. Y. ("Muralite," "Calcitrine").
Wadsworth, Howland & Co., Boston, Mass.

KITCHENS—STEEL

Murphy Door Bed Co., Chicago, Ill. ("Majestic")

KNIVES—MOULDING

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Henry Disston & Sons, Philadelphia, Pa.
Mack & Co., Rochester, N. Y.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Simonds Mfg. Co., Fitchburg, Mass. ("Simonds")
L. & I. J. White Co., Buffalo, N. Y.

KNIVES—PLANER

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Henry Disston & Sons, Philadelphia, Pa.
Mack & Co., Rochester, N. Y.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Simonds Mfg. Co., Fitchburg, Mass. ("Simonds")
L. & I. J. White Co., Buffalo, N. Y.

LADDERS

Allith-Prouty Co., Danville, Ill. (Store).
Geo. B. Carpenter & Co., Chicago, Ill.
F. E. Meyers & Bros., Ashland, O. (Store).

LATCHES

Allith-Prouty Co., Danville, Ill.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Wagner Mfg. Co., Cedar Falls, Iowa.

LATH—EXPANDED METAL

Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O.
Bostwick Steel Lath Co., Niles, O.
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O. ("G-F").
International Steel & Iron Co., Evansville, Ind.
MacAdams & Call, Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Joseph T. Ryerson & Son, Chicago, Ill.
Sykes Metal Lath & Roofing Co., Niles, O.
Truscon Steel Co., Detroit, Mich.
Willis Mfg. Co., Galesburg, Ill.
Youngstown Pressed Steel Co., Youngstown, O.

LATH—METAL

American Sheet & Tin Plate Co., Pittsburgh, Pa.
Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O.
Bostwick Steel Lath Co., Niles, O.
Cadillac Lumber Co., Cadillac, Mich.
Ceresit Waterproofing Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O. ("Herringbone" rigid metal lath, "Key" expanded metal lath, "GF" fire lath, "Herringbone-Armco" iron lath).
MacAdams & Call, Chicago, Ill.
Merchant & Evans Co., Chicago, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis.
New Jersey Wire Cloth Co., Trenton, N. J.
Northwestern Expanded Metal Co., Chicago, Ill. ("Nemco" line, including "Kno-Burn," "XXth Century," "Corrugated," "Eureka," "Chanelath," "Kno-Fur," etc.).
Joseph T. Ryerson & Son, Chicago, Ill.
Sykes Metal Lath & Roofing Co., Niles, O.
Truscon Steel Co., Detroit, Mich.
Western Iron & Foundry Co., Wichita, Kan.
Willis Mfg. Co., Galesburg, Ill.
Youngstown Pressed Steel Co., Youngstown, O.

LATH—SHEATHING

MacAdams & Call, Chicago, Ill. ("E-Cod Fabric).

LATH—WIRE

Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Gilbert & Bennett Mfg. Co., Chicago, Ill.
International Steel & Iron Co., Evansville, Ind.
MacAdams & Call, Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
New Jersey Wire Cloth Co., Trenton, N. J.
Wright Wire Co., Worcester, Mass.

LATH—WOODEN

Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine lath).

LATHES—WOODWORKING

Chicago Machinery Exchange, Chicago, Ill.
Sidney Machine Tool Co., Sidney, O.

LAUNDRY TRAYS

Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis.

LAUNDRY TUBS

Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Slatington Slate Co., Slatington, Pa. (Clear black).
Structural Slate Co., Pen Argyl, Pa.
Wolff Mfg. Co., Chicago, Ill.

LAVATORIES AND FITTINGS

Ankyra Mfg. Co., Philadelphia, Pa.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis. (Barber, battery, built-in, dental and prison).
Wolff Mfg. Co., Chicago, Ill.

LETTERS—METAL

Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
Lebanon Machine Co., Lebanon, N. H.
Merchant & Evans Co., Philadelphia, Pa.
Sargent & Co., New Haven, Conn.
Willis Mfg. Co., Galesburg, Ill.
Yale & Towne Mfg. Co., New York, N. Y.

LEVEL GLASSES

J. Sand & Sons, Detroit, Mich.

LEVEL SIGHTS

J. Sand & Sons, Detroit, Mich.

LEVELS—BUILDERS

A. S. Aloe Co., St. Louis, Mo.
L. Beckmann Co., Toledo, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Eugene Dietzgen Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Geier & Bluhm, Troy, N. Y. ("G. & B.").
Goodell-Pratt Co., Greenfield, Mass.
Edward Helb, Railroad, Pa.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
L. S. Starrett Co., Athol, Mass.
David White Co., Milwaukee, Wis. ("White Improved").
Warren-Knight Co., Philadelphia, Pa.

LEVELS—CARPENTERS

Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Goodell-Pratt Co., Greenfield, Mass.
Peerless Blue Print Co., New York, N. Y. ("Peerless").
J. Sand & Son, Detroit, Mich.
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.
Warren-Knight Co., Philadelphia, Pa.

LIGHT

General Electric Co., Schenectady, N. Y. (Arc lamps for blue printing, buzzer "Remondo" floodlighting projectors, arc lamps, "Novalux" units, "All-Nite-Lite").

LIGHTING FIXTURES

B. B. Karol, Chicago, Ill.
Sheldon Engine & Sales Co., Waterloo, Iowa.

LIGHTING SYSTEMS—ACETYLENE

Night Commander Lighting Co., Jackson, Mich. (Michigan pit generator).

LIGHTING SYSTEMS—ELECTRIC

Buhl Machine Co., Chicago, Ill.
Domestic Engineering Co., Dayton, O. ("Delco Light").
Kewanee Private Utilities Co., Kewanee, Ill.
Milwaukee Air Power Pump Co., Milwaukee, Wis.
Phelps Light & Power Co., Rock Island, Ill.
Sheldon Engine & Sales Co., Waterloo, Iowa. ("Sheldon").
Standard Scale & Supply Co., Pittsburgh, Pa.
Universal Products Co., Sandusky, O.

LIGHTNING PROTECTION

Jos. Barnett & Co., Cedar Rapids, Iowa.
Burkett Lightning Rod Co., Fremont, O.
Hawkeye Lightning Rod Co., Cedar Rapids, Iowa.
W. C. Shinn Mfg. Co., Chicago, Ill. ("Shinn-Flat").
Shrauger & Johnson, Atlantic, Iowa.
Geo. E. Thompson Lightning Rod Co., Owatonna, Minn.

LITTER CARRIERS

Drew Carrier Co., Waterloo, Wis. ("Drew").
Hunt, Helm, Ferris & Co., Harvard, Ill.
James Mfg. Co., Ft. Atkinson, Wis.
Louden Machinery Co., Fairfield, Iowa.
Mast, Foos & Co., Springfield, O. ("Buckeye").
J. E. Porter Co., Ottawa, Ill. ("Porter").

LIGHTS—SIDEWALK

American 3-Way Prism Co., Cicero, Ill.
Berger Mfg. Co., Canton, O.

LOADERS—CAR

Atlas Engineering Co., Milwaukee, Wis.
Standard Scale & Supply Co., Pittsburgh, Pa.

LOADERS—WAGON

Atlas Engineering Co., Milwaukee, Wis.
F. C. Austin Co., Inc., Chicago, Ill.
Buhl Machine Co., Chicago, Ill.
T. L. Smith Co., Milwaukee, Wis.
Standard Scale & Supply Co., Pittsburgh, Pa.

LOCKERS—STEEL

Berger Mfg. Co., Canton, O.
Edwards Mfg. Co., Cincinnati, O.
Hart & Hutchinson Co., New Britain, Conn.
Waterman-Waterbury Co., Minneapolis, Minn.
Wright Wire Co., Worcester, Mass.

LOCKS AND KNOBS—DOOR

Cadillac Lumber Co., Cadillac, Mich.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Yale & Towne Mfg. Co., New York, N. Y.

LUMBER MANUFACTURERS

Brown Co., Portland, Me.
Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" brand extra dense long-leaf Southern pine).
North Hemlock & Hardwood Mfrs. Asso., Oshkosh, Wis.
Sheldon Mfg. Co., Nehawka, Neb.
Southern Cypress Mfrs. Asso., New Orleans, La.
Wood Mosaic Co., New Albany, Ind. (Hardwood).

LUMBER—ASBESTOS

Architectural Service Corp., Philadelphia, Pa.
H. W. Jonhs-Manville Co., New York, N. Y. ("Johns-Manville Transite" asbestos wood; ebony asbestos wood).
Keasbey & Mattison Co., Ambler, Pa.

LUMBER—METAL

Berger Mfg. Co., Canton, O.
General Fireproofing Co., Youngstown, O. ("G-F" steel lumber).
North Western Expanded Metal Co., Chicago, Ill. ("Nemco Prest-Steel").
Truscon Steel Co., Detroit, Mich.

LUNCHROOM EQUIPMENT

Albert Pick & Co., Chicago, Ill. (For factories).

MANTELS—BRICK AND TILE

Architectural Service Corp., Philadelphia, Pa.
Chas. F. Lorenzen & Co., Chicago, Ill.
Midland Terra Cotta Co., Chicago, Ill.

MANTELS—WOOD

Carr, Ryder & Adams Co., Dubuque, Iowa.
Curtis Companies, Clinton, Iowa. (Sideboards colonnades, bookcases and everything in woodwork).
Hartmann-Sanders Co., Chicago, Ill.
Edwin A. Jackson & Bro., New York, N. Y.
Chas. F. Lorenzen & Co., Chicago, Ill.

MARBLE—ARTIFICIAL

Art Stone Co., Waynesboro, Pa. ("Artisto").

MARQUEES

Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
Milwaukee Corrugating Co., Milwaukee, Wis.
Willis Mfg. Co., Galesburg, Ill.

MATS AND MATTING

Albert Pick & Co., Chicago, Ill. (Rubber and cocoa).

MILLWORK—WHOLESALE

Cadillac Lumber Co., Cadillac, Mich.
Carr, Ryder & Adams Co., Dubuque, Iowa. ("Bilt-Well").
Curtis Companies, Clinton, Iowa. (Doors, windows, window and door frames, storm doors and windows, screen doors and windows, stairways, newels, and everything in woodwork).
International Woodworking Co., Evansville, Ind.
Hartmann-Sanders Co., Chicago, Ill.
Northern Hemlock & Hardwood Mfrs. Asso., Oshkosh, Wis.

MINERAL WOOL

Hardin-Lavin Co., Chicago, Ill.

MIRRORS

Albert Pick & Co., Chicago, Ill.

MITRE BOXES

E. C. Atkins & Co., Indianapolis, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Smith & Hemenway Co., Irvington, N. J.
Stanley Rule & Level Co., New Britain, Conn.

MITERING MACHINES

American Saw Mill Machinery Co., New York, N. Y. ("American").
Chicago Machinery Exchange, Chicago, Ill.

Goodell-Pratt Co., Greenfield, Mass.
Sidney Machine Tool Co., Sidney, O.

MIXERS—CONCRETE (BATCH)

American Cement Machine Co., Keokuk, Iowa. ("Boss," "Bull Dog").
Archer Iron Works, Chicago, Ill. ("Archer").
Atlas Engineering Co., Milwaukee, Wis.
F. C. Austin Co., Inc., Chicago, Ill.
Blystone Mfg. Co., Cambridge Springs, Pa. ("Blystone").
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
W. E. Dunn Mfg. Co., Holland, Mich.
Frank Mfg. Co., Des Moines, Iowa. ("Frank").
Helm Brick Machine Co., Cadillac, Mich.
Ideal Concrete Machinery Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
Jaeger Machine Co., Columbus, O.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Koehring Machine Co., Milwaukee, Wis.
Lakewood Engineering Co., Cleveland, O.
Lansing Co., Lansing, Mich.
Little Whirlwind Mixer Co., La Crosse, Wis. ("Little Whirlwind").
Miles Mfg. C., Jackson, Mich.
Northfield Iron Co., Northfield, Minn. ("Northfield").
O. K. Clutch & Machinery Co., Columbia, Pa.
Oshkosh Mfg. Co., Oshkosh, Wis.
Parks Ball Bearing Machine Co., Cincinnati, O.
Ransome Concrete Machinery Co., Dunellen, N. J.
Sheldon Engine & Sales Co., Waterloo, Iowa. ("Sheldon").
Sheldon Mfg. Co., Nehawka, Neb. ("Sheldon").
Sidney Elevator Mfg. Co., Sidney, O.
T. L. Smith Co., Milwaukee, Wis.
Stewart Mfg. Co., Waterloo, Iowa.
Standard Scale & Supply Co., Pittsburgh, Pa.
Waterloo Construction Machinery Co., Waterloo, Iowa. ("Wonder").
F. B. Zieg Mfg. Co., Fredericktown, O.

MIXERS—CONCRETE (CONTINUOUS)

Geo. B. Carpenter & Co., Chicago, Ill.
Elite Mfg. Co., Ashland, O.
Helm Brick Machine Co., Cadillac, Mich. ("Little Giant").
Ideal Concrete Machinery Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
Knickerbocker Co., Jackson, Mich. ("Coltrin").
Lansing Co., Lansing, Mich.
Miles Mfg. Co., Jackson, Mich. ("Simplex").
Oshkosh Mfg. Co., Oshkosh, Wis.
Sheldon Engine & Sales Co., Waterloo, Iowa.
F. B. Zieg Mfg. Co., Fredericktown, O.

MIXERS—MORTAR AND PLASTER

American Cement Machine Co., Keokuk, Iowa. ("Boss").
Archer Iron Works, Chicago, Ill.
Blystone Mfg. Co., Cambridge Springs, Pa. ("Blystone").
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Frank Mfg. Co., Des Moines, Iowa. ("Frank").
Helm Brick Machine Co., Cadillac, Mich.
Ideal Concrete Machinery Co., Cincinnati, O.
Jaeger Machine Co., Columbus, O.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Lakewood Engineering Co., Cleveland, O.
Miles Mfg. Co., Jackson, Mich.
Northfield Iron Co., Northfield, Minn.
Standard Scale & Supply Co., Pittsburgh, Pa.
Waterloo Construction Machinery Co., Waterloo, Iowa. ("Wonder").
F. B. Zieg Mfg. Co., Fredericktown, O.

MOLDS—CEMENT BRICK

Helm Brick Machine Co., Cadillac, Mich. ("Helm" ornamental brick molds).
Miles Mfg. Co., Jackson, Mich.
Stewart Mfg. Co., Waterloo, Iowa. ("Handy").
F. B. Zieg Mfg. Co., Fredericktown, O.

MOLDS—CEMENT CHIMNEY

W. E. Dunn Mfg. Co., Holland, Mich.

MOLDS—CEMENT DRAIN TILE

American Cement Machine Co., Keokuk, Iowa.
W. E. Dunn Mfg. Co., Holland, Mich.
Ideal Concrete Machinery Co., Cincinnati, O.
Lansing Co., Lansing, Mich.
Miles Mfg. Co., Jackson, Mich.
F. B. Zieg Mfg. Co., Fredericktown, O.

MOLDS—CEMENT FENCE POST

American Cement Machine Co., Keokuk, Iowa. ("Bull Dog").
W. E. Dunn Mfg. Co., Holland, Mich.
Helm Brick Machine Co., Cadillac, Mich. ("Helm").
Ideal Concrete Machinery Co., Cincinnati, O.
Lansing Co., Lansing, Mich.
Miles Mfg. Co., Jackson, Mich.
F. B. Zieg Mfg. Co., Fredericktown, O.

MOLDS—CEMENT SILO

American Cement Machine Co., Keokuk, Iowa. ("Boss").
Helm Brick Machine Co., Cadillac, Mich. ("Helm").
Ideal Concrete Machinery Co., Cincinnati, O.
Lansing Co., Lansing, Mich.
Metal Forms Corp., Milwaukee, Wis.
Miles Mfg. Co., Jackson, Mich.
M. L. Schleuter, Chicago, Ill.
F. B. Zieg Mfg. Co., Fredericktown, O.

MOLDS—ORNAMENTAL CONCRETE

American Cement Machine Co., Keokuk, Iowa. ("Boss").
W. E. Dunn Mfg. Co., Holland, Mich.
Ideal Concrete Machinery Co., Cincinnati, O. (Bench, column, mantel molds).
Lansing Co., Lansing, Mich.
Miles Mfg. Co., Jackson, Mich.
F. B. Zieg Mfg. Co., Fredericktown, O.

MORTAR COLORS

Ceresit Waterproofing Co., Chicago, Ill.
General Fireproofing Co., Youngstown, O.
Lookout Paint Mfg. Co., Chattanooga, Tenn. ("Lookout Paramount").
Toch Bros., New York, N. Y.

MOTOR APPLICATIONS

General Electric Co., Schenectady, N. Y. (Individual motors, elevator motors, hoist motors, stationary motors, alternating current; stationary motors, direct current).

MOTORS—ELECTRIC

Buhl Machine Co., Chicago, Ill.
Choraleon Co., Elkhart, Ind. (Electric motors and springs for phonographs).
Domestic Engineering Co., Dayton, O. ("Delco-Light" power stands).
General Electric Co., Schenectady, N. Y. (Motors with device attached for small drills, electric fans, ceiling fans, desk and bracket fans, "Davidson" exhaust fans, "Ventura" oscillating and non-oscillating fans).
B. B. Karol, Chicago, Ill.
Milwaukee Air Power Pump Co., Milwaukee, Wis.
Phelps Light & Power Co., Rock Island, Ill.
Sheldon Engine & Sales Co., Waterloo, Iowa.
Sidney Machine Tool Co., Sidney, O.
Standard Electric & Elevator Co., Baltimore, Md.
Standard Scale & Supply Co., Pittsburgh, Pa.

MOTOR TRUCKS

Acme Motor Truck Co., Cadillac, Mich.
Federal Motor Truck Co., Detroit, Mich.
Kissel Motor Car Co., Hartford, Wis.
Mutual Truck Co., Sullivan, Ind.
Republic Motor Truck Co., Alma, Mich.
Stewart Motor Corp., Buffalo, N. Y. ("Stewart").

MOTOR TRUCK BODIES

Acme Motor Truck Co., Cadillac, Mich. (Steel dump).
Archer Iron Works, Chicago, Ill.

MOULDINGS—METAL

Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Detroit Show Case Co., Detroit, Mich.
General Fireproofing Co., Youngstown, O.
Kawneer Mfg. Co., Niles, Mich. (Copper, bronze, steel for architectural work, automobile bodies, filing cabinets, etc.).
Milwaukee Corrugating Co., Milwaukee, Wis.
Shrauger & Johnson, Atlantic, Iowa.
Willis Mfg. Co., Galesburg, Ill.
Zouri Drawn Metals Co., Chicago Heights, Ill.

NAILING MACHINES

Pearson Mfg. Co., Robbinsdale, Minn.

NAILS—GALVANIZED

Badger Corrugating Co., La Crosse, Wis.
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Joseph T. Ryerson & Son, Chicago, Ill.

NAILS—ROOFING AND SHEATHING

Badger Corrugating Co., La Crosse, Wis.
Beckman-Dawson Roofing Co., Chicago, Ill.
Bird & Son, East Walpole, Mass.
Bostwick Steel Lath Co., Niles, O.
Cadillac Lumber Co., Cadillac, Mich.
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
H. W. Johns-Manville Co., New York, N. Y.
Knickerbocker Slate Corp., New York, N. Y.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Slatington Slate Co., Slatington, Pa.

NAILS—SHINGLE

Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
H. W. Johns-Manville Co., New York, N. Y.
Merchant & Evans Co., Philadelphia, Pa.

NAIL SETS

Buck Bros., Millbury, Mass.
Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Sargent & Co., New Britain, Conn. ("Sargent").
L. A. Sayre Co., Newark, N. J.
Smith & Hemenway Co., Irvington, N. J. ("Red Devil").
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.
James Swan Co., Seymour, Conn. ("Swan").
Syracuse Twist Drill Co., Syracuse, N. Y. ("Syracuse").
Vaughn & Bushnell Mfg. Co., Chicago, Ill.

NETTING—POULTRY WIRE

New Jersey Wire Cloth Co., Trenton, N. J.

ORNAMENTS—SHEET METAL

Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Willis Mfg. Co., Galesburg, Ill.

ORNAMENTS—WOOD

The Curtis Companies, Clinton, Iowa.

PACKAGE RECEIVERS

Donley Bros. Co., Cleveland, O.
Edwin A. Jackson & Bro., New York, N. Y.
Majestic Co., Huntington, Ind.

PAINT AND VARNISH REMOVERS

Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y. ("Devoe").
S. C. Johnson & Son, Racine, Wis. ("Johnson's Electric Solvo").
Murphy Varnish Co., Newark, N. J.
Eugene E. Nice, Philadelphia, Pa.
Patton Paint Co., Milwaukee, Wis.
Albert Pick & Co., Chicago, Ill.
Pitcairn Varnish Co., Milwaukee, Wis.
Wadsworth, Howland & Co., Boston, Mass.

PAINTING EQUIPMENT—AIR

Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
DeVilbiss Mfg. Co., Toledo, O. (The "Aeron" system portable painting equipment).
Devoe & Raynolds Co., New York, N. Y. ("Devoe").
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" cold-water paint spraying machine).
Paasche Air Brush Co., Chicago, Ill.
Wadsworth, Howland & Co., Boston, Mass.

PAINTS

American Chemical Paint Co., Philadelphia, Pa. ("Lithoform" galvanized iron primer, "Deoxidine" iron and steel rustproofer).
Beaver Board Companies, Buffalo, N. Y.
Bird & Sons, East Walpole, Mass. ("Neponset" roofing paint).
Philip Carey Co., Cincinnati, O. (Black asphalt paint, carbon paint, universal coating).
Geo. B. Carpenter & Co., Chicago, Ill.
Ceresit Waterproofing Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y. ("Devoe" for every purpose).
Joseph Dixon Crucible Co., Jersey City, N. J. (Graphite).
Edwards Mfg. Co., Cincinnati, O.
The Flintkote Co., Boston, Mass. ("Rex" red roof paint, "Rex" black roof paint, "Rex" asphalt roof paint, "Rex" dampproof paints, "Rex" insulating paint, "Rex" preservative paint, "Rex Flintkote" plastic).
M. Ewing Fox Co., New York, N. Y. ("Permanite" cold-water paint).
General Fireproofing Co., Youngstown, O. ("GF" protective steel coatings).
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville Regal" roof coating, fibrous enamel, cold-water paint, boiler front coating, iron preservative, stack preservative).
Lookout Paint Mfg. Co., Chattanooga, Tenn. (Mineral).
Merchant & Evans Co., Philadelphia, Pa.
National Lead Co., New York, N. Y.
Eugene E. Nice, Philadelphia, Pa.
Patent Vulcanite Roofing Co., Chicago, Ill. ("Vulcanite" jet-black metal and roofing paint, "Vulcanite" red roofing paint, "Vulcanite" green roofing paint).
Patton Paint Co., Milwaukee, Wis. ("Patton's Sun Proof").
Pitcairn Varnish Co., Milwaukee, Wis.
S. O. S. Mfg. Co., Kansas City, Mo. ("S. O. S." waterproofing paint).
Toch Bros., New York, N. Y.
Truscon Steel Co., Detroit, Mich.
Wadsworth, Howland & Co., Boston, Mass.

PAINT SPRAYING MACHINES

Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
DeVilbiss Mfg. Co., Toledo, O. ("Aeron" system portable painting equipment).
Devoe & Raynolds Co., New York, N. Y. ("Devoe").
M. Ewing Fox Co., New York, N. Y.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" cold-water paint spraying machine).
Paasche Air Brush Co., Chicago, Ill. ("Paasche" superior portable painting equipment).
Wadsworth, Howland & Co., Boston, Mass.
A. S. Aloe Co., St. Louis, Mo.
Eugene Dietzgen Co., Chicago, Ill.
International Correspondence Schools, Scranton, Pa.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y. ("Peerless").
Spaulding-Moss Co., Boston, Mass.
Wadsworth, Howland & Co., Boston, Mass.
Warren-Knight Co., Philadelphia, Pa.

PAPER—BUILDING

Bird & Son, East Walpole, Mass. ("Neponset" red-rope waterproof, "Neponset" black waterproof, coated waterproof, "American" waterproof).
Brown Co., Portland, Me. ("Brownco").
Philip Carey Co., Cincinnati, O. ("Fibrewove" insulating paper).
Carr, Ryder & Adams Co., Dubuque, Iowa.
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
C. B. Hewitt & Bros., New York, N. Y.
H. W. Johns-Manville Co., New York, N. Y. (Asbestos slating felt, roofing and insulating felt, wool deadening felt, weathertite building paper, asbestos paper and roll board, sheet millboard, "Asbestocel" corrugated paper).
Keasbey & Mattison Co., Ambler, Pa.
Merchant & Evans Co., Philadelphia, Pa.

PAPER—ROOFING AND SHEATHING

Badger Corrugating Co., La Crosse, Wis.
Beckmann-Dawson Roofing Co., Chicago, Ill.
Bird & Son, East Walpole, Mass.
Cadillac Lumber Co., Cadillac, Mich.
Philip Carey Co., Cincinnati, O. (Fibrewove insulating paper).
Geo. B. Carpenter & Co., Chicago, Ill.
Carr, Ryder & Adams Co., Dubuque, Iowa.
Edwards Mfg. Co., Cincinnati, O.
Flintkote Mfg. Co., Boston, Mass. ("Rex" products, "Rex" Flintkote roofing, "Zarex" roofing, "Minado" roofing).

C. B. Hewitt & Bros., New York, N. Y.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" roofing and insulating felt, asbestos slaters' felt, wool deadening felt, "Weathertite" building paper, "Keystone" hair insulator).
Keasbey & Mattison Co., Ambler, Pa.
Merchant & Evans Co., Philadelphia, Pa.

PARTITIONS—HOLLOW TILE

Mason City Brick & Tile Co., Mason City, Iowa.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").

PARTITIONS—METAL

Architectural Service Corp., Philadelphia, Pa.
Berger Mfg. Co., Canton, O.
A. C. Chesley Co., Inc., New York, N. Y. (Steel interior).
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, Ohio. ("Trussit").
International Steel & Iron Co., Evansville, Ind.
Truscon Steel Co., Detroit, Mich.
Wright Wire Co., Worcester, Mass.
Youngstown Pressed Steel Co., Youngstown, O.

PARTITIONS—SLATE

Structural Slate Co., Pen Argyl, Pa. (Water Closet).

PARTITIONS—WOOD

Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine partitioning stock).

PENCILS—CARPENTERS

Joseph Dixon Crucible Co., Jersey City, N. J.
Peerless Blue Print Co., New York, N. Y. ("Peerless").
Spaulding-Moss Co., Boston, Mass.
Warren-Knight Co., Philadelphia, Pa.

PENCILS—DRAFTING

A. S. Aloe Co., St. Louis, Mo.
Eugene Dietzgen Co., Chicago, Ill.
Joseph Dixon Crucible Co., Jersey City, N. J.
Devoe & Raynolds Co., Inc., New York, N. Y.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
New York Blue Print Paper Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y. ("Peerless").
Spaulding-Moss Co., Boston, Mass.
Wadsworth, Howland & Co., Boston, Mass.
Warren-Knight Co., Philadelphia, Pa.

PERGOLAS

The Curtis Companies, Clinton, Iowa. (Component parts).
Hartmann-Sanders Co., Chicago, Ill.

PHONOGRAPHS AND PHONOGRAPH SUPPLIES

Jos. L. A. Barnett Co., Cedar Rapids, Iowa.
Choraleon Phonograph Co., Elkhart, Ind.
Modern Phonograph Supply Co., Chicago, Ill.

PIPE—FURNACE

Badger Corrugating Co., La Crosse, Wis.
Hardin-Lavin Co., Chicago, Ill.
Haynes-Langenberg Mfg. Co., St. Louis, Mo.
Hess Warming & Ventilating Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Williamson Heater Co., Cincinnati, O.

PIPE—IRON AND STEEL

Geo. B. Carpenter & Co., Chicago, Ill.

PLANE IRONS

Buck Bros., Millbury, Mass.
Geo. B. Carpenter & Co., Chicago, Ill.
Mack & Co., Rochester, N. Y.
Sargent & Co., New Haven, Conn. ("Sargent").
Stanley Rule & Level Co., New Britain, Conn.
L. & I. J. White Co., Buffalo, N. Y.

PLANERS—WOOD (POWER)

American Saw Mill Machinery Co., New York, N. Y. ("Triumph," "Jewel," "Pony").
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Parks Ball Bearing Machine Co., Cincinnati, O.
Standard Scale & Supply Co., Pittsburgh, Pa.
J. D. Wallace & Co., Chicago, Ill.

PLANES—CARPENTERS

Geo. B. Carpenter & Co., Chicago, Ill.
Mack & Co., Rochester, N. Y. ("D. R. Barton").
Sargent & Co., New Haven, Conn. ("Sargent").
Stanley Rule & Level Co., New Britain, Conn.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

PLASTER BOARD

Badger Corrugating Co., La Crosse, Wis.
Bishopric Mfg. Co., Cincinnati, O.
Cadillac Lumber Co., Cadillac, Mich.
Philip Carey Co., Cincinnati, O. ("Ceil-Board").
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.

PLASTER—INTERIOR

National Kellastone Co., Chicago, Ill. ("Kellastone Interior Plaster").

PLATES—DOOR

Allith-Prouty Co., Danville, Ill.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Detroit Show Case Co., Detroit, Mich. (Brass kick plates).
Griffin Mfg. Co., Erie, Pa.
National Mfg. Co., Sterling, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn. ("Sargent").
Yale & Towne Mfg. Co., New York, N. Y.

PLUMB AND LEVEL

Henry Disston & Sons, Philadelphia, Pa.
J. Sand & Sons, Detroit, Mich.

PLUMBING FIXTURES

Architectural Service Corp., Philadelphia, Pa.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis. (Enameled ware).
Wolff Mfg. Co., Chicago, Ill.

PORCH COVERING

Wm. L. Barrell Co., New York, N. Y. (Canvas).

PRESERVATIVES—WOOD

Philip Carey Co., Cincinnati, O. ("Universal Coating").
Geo. B. Carpenter & Co., Chicago, Ill.
Ceresit Waterproofing Co., Chicago, Ill. ("Kramoil").
Devoe & Raynolds Co., Inc., New York, N. Y. ("Devoe").
General Fireproofing Co., Younkstown, O. ("GF 550").
Patton Paint Co., Milwaukee, Wis.
S. O. S. Mfg. Co., Kansas City, Mo. ("S. O. S.")
Toch Bros., New York, N. Y.

PRISM LIGHTING

American 3-Way Prism Co., Cicero, Ill.
Berger Mfg. Co., Canton, O. ("Raydiant" sidewalk lights).
International Steel & Iron Co., Evansville, Ind.

PULLEYS—CEILING

American Pulley Co., Philadelphia, Pa. ("American").

PULLEYS—SCREW

American Pulley Co., Philadelphia, Pa. ("American").

PUMPS—CONTRACTORS

American Cement Machine Co., Keokuk, Iowa. ("Boss").
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis.
The Deming Co., Salem, O.
Goulds Mfg. Co., Seneca Falls, N. Y.
Ideal Engine Co., Lansing, Mich. (Force, diaphragm, centrifugal, etc.).
B. B. Karol, Chicago, Ill.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Mast, Foos & Co., Springfield, O.
Milwaukee Air Power Pump Co., Milwaukee, Wis.
F. E. Myers & Bros., Ashland, O.
Novo Engine Co., Lansing, Mich. ("Novo" force, diaphragm, centrifugal, deep well).
O. K. Clutch & Machinery Co., Columbia, Pa. ("O. K.").
Oshkosh Mfg. Co., Oshkosh, Wis.
Rider-Ericsson Engine Co., Walden, N. Y.
T. L. Smith Co., Milwaukee, Wis.
Standard Scale & Supply Co., Pittsburgh, Pa.
Stewart Mfg. Co., Waterloo, Iowa.
Waterloo Construction Machinery Co., Waterloo, Iowa.

PUMPS—ELECTRIC DRIVEN

Rider-Ericsson Engine Co., Walden, N. Y.

PUMPS—HOT AIR

Rider-Ericsson Engine Co., Walden, N. Y. ("Recco").

PUMPS—HOUSE

Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
The Deming Co., Salem, O.
Flint & Walling Mfg. Co., Kendallville, Ind.
Goulds Mfg. Co., Seneca Falls, N. Y.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kewanee Private Utilities Co., Kewanee, Ill. ("Kewanee").
Mast, Foos & Co., Springfield, O. ("Buckeye").
Milwaukee Air Power Pump Co., Milwaukee, Wis.
F. E. Myers & Co., Ashland, O.
Rider-Ericsson Engine Co., Walden, N. Y.
Standard Scale & Supply Co., Pittsburgh, Pa.

RADIATORS—HOT AIR

Geo. B. Carpenter & Co., Chicago, Ill.
Hardin-Lavin Co., Chicago, Ill.
Haynes-Langenberg Mfg. Co., St. Louis, Mo.
B. B. Karol, Chicago, Ill.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Williamson Heater Co., Cincinnati, O.

RADIATORS—HOT WATER AND STEAM

Architectural Service Corp., Philadelphia, Pa.
Geo. B. Carpenter & Co., Chicago, Ill.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Majestic Co., Huntington, Ind.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Williamson Heater Co., Cincinnati, O.

RADIATOR BOTTOMS—SLATE

Structural Slate Co., Pen Argyl, Pa.

RADIATOR SHIELDS

L. J. Mueller Furnace Co., Milwaukee, Wis.
Milwaukee Corrugating Co., Milwaukee, Wis.
Thomas & Armstrong Co., London, O. ("Buckeye").
Williamson Heater Co., Cincinnati, O.

RAILINGS—BRASS

Brasco Mfg. Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
International Steel & Iron Co., Evansville, Ind.
Merchant & Evans Co., Philadelphia, Pa.
Wright Wire Co., Worcester, Mass.

RAILINGS—IRON

Geo. B. Carpenter & Co., Chicago, Ill.
Hardin-Lavin Co., Chicago, Ill.
International Steel & Iron Co., Evansville, Ind.
B. B. Karol, Chicago, Ill.
Wright Wire Co., Worcester, Mass.

RAILS—BARNDOOR

Griffin Mfg. Co., Erie, Pa.
Hunt, Helm, Ferris & Co., Harvard, Ill.
Lane Bros. Co., Poughkeepsie, N. Y. ("Lane").
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Sargent & Co., New Haven, Conn.
Wagner Mfg. Co., Cedar Falls, Ia. ("Wagner").

RAISERS—PANEL

Huther Bros. Saw Mfg. Co., Rochester, N. Y.

REAMERS

Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
B. B. Karol, Chicago, Ill.
Sargent & Co., New Haven, Conn.
James Swan Co., Seymour, Conn.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

REFRIGERATORS—ICELESS

Willis Mfg. Co., Galesburg, Ill.

REFRIGERATORS—OUTSIDE ICING

Herrick Refrigerator Co., Waterloo, Ia. ("Herrick").
Albert Pick & Co., Chicago, Ill.

REGISTERS—HOT AIR

Bovee Furnace Works, Waterloo, Ia.
Geo. B. Carpenter & Co., Chicago, Ill.
Haynes-Langenberg Mfg. Co., St. Louis, Mo.
Hess Warming & Ventilating Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Majestic Co., Huntington, Ind.
Merchant & Evans Co., Philadelphia, Pa.
L. J. Mueller Furnace Co., Milwaukee, Wis.
Williamson Heater Co., Cincinnati, O.
Willis Mfg. Co., Galesburg, Ill.

REINFORCING—CONCRETE

Architectural Service Corp., Philadelphia, Pa.
Berger Mfg. Co., Canton, O. ("Ribplex," "Ferro-Lithic," "Multiplex").
Bostwick Steel Lath Co., Niles, O.
General Fireproofing Co., Youngstown, O. ("Self-Sentering").
International Steel & Iron Co., Evansville, Ind.
New Jersey Wire Cloth Co., Trenton, N. J.
Joseph T. Ryerson & Son, Chicago, Ill.
Truscon Steel Co., Detroit, Mich.
Western Iron & Foundry Co., Wichita, Kans.
Wright Wire Co., Worcester, Mass.

RESAW MACHINES

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Chicago Machinery Exchange, Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Sidney Machine Tool Co., Sidney, O.

RESTAURANT EQUIPMENT

Albert Pick & Co., Chicago, Ill. (Automatic).

RIDGING—VENTILATED

Merchant & Evans Co., Philadelphia, Pa.
Willis Mfg. Co., Galesburg, Ill.

RIVETS

Joseph T. Ryerson & Son, Chicago, Ill.

ROLLERS—BARNDOOR

Allith-Prouty Co., Danville, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Griffin Mfg. Co., Erie, Pa.
Hunt, Helm, Ferris & Co., Harvard, Ill. ("Cannon Ball").
Lane Bros. Co., Poughkeepsie, N. Y. ("Lane").
Louden Mach. Co., Fairfield, Ia.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill. ("Big 4," "Storm Proof," "National").
J. E. Porter Co., Ottawa, Ill.
Sargent & Co., New Haven, Conn. ("Sargent").
Wagner Mfg. Co., Cedar Falls, Ia. ("Wagner").

ROLLERS—HOUSE DOOR

Allith-Prouty Co., Danville, Ill.
Hunt, Helm, Ferris & Co., Harvard, Ill. ("Cannon Ball").
Lane Bros. Co., Poughkeepsie, N. Y. ("Lane").
National Mfg. Co., Sterling, Ill.
Sargent & Co., New Britain, Conn. ("Sargent").
Wagner Mfg. Co., Cedar Falls, Ia. ("Wagner").

ROOFING CEMENT

Badger Corrugating Co., La Crosse, Wis.
Beckman-Dawson Roofing Co., Chicago, Ill.
Berger Mfg. Co., Canton, O.
Bird & Son, East Walpole, Mass. ("Neponset").
Philip Carey Co., Cincinnati, O.
Devoe & Raynolds Co., New York, N. Y.
Flintkote Co., Boston, Mass. ("Rex" plastic cement).
Heppes Roofing Co., Chicago, Ill.
International Steel & Iron Co., Evansville, Ind.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" asbestos roof putty, "Regal" anti-leak stick).
Keasbey & Mattison Co., Ambler, Pa.
Knickerbocker Slate Corp., New York, N. Y.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis. ("Federal Elastic").
Eugene E. Nice, Philadelphia, Pa.
Patent Vulcanite Roofing Co., Chicago, Ill. ("Vulcanite" asphalt roofing cement, "Vulcanite" elastic cement).
Pyramid Products Co., Bay City, Mich. ("Cow Hide" roof cement for repairing leaky roofs).

ROOFING PUTTY

Badger Corrugating Co., La Crosse, Wis.
Philip Carey Co., Cincinnati, O. ("Noah's Pitch").
Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Reynolds Co., Inc., New York, N. Y. ("Devoe").
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" asbestos roof putty, "Regal" anti-leak stick).
Eugene E. Nice, Philadelphia, Pa.
S. O. S. Mfg. Co., Kansas City, Mo. ("S. O. S.").

ROOFING—ASBESTOS

Architectural Service Corp., Philadelphia, Pa.
Cadillac Lumber Co., Cadillac, Mich.
Philip Carey Co., Cincinnati, O.
Edwards Mfg. Co., Cincinnnati, O.
International Steel & Iron Co., Evansville, Ind.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" asbestos built-up, asbestos

ready-to-lay, "Brooks," "Flexstone" and "Asbestone" brands; asbestos corrugated and "Color Blend" asbestos shingles.)
Keasbey & Mattison Co., Ambler, Pa.

ROOFING—ASBESTOS SHINGLES
Architectural Service Corp., Philadelphia, Pa.
Cadillac Lumber Co., Cadillac, Mich.
Edwards Mfg. Co., Cincinnati, O.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" standard and "Color Blend" asbestos shingles).
Keasbey & Mattison Co., Ambler, Pa.

ROOFING—ASPHALT (READY)
Beckman-Dawson Roofing Co., Chicago, Ill.
Bird & Son, East Walpole, Mass. ("Neponset Parold," "American Ready," "Granitized," "Universal," "Artcraft").
Cadillac Lumber Co., Cadillac, Mich.
Philip Carey Co., Cincinnati, O. ("Philco," "Sterling," "Manhattan," "Lastile," "Micakote," "Premium," "Surety").
Geo. B. Carpenter & Co., Chicago, Ill.
Carr, Ryder & Adams Co., Dubuque, Ia.
Edwards Mfg. Co., Cincinnati, O.
Flintkote Co., Boston, Mass. ("Rex Strip Shingles").
Heppes Roofing Co., Chicago, Ill. ("Flex-a-Tile").
International Steel & Iron Co., Evansville, Ind.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" rubber-type, "Regal," "Pilot," "Slatekote").
Patent Vulcanite Roofing Co., Chicago, Ill. (Mosaic roofing, styles H and K; ornamental roofing, styles P and O; red and green asphalt; "Higrade" rubber and "Vulcanoid." Trade name "Vulcanite" for all products).

ROOFING—ASPHALT SHINGLES
Beckman-Dawson Roofing Co., Chicago, Ill.
Bird & Son, East Walpole, Mass. ("Neponset Twin," "American Twin," "Proslate").
Brown Co., Portland, Me.
Cadillac Lumber Co., Cadillac, Mich.
Philip Carey Co., Cincinnati, O. ("Asfaltslate," "Junior," "Firefiter").
Geo. B. Carpenter & Co., Chicago, Ill.
Carr, Ryder & Adams Co., Dubuque, Ia.
Edwards Mfg. Co., Cincinnati, O.
Flintkote Co., Boston, Mass. ("Rex" strip, widespace, individual, diamond-strip, reversible strip).
Heppes Roofing Co., Chicago, Ill.
International Steel & Iron Co., Evansville, Ind.
Patent Vulcanite Roofing Co., Chicago, Ill. ("Vulcanite" self-spacing, style G; individual, style E; slab, style L; slabtile, style R; roll or strip, style D).

ROOFING—BUILT-UP
Architectural Service Corp., Philadelphia, Pa.
Bird & Son, East Walpole, Mass. ("Neponset" asphalt).
Philip Carey Co., Cincinnati, O. ("Carey Contract Roofing," styles B, C, D, F; "Carey Roof," specifications 2, 3, 4).
Flintkote Co., Boston, Mass. ("Rex" construction).
International Steel & Iron Co., Evansville, Ind.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" asbestos).
Patent Vulcanite Roofing Co., Chicago, Ill. ("Vulcanite" asphalt).

ROOFING—CANVAS
Wm. L. Barrell Co., New York, N. Y. ("Conser-tex").
Beckman-Dawson Roofing Co., Chicago, Ill.
John Boyle & Co., New York, N. Y. ("Bayonne").
Flintkote Co., Boston, Mass. ("Paradux-Rex").

ROOFING—MASTIC
Beckman-Dawson Roofing Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O.
International Steel & Iron Co., Evansville, Ind.
H. W. Johns-Manville Co., New York, N. Y.

ROOFING—METAL (CORRUGATED)
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O.
Bostwick Steel Lath Co., Niles, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" asbestos).
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Sheet Metal Roofing Co., Jersey City, New Jersey.
Northfield Iron Co., Northfield, Minn. ("Northfield").
Jos. T. Ryerson & Son, Chicago, Ill.
Stark Rolling Mills Co., Canton, O. ("Toncan" metal and steel).
Thomas & Armstrong Co., London, O.
Willis Mfg. Co., Galesburg, Ill.

ROOFING—METAL (SHEETS)
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O.
Bostwick Steel Lath Co., Niles, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O. ("Self-Sentering").
International Steel & Iron Co., Evansville, Ind.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" asbestos).
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Sheet Metal Roofing Co., Jersey City, New Jersey.
Joseph T. Ryerson & Son, Chicago, Ill.
Stark Rolling Mills Co., Canton, O. ("Toncan" metal and steel).
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill.

ROOFING—METAL SHINGLES
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O. ("Berco," "Swanee," "Chifetain").
Bostwick Steel Lath Co., Niles, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Cortright Metal Roofing Co., Philadelphia, Pa.
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
F. D. Kees Mfg. Co., Beatrice, Neb. (Hip).
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Sheet Metal Roofing Co., Jersey City, New Jersey.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill.

ROOFING—RUBBER
Badger Corrugating Co., La Crosse, Wis.
Beckman-Dawson Roofing Co., Chicago, Ill.
Philip Carey Co., Cincinnati, O. ("Philco," "Sterling," "Manhattan," "Lastile," "Micakote," "Premium," "Surety").
Geo. B. Carpenter & Co., Chicago, Ill.
Carr, Ryder & Adams Co., Dubuque, Ia.
Edwards Mfg. Co., Cincinnati, O.
Heppes Roofing Co., Chicago, Ill.
C. B. Hewitt & Bros., New York, N. Y. ("Oronoko").
International Steel & Iron Co., Evansville, Ind.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville," "Regal," "Pilot," "Slatekote").

ROOFING—SLATE
Architectural Service Corp., Philadelphia, Pa.
Flintkote Co., Boston, Mass. ("Rex" slate-surfaced).
Knickerbocker Slate Corp., New York, N. Y.
F. C. Sheldon Slate Co., Granville, N. Y.
Structural Slate Co., Pen Argyl, Pa.
Vendor Slate Co., Bangor, Pa.

ROOFING TILE—METAL
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O. ("Lyketile").
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O. ("GF" steel tile).
International Steel & Iron Co., Evansville, Ind.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Sheet Metal Roofing Co., Jersey City, New Jersey.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill.

ROOFING TIN
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O.
Cadillac Lumber Co., Cadillac, Mich.
Edwards Mfg. Co., Cincinnati, O.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill.

ROOFING—WOOD SHINGLES
Architectural Service Corp., Philadelphia, Pa.
H. S. Barber Cre-Sote Stained Shingle Co., Detroit, Mich. ("Barcrest," red cedar).
Brown Co., Portland, Me. ("Brownco").
Cadillac Lumber Co., Cadillac, Mich.
Northern Hemlock & Hardwood Mfrs. Assn., Oshkosh, Wis. ("Half Century" brand white cedar).
West Coast Lumbermen's Assn., Seattle, Wash. ("Rite-Grade" red cedar).

ROOFING AND SIDING—ASBESTOS
Keasbey & Mattison Co., Ambler, Pa. (Corrugated).

ROOFING AND SIDING—IRON AND STEEL
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville Asbestoside").
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Sheet Metal Roofing Co., Jersey City, New Jersey.
Jos. T. Ryerson & Son, Chicago, Ill.
Stark Rolling Mills Co., Canton, O.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill.

ROOFING AND SIDING—SLATE
Architectural Service Corp., Philadelphia, Pa.
Knickerbocker Slate Corp., New York, N. Y.
Slatington Slate Co., Slatington, Pa.
F. C. Sheldon Slate Co., Ganville, N. Y.
Willis Mfg. Co., Galesburg, Ill.

ROPE
Geo. B. Carpenter & Co., Chicago, Ill. (Manila and wire).

ROUTERS
Sargent & Co., New Britain, Conn.
Stanley Rule & Level Co., New Britain, Conn.

RULES—BOXWOOD
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Eugene Ditzgen Co., Chicago, Ill.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
Lufkin Rule Co., Saginaw, Mich.
Master Rule Mfg. Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
Stanley Rule & Level Co., New Britain, Conn.
Warren-Knight Co., Philadelphia, Pa.

RULES—CALIPER
Geo. B. Carpenter & Co., Chicago, Ill.
Eugene Ditzgen Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Lufkin Rule Co., Saginaw, Mich.
Peerless Blue Print Co., New York, N. Y.
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.
Warren-Knight Co., Philadelphia, Pa.

RULES—EXTENSION
Geo. B. Carpenter & Co., Chicago, Ill.
Eugene Ditzgen Co., Chicago, Ill.
International Correspondence Schools, Scranton, Pennsylvania.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
Lufkin Rule Co., Saginaw, Mich.
Master Rule Mfg. Co., New York, N. Y.
New York Blue Print Paper Co., New York, New York.
Peerless Blue Print Co., New York, N. Y.
Stanley Rule & Level Co., New Britain, Conn.
Warren-Knight Co., Philadelphia, Pa.

RULES—LUMBERMEN'S
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Lufkin Rule Co., Saginaw, Mich.
Peerless Blue Print Co., New York, N. Y.

RULES—SPRING JOINT
A. S. Aloe Co., St. Louis, Mo.
Geo. B. Carpenter & Co., Chicago, Ill.
Eugene Dietzgen Co., Chicago, Ill.
Keuffel & Esser Co., Hoboken, N. J.
Lufkin Rule Co., Saginaw, Mich.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
Stanley Rule & Level Co., New Britain, Conn.
Warren-Knight Co., Philadelphia, Pa.

RULES—STEEL
Geo. B. Carpenter & Co., Chicago, Ill.
Eugene Dietzgen Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
International Correspondence Schools, Scranton, Pennsylvania.
Kolesch & Co., New York, N. Y.
Lufkin Rule Co., Saginaw, Mich.
Master Rule Mfg. Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
L. S. Starrett Co., Athol, Mass.

SACK BALERS
Rowe Mfg. Co., Galesburg, Ill.

SAFES—WALL
Geo. Angell Co., Detroit, Mich.

SALAMANDERS
Geo. B. Carpenter & Co., Chicago, Ill.
Donley Bros. Co., Cleveland, O.

SANDERS
American Saw Mill Machinery Co., New York, N. Y. ("American").
American Floor Surfacing Machine Co., Toledo, O.
Chicago Machinery Exchange, Chicago, Ill.
Parks Ball Bearing Machine Co., Cincinnati, O.
M. L. Schleuter, Chicago, Ill. (for floors).

SANDPAPERING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
Parks Ball Bearing Machine Co., Cincinnati, O.
M. L. Schleuter, Chicago, Ill. (for floors).

SASH—HOLLOW METAL
Architectural Service Corp., Philadelphia, Pa.
Brasco Mfg. Co., Chicago, Ill.
A. C. Chesley Co., Inc., New York, N. Y.
Detroit Show Case Co., Detroit, Mich. ("Desco").
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
Willis Mfg. Co., Galesburg, Ill.

SASH—IRON AND STEEL
Architectural Service Corp., Philadelphia, Pa.
International Steel & Iron Co., Evansville, Ind.
Shrauger & Johnson, Atlantic, Ia.
Truscon Steel Co., Detroit, Mich.

SASH BALANCES
Caldwell Mfg. Co., Rochester, N. Y.
Carr, Ryder & Adams Co., Dubuque, Ia.
The Curtis Companies, Clinton, Ia.
Lebanon Machine Co., Lebanon, N. H.
Pullman Mfg. Co., Rochester, N. Y. ("Pullman Unit").
Stanley Works, New Britain, Conn.

SASH CORD
Cadillac Lumber Co., Cadillac, Mich.
Geo. B. Carpenter & Co., Chicago, Ill.
Carr, Ryder & Adams Co., Dubuque, Ia.
The Curtis Companies, Clinton, Ia.
Samson Cordage Works, Boston, Mass. ("Spot," "Massachusetts," "Phoenix").
Silver Lake Co., Newtonville, Mass.

SASH HOLDERS
Architectural Service Corp., Philadelphia, Pa.
Geo. B. Carpenter & Co., Chicago, Ill.
Hardware Sales Co., New York, N. Y. ("Automatic").
F. D. Kees Mfg. Co., Beatrice, Neb. ("Kees").
Sager Lock Co., North Chicago, Ill.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Wagner Mfg. Co., Cedar Falls, Ia. ("Wagner").

SASH LIFTS
Allith-Prouty Co., Danville, Ill.
Architectural Service Corp., Philadelphia, Pa.
Geo. B. Carpenter & Co., Chicago, Ill.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
Lufkin Rule Co., Saginaw, Mich.
Master Rule Mfg. Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
Stanley Rule & Level Co., New Britain, Conn.
Warren-Knight Co., Philadelphia, Pa.

Griffin Mfg. Co., Erie, Pa.
McKinney Mfg. Co., Pittsburgh, Pa.
National Mfg. Co., Sterling, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn. ("Sargent").
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Stover Mfg. & Engine Co., Freeport, Ill.
Yale & Towne Mfg. Co., New York, N. Y.

SASH LOCKS

Allith-Prouty Co., Danville, Ill.
Cadillac Lumber Co., Cadillac, Mich.
Geo. B. Carpenter & Co., Chicago, Ill.
McKinney Mfg. Co., Pittsburgh, Pa.
National Mfg. Co., Sterling, Ill.
Sager Lock Co., North Chicago, Ill.
Sargent & Co., New Haven, Conn.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Yale & Towne Mfg. Co., New York, N. Y.

SASH PULLEYS

American Pulley Co., Philadelphia, Pa. ("American," "Merit," "Common Sense," "Eagle," hollow-axle, "Eagle," top notch, saw tooth).
Cadillac Lumber Co., Cadillac, Mich.
Geo. B. Carpenter & Co., Chicago, Ill.
Curtis Companies, Clinton, O.
Grand Rapids Hardware Co., Grand Rapids, Michigan.
Sargent & Co., New Haven, Conn. ("Sargent").
Stover Mfg. & Engine Co., Freeport, Ill.

SAW ARBORS

American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Goodell-Pratt Co., Greenfield, Mass.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Ohlen & Sons Saw Mfg. Co., Columbus, O.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sheldon Engine & Sales Co., Waterloo, Ia.
Sidney Machine Tool Co., Sidney, O.
Silver Mfg. Co., Salem, O.
Simonds Mfg. Co., Fitchburg, Mass.

SAW BENCHES

American Cement Machine Co., Keokuk, Ia. ("Boss").
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Crescent Machine Co., Leetonia, O.
Sidney Machine Tool Co., Sidney, O.
J. D. Wallace & Co., Chicago, Ill.

SAW GAUGES

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.

SAW RIGS

American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Chicago Machinery Exchange, Chicago, Ill.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Novo Engine Co., Lansing, Mich. ("Novo").
Ohlen & Sons Saw Mfg. Co., Columbus, O.
Oshkosh Mfg. Co., Oshkosh, Wis.
Ottawa Mfg. Co., Ottawa, Kan.
Parks Ball Bearing Machine Co., Cincinnati, O.
Ransome Concrete Machinery Co., Dunellen, New Jersey.
Sidney Machine Tool Co., Sidney, O.
Sheldon Engine & Sales Co., Waterloo, Ia.
Standard Scale & Supply Co., Pittsburgh, Pa.
Witte Engine Works, Kansas City, Mo. ("Witte").
Woodworker Mfg. Co., Detroit, Mich.

SAW SETS

E. C. Atkins & Co., Indianapolis, Ind.
Geo. H. Bishop & Co., Lawrenceburgh, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Goodell-Pratt Co., Greenfield, Mass.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Chas. Morrill, Inc., New York, N. Y.
Ohlen-Bishop Co., Columbus, O.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sargent & Co., New Haven, Conn.
L. A. Sayre Co., Newark, N. J.
Sheldon Engine & Sales Co., Waterloo, Ia.
Sidney Machine Tool Co., Sidney, O.
Simonds Mfg. Co., Fitchburg, Mass.
Smith & Hemenway Co., Irvington, N. J.
Stanley Rule & Level Co., New Britain, Conn.

SAW SWAGES

E. C. Atkins & Co., Indianapolis, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Ohlen-Bishop Co., Columbus, O.
Sheldon Engine & Sales Co., Waterloo, Ia.
Sidney Machine Tool Co., Sidney, O.
Simonds Mfg. Co., Fitchburg, Mass.

SAW TABLES

American Cement Machine Co., Keokuk, Ia. ("Boss").
American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Novo Engine Co., Lansing, Mich. ("Novo").
Oshkosh Mfg. Co., Oshkosh, Wis.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sheldon Engine & Sales Co., Waterloo, Ia.
Sidney Machine Tool Co., Sidney, O.
Silver Mfg. Co., Salem, O. ("Silver's").
Standard Scale & Supply Co., Pittsburgh, Pa.
J. D. Wallace & Co., Chicago, Ill.
Woodworker Mfg. Co., Detroit, Mich.

SAW MILL MACHINERY

American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind.
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sheldon Engine & Sales Co., Waterloo, Ia.
Sidney Machine Tool Co., Sidney, O.
Standard Scale & Supply Co., Pittsburgh, Pa.

SAWS—BAND

American Cement Machine Co., Keokuk, Ia. ("Boss").
American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Henry Disston & Sons, Philadelphia, Pa.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Novo Engine Co., Lansing, Mich. ("Novo").
Ohlen-Bishop Saw Co., Columbus, O.
Oshkosh Mfg. Co., Oshkosh, Wis.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Silver Mfg. Co., Salem, O.
Simonds Mfg. Co., Fitchburg, Mass.
J. D. Wallace & Co., Chicago, Ill.

SAWS—CIRCULAR

American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Henry Disston & Sons, Philadelphia, Pa.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Ohlen-Bishop Saw Co., Columbus, O.
Ottawa Mfg. Co., Ottawa, Kans.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sheldon Engine & Sales Co., Waterloo, Ia.
Sidney Machine Tool Co., Sidney, O.
Silver Mfg. Co., Salem, O. ("Silver's").
Simonds Mfg. Co., Fitchburg, Mass. ("Simonds").
Standard Scale & Supply Co., Pittsburgh, Pa.
J. D. Wallace & Co., Chicago, Ill.

SAWS—DRAG

American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Ohlen-Bishop Saw Co., Columbus, O.
Ottawa Mfg. Co., Ottawa, Kan.
Sheldon Engine & Sales Co., Waterloo, Ia.
Simonds Mfg. Co., Fitchburg, Mass.
J. D. Wallace & Co., Chicago, Ill.
Witte Engine Works, Kansas City, Mo.

SAWS—GANG

Wickes Bros., Saginaw, Mich. ("Wickes").

SAWS—GROOVING

American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Chicago Machinery Exchange, Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Ohlen-Bishop Saw Co., Columbus, O.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Simonds Mfg. Co., Fitchburg, Mass. ("Simonds").

SAWS—HAND

E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Geo. H. Bishop & Co., Lawrenceburg, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Ohlen-Bishop Saw Co., Columbus, O.
Parks Ball Bearing Machine Co., Cincinnati, O.
Albert Pick & Co., Chicago, Ill.
Simonds Mfg. Co., Fitchburg, Mass. ("Simonds").

SAWS—JIG

American Saw Mill Machinery Co., New York, N. Y.
E. C. Atkins & Co., Indianapolis, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Ohlen-Bishop Co., Columbus, O.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Simonds Mfg. Co., Fitchburg, Mass.
Standard Scale & Supply Co., Pittsburgh, Pa.

SAWS—SWING

American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Henry Disston & Sons, Philadelphia, Pa.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Novo Engine Co., Lansing, Mich. ("Novo").
Ohlen-Bishop Co., Columbus, O.
Oshkosh Mfg. Co., Oshkosh, Wis.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Silver Mfg. Co., Salem, O.
Simonds Mfg. Co., Fitchburg, Mass. ("Simonds").
Standard Scale & Supply Co., Pittsburgh, Pa.

SCAFFOLD BRACKETS

Geo. B. Carpenter & Co., Chicago, Ill.
Elite Mfg. Co., Ashland, O.
International Steel & Iron Co., Evansville, Ind.
Knickerbocker Slate Corp., New York, N. Y.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Steel Scaffolding Co., Evansville, Ind.
Standard Scale & Supply Co., Pittsburgh, Pa.
James L. Taylor Mfg. Co., Poughkeepsie, N. Y.
Wagner Mfg. Co., Cedar Falls, Iowa. ("Wagner").

SCAFFOLDS—STEEL

Geo. B. Carpenter & Co., Chicago, Ill.
Elite Mfg. Co., Ashland, O.
International Steel & Iron Co., Evansville, Ind.
Richards-Wilcox Mfg. Co., Aurora, Ill. ("R.W.")
Standard Scale & Supply Co., Pittsburgh, Pa.
Steel Scaffolding Co., Evansville, Ind.

SCALES

Albert Pick & Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

SCHOOL EQUIPMENT

Albert Pick & Co., Chicago, Ill. (Domestic science).

SCRAPERS—DRAG

Lansing Co., Lansing, Mich.

SCREEN DOOR SETS

Allith-Prouty Co., Danville, Ill.
Architectural Service Corp., Philadelphia, Pa.
Bommer Spring Hinge Co., Brooklyn, N. Y. ("Bommer").
Chicago Spring Butt Co., Chicago, Ill.
McKinney Mfg. Co., Pittsburgh, Pa. ("McKinney").
National Mfg. Co., Sterling, Ill.
Sargent & Co., New Haven, Conn. ("Sargent").
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Stover Mfg. & Engine Co., Freeport, Ill.
Wagner Mfg. Co., Cedar Falls, Iowa. ("Wagner").

SCREEN FASTENERS

F. D. Kees Mfg. Co., Beatrice, Neb.

SCREEN HANGERS

F. D. Kees Mfg. Co., Beatrice, Neb.

SCREEN HARDWARE

Whitney Window Corp., Minneapolis, Minn. ("Whitney").

SCREENS—BANK AND COUNTER

New Jersey Wire Cloth Co., Trenton, N. J.
Wright Wire Co., Worcester, Mass.

SCREENS—SAND AND GRAVEL

Geo. B. Carpenter & Co., Chicago, Ill.
Lansing Co., Lansing, Mich.
New Jersey Wire Cloth Co., Trenton, N. J.
Stewart Mfg. Co., Waterloo, Iowa.
Wright Wire Co., Worcester, Mass.

SCREENS—WINDOW AND DOOR

Architectural Service Corp., Philadelphia, Pa.
Cadillac Lumber Co., Cadillac, Mich. ("No-Sag").
Geo. B. Carpenter & Co., Chicago, Ill.
Carr, Ryder & Adams Co., Dubuque, Iowa.
Curtis Companies, Clinton, Iowa.
Morgan Metal Weatherstrip Co., St. Louis, Mo.
New Jersey Wire Cloth Co., Trenton, N. J.
Sargent & Co., New Haven, Conn.
Standard Screen Co., Chicago, Ill.
Whitney Window Corp., Minneapolis, Minn. ("Whitney").

SCREW DRIVERS

Henry Disston & Sons, Philadelphia, Pa.
Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
North Bros. Mfg. Co., Philadelphia, Pa. ("Yankee").
Albert Pick & Co., Chicago, Ill.
Sargent & Co., New Haven, Conn. ("Sargent").
Smith & Hemenway Co., Irvington, N. J. ("Red Devil").
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.
James Swan Co., Seymour, Conn. ("Swan").

SCREW HOLES

Stine Screw Holes Co., Waterbury, Conn.

SCREW SLEEVES

Stannard Mfg. Co., Springfield, Mass. ("Little Giant").

SCRIBERS

Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
L. S. Starrett Co., Athol, Mass.

SEWAGE DISPOSAL PLANTS

Dail Steel Products Co., Lansing, Mich.
Hardin-Lavin Co., Chicago, Ill.
Kewanee Private Utilities Co., Kewanee, Ill. ("Kewanee").
Milwaukee Air Power Pump Co., Milwaukee, Wis.

SEWER PIPE—CLAY

National Fireproofing Co., Pittsburgh, Pa. ("Natco").

SEWER PIPE MACHINES—CEMENT

W. E. Dunn Mfg. Co., Holland, Mich.
Ideal Concrete Machinery Co., Cincinnati, O.
Lansing Co., Lansing, Mich.

SHADE ADJUSTERS

Eveleth Mfg. Co., River Forest, Ill.

SHAFTING AND HANGERS

American Saw Mill Machinery Co., New York, N. Y.
W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
Chicago Machinery Exchange, Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
O. K. Clutch & Machinery Co., Columbia, Pa. ("O. K.").

Sidney Machine Tool Co., Sidney, O.
Standard Electric & Elevator Co., Baltimore, Md.
Stewart Mfg. Co., Waterloo, Iowa.
Western Iron & Foundry Co., Wichita, Kan.

SHAPING MACHINES—WOOD

American Saw Mill Machinery Co., New York, N. Y.
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Sidney Machine Tool Co., Sidney, O.

SHARPENING STONES

Luther Grinder Mfg. Co., Milwaukee, Wis.

SHARPENERS—TOOL

Fox Supply Co., Brooklyn, Wis.

SHEATHING—ASBESTOS

Architectural Service Corp., Philadelphia, Pa.
Philip Carey Co., Cincinnati, O. ("Best-o-felt").
Geo. B. Carpenter & Co., Chicago, Ill.
H. W. Johns-Manville Co., New York, N. Y. ("Asbestoside," asbestos corrugated siding, asbestos slaters felt, roofing and insulating felt, asbestos paper and roll board, asbestos sheet millboard, asbestos corrugated paper, "Regal" roofing).
B. B. Karol, Chicago, Ill.
Keasbey & Mattison Co., Ambler, Pa.
Merchant & Evans Co., Philadelphia, Pa.

SHEATHING BOARD

Bishopric Mfg. Co., Cincinnati, O. ("Bishopric").
Architectural Service Corp., Philadelphia, Pa.
Edwards Mfg. Co., Cincinnati, O.
C. B. Hewitt & Bros., New York, N. Y.
MacAdams & Call, Chicago, Ill. (Plastering board).

SHEETS—IRON AND STEEL

American Sheet & Tin Plate Co., Pittsburgh, Pa. (Galvanized, black sheets).
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O.
Bostwick Steel Lath Co., Niles, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Joseph T. Ryerson & Son, Chicago, Ill.
Stark Rolling Mill Co., Canton, O. ("Toncan" metal and steel).
Thomas & Armstrong Co., London, O. ("Buckeye").
Western Iron & Foundry Co., Wichita, Kan.
Willis Mfg. Co., Galesburg, Ill.

SHELVING—STEEL

Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O. ("GF") all-steel economy shelving).
Hart & Hutchinson Co., New Britain, Conn.

SHINGLE NAILERS

Pearson Mfg. Co., Robbinsdale, Minn.

SHINGLING BRACKETS

Ajax Bracket Mfg. Co., Cleveland, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Elite Mfg. Co., Ashland, O.
Steel Scaffolding Co., Evansville, Ind.
Stanley Rule & Level Co., New Britain, Conn.
Wagner Mfg. Co., Cedar Falls, Iowa. ("Wagner").

SHOW CASES

Detroit Show Case Co., Detroit, Mich. ("Silent Salesman").
International Store Front Co., Evansville, Ind.
Albert Pick & Co., Chicago, Ill.

SHOWER RECEPTORS

Kohler Co., Kohler, Wis. (Enameled ware).

SHUTTERS—FIREPROOF

Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O. (Doors and windows).
A. C. Chesley Co., Inc., New York, N. Y.
Edwards Mfg. Co., Cincinnati, O.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Willis Mfg. Co., Galesburg, Ill.

SIDING

Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine siding).

SIGNS

Chas. F. Lorenzen & Co., Chicago, Ill. ("Tawking Tile Letters").

SIGNS—ELECTRIC

Chas. F. Lorenzen & Co., Chicago, Ill. (Tile street and electric signs and luminous house numbers).

SILOS

Cadillac Lumber Co., Cadillac, Mich. ("Common Sense").
W. E. Caldwell Co., Louisville, Ky. ("Caldwell" wood).
General Fireproofing Co., Youngstown, O. ("Self-Sentering").
Lansing Silo Co., Lansing, Mich.
Mason City Brick & Tile Co., Mason City, Iowa.
Metal Forms Corp., Milwaukee, Wis.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").
Northern Hemlock & Hardwood Mfrs. Asso., Oshkosh, Wis. ("Old Faithful" hemlock cerosoted, "Korn-Keep" silo).
Wm. J. M. Preston Co., Lansing, Mich. ("Preston-Lansing" vitrified tile).

SILO DOORS

Metal Forms Corp., Milwaukee, Wis.
Northfield Iron Co., Northfield, Minn. ("Northfield" square or continuous).

SILO FIXTURES

Lansing Silo Co., Lansing, Mich.
Thomas & Armstrong Co., London, O. ("Buckeye").

SILO LUGS

W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
Lansing Silo Co., Lansing, Mich.
Lebanon Machine Co., Lebanon, N. H.
Thomas & Armstrong Co., London, O. ("Buckeye").

SILO MACHINES

American Cement Machine Co., Keokuk, Iowa. ("Boss").
Helm Brick Machine Co., Cadillac, Mich. ("Helm").
Metal Forms Corp., Milwaukee, Wis.
M. L. Schleuter, Chicago, Ill.
Sidney Elevator Mfg. Co., Sidney, O. ("Silo-Man-Lifts" elevators).
T. L. Smith Co., Milwaukee, Wis.

SILO ROOFS

Badger Corrugating Co., La Crosse, Wis.
W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
Edwards Mfg. Co., Cincinnati, O.
Lansing Silo Co., Lansing, Mich.
Metal Forms Corp., Milwaukee, Wis.
Northfield Iron Co., Northfield, Minn. ("Northfield").
Thomas & Armstrong Co., London, O. ("Buckeye").

SILO STOCK

Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine silo stock).

SINKS—FACTORY WASH

Geo. B. Carpenter & Co., Chicago, Ill.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis. (Enameled ware).
Wolff Mfg. Co., Chicago, Ill.

SINKS—KITCHEN

Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis. (Also slop sinks, kitchenette sinks).
Mast, Foos & Co., Springfield, O. ("Buckeye").
Structural Slate Co., Pen Argyl, Pa. (Slate).
Wolff Mfg. Co., Chicago, Ill.

SKYLIGHTS

American 3-Way Prism Co., Cicero, Ill.
Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Berger Mfg. Co., Canton, O.
Edwards Mfg. Co., Cincinnati, O.
International Steel & Iron Co., Evansville, Ind.
Milwaukee Corrugating Co., Milwaukee, Wis. ("Torpedo").
National Sheet Metal Roofing Co., Jersey City, N. J.
Shrauger & Johnson, Atlantic, Iowa.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill. ("Willis").

SLATE—STRUCTURAL

Knickerbocker Slate Corp., New York, N. Y.
Natural Slate Co., Pen Argyl, Pa.
Slatington Slate Co., Slatington, Pa.
Structural Slate Co., Pen Argyl, Pa.
Vendor Slate Co., Bangor, Pa.

SLICKS—CARPENTERS

Geo. B. Carpenter & Co., Chicago, Ill.
Sargent & Co., New Haven, Conn. ("Sargent").
James Swan Co., Seymour, Conn.
L. & I. J. White Co., Buffalo, N. Y.

SOUND DEADENERS

Architectural Service Corp., Philadelphia, Pa.
Bird & Son, East Walpole, Mass. ("Neponset" Florian sound-deadening felt).
Samuel Cabot, Inc., Boston, Mass. ("Cabot's Quilt").
H. W. John-Manville Co., New York, N. Y. ("Johns-Manville" acoustical service, "Keystone" hair insulator, hair felt).

SPOKE SHAVES

Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Goodell-Pratt Co., Greenfield, Mass.
Stanley Rule & Level Co., New Britain, Conn.
James Swan Co., Seymour, Conn. ("Swan").
L. & I. J. White Co., Buffalo, N. Y.

SQUARES—BEVEL

Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Goodell-Pratt Co., Greenfield, Mass.
Peerless Blue Print Co., New York, N. Y.
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.

SQUARES—COMBINATION

Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Goodell-Pratt Co., Greenfield, Mass.
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.

SQUARES—STEEL

Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Eugene Dietzgen Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
International Correspondence Schools, Scranton, Pa.
Nicholls Mfg. Co., Ottumwa, Iowa.
Peerless Blue Print Co., New York, N. Y.
Sargent & Co., New Haven, Conn. ("Sargent").
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.

SQUARES—T

A. S. Aloe Co., St. Louis, Mo. ("Aloe's").
Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y.
Eugene Dietzgen Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
International Correspondence Schools, Scranton, Pa.
Keuffel & Esser Co., Hoboken, N. J.
New York Blue Print Paper Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.
Warren-Knight Co., Philadelphia, Pa.

SQUARES—TRY AND MITER

Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Raynolds Co., Inc., New York, N. Y.
Eugene Dietzgen Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Goodell-Pratt Co., Greenfield, Mass.
Peerless Blue Print Co., New York, N. Y.
Sargent & Co., New Haven, Conn. ("Sargent").
Stanley Rule & Level Co., New Britain, Conn.
L. S. Starrett Co., Athol, Mass.

STABLE FIXTURES

Drew Carrier Co., Waterloo, Wis. ("Drew").
Gilbert & Bennett Mfg. Co., Chicago, Ill.
Hunt, Helm, Ferris & Co., Harvard, Ill. ("Star").
James Mfg. Co., Ft. Atkinson, Wis.
Louden Machinery Co., Fairfield, Iowa.
Mast, Foos & Co., Springfield, O. ("Buckeye").
J. E. Porter Co., Ottawa, Ill. ("Porter").

STAINS—BRICK

Devoe & Raynolds Co., New York, N. Y. ("Devoe").
S. O. S. Mfg. Co., Kansas City, Mo. ("S. O. S.").
Toch Bros., New York, N. Y.

STAINS—CEMENT

Samuel Cabot, Inc., Boston, Mass. ("Cabot's" waterproof).
Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y. ("Devoe").
General Fireproofing Co., Youngstown, O.
National Kellastone Co., Chicago, Ill. ("Kellastone Third Coat" liquid application).
Eugene E. Nice, Philadelphia, Pa.
S. O. S. Mfg. Co., Kansas City, Mo. ("S. O. S.").
Toch Bros., New York, N. Y. ("R. I. W.").

STAINS—SHINGLE

H. S. Barber Cre-Sote Stained Shingle Co., Grand Rapids, Mich. ("Barcrest").
Samuel Cabot, Inc., Boston, Mass. ("Cabot's" cresote stains).
Geo. B. Carpenter & Co., Chicago, Ill.
Creo-Dipt Co., No. Tonawanda, N. Y.
Devoe & Raynolds Co., New York, N. Y.
Eugene E. Nice, Philadelphia, Pa.
Patton Paint Co., Milwaukee, Wis.
S. O. S. Mfg. Co., Kansas City, Mo. ("S. O. S.").

STAINS—WOOD

Samuel Cabot, Inc., Boston, Mass. ("Cabot's" cresote stains).
Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y. ("Devoe").
S. C. Johnson & Son, Racine, Wis. ("Johnson's Wood Dye").
Eugene E. Nice, Philadelphia, Pa.
Patton Paint Co., Milwaukee, Wis. ("Pitcairn" wood stains).
S. O. S. Mfg. Co., Kansas City, Mo. ("Stark's").
Toch Bros., New York, N. Y.

STANCHIONS

Brasco Mfg. Co., Chicago, Ill.
Donley Bros. Co., Cleveland, O. (for basement columns).
Drew Carrier Co., Waterloo, Wis. ("Drew").
Hunt, Helm, Ferris & Co., Harvard, Ill.
James Mfg. Co., Fort Atkinson, Wis. ("James").
Louden Machinery Co., Fairfield, Ia.
Mast, Foos & Co., Springfield, O. ("Buckeye").
J. E. Porter Co., Ottawa, Ill. ("Porter").
Stanley C. Swift Mfg. Co., Cuba, N. Y.

STAIR TREADS

Cadillac Lumber Co., Cadillac, Mich.
Geo. B. Carpenter & Co., Chicago, Ill.
Carr, Ryder & Adams Co., Dubuque, Ia.
The Curtis Companies, Clinton, Ia.
International Steel & Iron Co., Evansville, Ind.
Knickerbocker Slate Corp., New York, N. Y.
Franklyn B. Muller Co., Waukegan, Ill. (Composition).
Structural Slate Co., Pen Argyl, Pa. ("Pyramid").
Truscon Steel Co., Detroit, Mich.

STAIRWAYS

Bessler Movable Stairway Co., Akron, O. (Movable).
Carr, Ryder & Adams Co., Dubuque, Ia.
The Curtis Companies, Clinton, Ia.
International Steel & Iron Co., Evansville, Ind.
Western Iron & Foundry Co., Wichita, Kan.

STEAM TABLES

Albert Pick & Co., Chicago, Ill.

STORE FIXTURES

Albert Pick & Co., Chicago, Ill.

STORE FRONTS

Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis.
Brasco Mfg. Co., Chicago, Ill.
Carr, Ryder & Adams Co., Dubuque, Ia.
J. W. Coulson Co., Columbus, O.
The Curtis Companies, Clinton, Ia.
Detroit Show Case Co., Detroit, Mich. ("Desco").
Edwards Mfg. Co., Cincinnati, O.
International Store Front Co., Evansville, Ind.
Kawneer Mfg. Co., Niles, Mich. ("Kawneer" all-metal).
Milwaukee Corrugating Co., Milwaukee, Wis.
Willis Mfg. Co., Galesburg, Ill.
Zouri Drawn Metals Co., Chicago Heights, Ill.

STORM SASH

Architectural Service Corp., Philadelphia, Pa.
Cadillac Lumber Co., Cadillac, Mich.
Carr, Ryder & Adams Co., Dubuque, Ia.
The Curtis Companies, Clinton, Ia.
Northern Hemlock & Hardwood Mfrs. Asso., Oshkosh, Wis.
Standard Screen Co., Chicago, Ill.

STORM SASH FASTENERS

F. D. Kees Mfg. Co., Beatrice, Neb.

STORM SASH HANGERS

F. D. Kees Mfg. Co., Beatrice, Neb.
National Mfg. Co., Sterling, Ill.
Shelby Spring Hinge Co., Shelby, O.
Stanley Works, New Britain, Conn.
Wagner Mfg. Co., Cedar Falls, Ia.

STRAIGHT EDGES
Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y.
Eugene Dietzgen Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
International Correspondence Schools, Scranton, Pennsylvania.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
L. S. Starrett Co., Athol, Mass.
Warren-Knight Co., Philadelphia, Pa.

STRETCHERS—CLOTHESLINE
Sterling Foundry Co., Sterling, Ill.

STUCCO
Architectural Service Corp., Philadelphia, Pa.
Construction Materials Co., Chicago, Ill. ("Kragstone").
Crown Point Spar Co., New York, N. Y. (Dash for stucco).
H. W. Johns-Manville Co., New York, N. Y. ("Johns-Manville" asbestos).
National Kellastone Co., Chicago, Ill. ("Kellastone Imperishable Stucco").
Franklyn R. Muller Co., Waukegan, Ill. ("Asbestone").

STUCCO BOARD
Architectural Service Corp., Philadelphia, Pa.
Bishopric Mfg. Co., Cincinnati, O.

STUCCO MACHINES
Hodges Stucco Machine Co., Cincinnati, O.

STUDDING SOCKETS
Geo. B. Carpenter & Co., Chicago, Ill.
Sterling Foundry Co., Sterling, Ill. ("Best").
Wagner Mfg. Co., Cedar Falls, Ia. ("Wagner").

STUDS—FIREPROOF
Berger Mfg. Co., Canton, O.
Truscon Steel Co., Detroit, Mich.

SUN DIALS
Geier & Bluhm, Troy, N. Y. ("G. & B.").
Hartmann-Sanders Co., Chicago, Ill.
Warren-Knight Co., Philadelphia, Pa.

SURFACERS
American Saw Mill Machine Co., New York, N. Y. ("American").
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
M. L. Schleuter, Chicago, Ill.
Sidney Machine Tool Co., Sidney, O.

SURFACING MACHINES—DESK AND TABLE
Wayvell Chappell & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.

SURFACING MACHINES—FLOOR (ELECTRIC)
American Floor Surfacing Machine Co., Toledo, O. (for terrazzo, marble and mosaic).
Wayvell Chappell & Co., Chicago, Ill.
Fox Machine Co., Brooklyn, Wis. ("Fox").
Sargent & Co., New Britain, Conn.
M. L. Schleuter, Chicago, Ill. ("Schleuter").

SURFACING MACHINES—FLOOR (HAND-POWER)
Fox Supply Co., Brooklyn, Wis.
Goodell-Pratt Co., Greenfield, Mass.
C. J. Kepplinger, Dwight, Ill.
Sidney Machine Tool Co., Sidney, O.
Triple A Machine Co., Chicago, Ill.

TABLES—CAFE AND RESTAURANT
Albert Pick & Co., Chicago, Ill.

TAMPERS—CONCRETE
Abram Cement Tool Co., Detroit, Mich. ("Abram").
American Cement Machine Co., Keokuk, Ia.
Geo. B. Carpenter & Co., Chicago, Ill.
Ideal Concrete Machinery Co., Cincinnati, O.
Lakewood Engineering Co., Cleveland, O.
Miles Mfg. Co., Jackson, Mich.
Oshkosh Mfg. Co., Oshkosh, Wis.

TANK HEATERS
Drew Carrier Co., Waterloo, Ia. ("Drew").

TANK LUGS
W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
Jos. T. Ryerson & Son, Chicago, Ill.

TANK STOCK
Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine tank stock).

TANKS—CLOSET
Geo. B. Carpenter & Co., Chicago, Ill.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis.
Waterman-Waterbury Co., Minneapolis, Minn.

TANKS—PNEUMATIC WATER
Buhl Machine Co., Chicago, Ill.
W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
Geo. B. Carpenter & Co., Chicago, Ill.
Flint & Walling Mfg. Co., Kendallville, Ind.
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Kewanee Private Utilities Co., Kewanee, Ill. ("Kewanee Indian").
Mast, Foos & Co., Springfield, O. ("Buckeye").

TANKS—SLATE
Knickerbocker Slate Corp., New York, N. Y.
Structural Slate Co., Pen Argyl, Pa. ("Pyramid").

TANKS—STEEL AND IRON
Badger Corrugating Co., La Crosse, Wis. ("Badger").
Philip Bernard Co., Sioux City, Ia.
Buhl Machine Co., Chicago, Ill.
W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O. ("Self-Sentering").
Hardin-Lavin Co., Chicago, Ill.
B. B. Karol, Chicago, Ill.
Mast, Foos & Co., Springfield, O. ("Buckeye").
Milwaukee Corrugating Co., Milwaukee, Wis.
Northfield Iron Co., Northfield, Minn. ("Northfield").
Sheldon Engine & Sales Co., Waterloo, Ia. ("Sheldon").
Thomas & Armstrong Co., London, O. ("Buckeye").
Waterman-Waterbury Co., Minneapolis, Minn.
Western Iron & Foundry Co., Wichita, Kan.
Williamson Heater Co., Cincinnati, O.

TANKS—WOOD
W. E. Caldwell Co., Louisville, Ky. ("Caldwell").

TAPES—MEASURING (STEEL)
A. S. Aloe Co., St. Louis, Mo.
Geo. B. Carpenter & Co., Chicago, Ill.
Eugene Dietzgen Co., Chicago, Ill.
International Correspondence Schools, Scranton, Pennsylvania.
Keuffel & Esser Co., Hoboken, N. J.
Lufkin Rule Co., Saginaw, Mich.
New York Blue Print Paper Co., New York, New York.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
L. S. Starrett Co., Athol, Mass.
Warren-Knight Co., Philadelphia, Pa.

TENONERS
American Cement Machine Co., Keokuk, Iowa ("Boss").
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.

TERRA COTTA—ARCHITECTURAL
Midland Terra Cotta Co., Chicago, Ill.

THRESHOLDS—METAL
Architectural Service Corp., Philadelphia, Pa.
Brasco Mfg. Co., Chicago, Ill.
Detroit Show Case Co., Detroit, Mich.
International Steel & Iron Co., Evansville, Ind.
Kawneer Mfg. Co., Niles, Mich.
Structural Slate Co., Pen Argyl, Pa.

TILE—DRAIN
Mason City Brick & Tile Co., Mason City, Ia.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").

TILE—FLOOR AND WALL
General Fireproofing Co., Youngstown, O. ("GF" steel tile).
Mason City Brick & Tile Co., Mason City, Ia.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").
Upson Co., Lockport, N. Y. ("Upson Fibre Tile").
Structural Slate Co., Pen Argyl, Pa.
Western Brick Co., Danville, Ill.

TILE—HOLLOW BUILDING
Bostwick Steel Lath Co., Niles, O.
General Fireproofing Co., Youngstown, O.
Mason City Brick & Tile Co., Mason City, Ia.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").
J. M. Preston Co., Lansing, Mich. ("Preston-Lansing" vitrified tile).
Truscon Steel Co., Detroit, Mich.
Western Brick Co., Danville, Ill.

TILE—PARTITION
Mason City Brick & Tile Co., Mason City, Ia.
National Fireproofing Co., Pittsburgh, Pa. ("Natco").
Western Brick Co., Danville, Ill.

TILE MACHINES—DRAIN (CEMENT)
W. E. Dunn Mfg. Co., Holland, Mich.
Ideal Concrete Machinery Co., Cincinnati, O.
Lansing Co., Lansing, Mich.

TIMBERS
Great Southern Lumber Co., Bogalusa, La. ("Bogalusa" Southern pine timbers).

TINTS—WALL
Devoe & Raynolds Co., New York, N. Y. ("Devoe" velour finish).
General Fireproofing Co., Youngstown, O. ("GF").
National Lead Co., New York, N. Y.
Patton Paint Co., Milwaukee, Wis. ("Patton's Velumina").
Wadsworth, Howland & Co., Boston, Mass.

TOGGLE BOLTS
Ankyra Mfg. Co., Philadelphia, Pa. ("Ankyra").
Geo. B. Carpenter & Co., Chicago, Ill.
Richards-Wilcox & Co., Aurora, Ill.
U. S. Expansion Bolt Co., New York, N. Y.

TOOL CASES AND CHESTS
Geo. B. Carpenter & Co., Chicago, Ill.
Wedell & Boers, Detroit, Mich.

TOOLS—CARVING
Buck Bros., Millbury, Mass.
Geo. B. Carpenter & Co., Chicago, Ill.
Mack & Co., Rochester, N. Y.

TOOLS—CEMENT WORKERS'
Abram Cement Tool Co., Detroit, Mich. ("Abram").
E. C. Atkins & Co., Indianapolis, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
Sheldon Mfg. Co., Nehawka, Neb.

TOWERS—CONCRETE PLACING
Archer Iron Works, Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Lakewood Engineering Co., Cleveland, O.
Standard Scale & Supply Co., Pittsburgh, Pa.

TOWERS—STEEL
Archer Iron Works, Chicago, Ill.
Buhl Machine Co., Chicago, Ill.
W. E. Caldwell Co., Louisville, Ky. ("Caldwell").
Flint & Walling Mfg. Co., Kendallville, Ind.
International Bridge Co., Evansville, Ind.
Lakewood Engineering Co., Cleveland, O.
Mast, Foos & Co., Springfield, O. ("Imperial").
Ransome Concrete Machinery Co., Dunellen, New Jersey.

TRACING CLOTH AND PAPER
A. S. Aloe Co., St. Louis, Mo.
Eugene Dietzgen Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y.
International Correspondence Schools, Scranton, Pennsylvania.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
New York Blue Print Paper Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
Spaulding-Moss Co., Boston, Mass.
Wadsworth, Howland & Co., Boston, Mass.
Warren-Knight Co., Philadelphia, Pa.

TRANSFORMERS
General Electric Co., Schenectady, N. Y. (Bell-ringing and toy).

TRANSITS AND LEVELS
A. S. Aloe Co., St. Louis, Mo.
L. Beckman Co., Toledo, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Eugene Dietzgen Co., Chicago, Ill.
Geier & Bluhm, Troy, N. Y. ("G. & B.").
International Correspondence Schools, Scranton, Pennsylvania.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York, N. Y.
New York Blue Print Paper Co., New York, N. Y.
Peerless Blue Print Co., New York, N. Y.
L. S. Starrett Co., Athol, Mass.
David White Co., Milwaukee, Wis. ("White Improved").
Warren-Knight Co., Philadelphia, Pa.

TRANSOM CHAINS
Sager Lock Co., North Chicago, Ill.

TRANSOM LIFTS
Sargent & Co., New Haven, Conn. ("Sargent").
Yale & Towne Mfg. Co., New York, N. Y.

TRAPS—BACK PRESSURE
Sterling Foundry Co., Sterling, Ill.

TRESTLES
Steel Scaffolding Co., Evansville, Ind. (Plasterers, bricklayers, stuccoers).

TROLLEYS AND TRAMWAYS
Allit-Prouty Co., Danville, Ill. (Trolley tracks for steel frame doors or gates).
Geo. B. Carpenter & Co., Chicago, Ill.
Lane Bros. Co., Poughkeepsie, N. Y. ("Lane" overhead trolley track and carriers).
Louden Machinery Co., Fairfield, Ia. ("Louden" overhead carrying system for factories, warehouses, garages, etc.).
Richards-Wilcox Mfg. Co., Aurora, Ill. ("Over-Way" trolley system).
J. G. Spiedel, Reading, Pa.
Standard Electric & Elevator Co., Baltimore, Maryland.
Yale & Towne Mfg. Co., New York, N. Y.

TROWELS
Abram Cement Tool Co., Detroit, Mich. ("Abram").
E. C. Atkins & Co., Indianapolis, Ind.
Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa.
Nicholls Mfg. Co., Ottumwa, Ia.
L. A. Sayre Co., Newark, N. J.
Sheldon Mfg. Co., Nehawka, Neb.

TRUCKS—CONCRETE
American Cement Machine Co., Keokuk, Iowa ("Boss").
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Helm Brick Machine Co., Cadillac, Mich. ("Helm").

TRUCKS—HAND
Lansing Co., Lansing, Mich.
Standard Scale & Supply Co., Pittsburgh, Pa.

TRUCKS—HOUSE MOVING
LaPlant-Choate Mfg. Co., Cedar Rapids, Ia.
Republic Motor Truck Co., Alma, Mich.

TUBING—BRASS, COPPER, ETC.
Geo. B. Carpenter & Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.

TURNTABLES—AUTOMOBILE
Canton Foundry & Machine Co., Canton, O. ("Universal").
Richards-Wilcox Mfg. Co., Aurora, Ill.

TYPEWRITERS
Oliver Typewriter Co., Chicago, Ill.
Harry A. Smith, Chicago, Ill. (New and rebuilt).

URINALS
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis. (Enameled ware).
Knickerbocker Slate Corp., New York, N. Y.
Structural Slate Co., Pen Argyl, Pa. ("Pyramid").
Wolff Mfg. Co., Chicago, Ill.

URINAL STALLS
Structural Slate Co., Pen Argyl, Pa. (slate).

VACUUM CLEANERS—PORTABLE
United Electric Co., Canton, O.

VACUUM CLEANERS—STATIONARY
United Electric Co., Canton, O.

VARNISHES—ARCHITECTURAL
Beaver Board Companies, Buffalo, N. Y.
Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y.
S. C. Johnson & Son, Racine, Wis. ("Johnson's Under-Lac" and "Johnson's Flat Varnish").
Eugene E. Nice, Philadelphia, Pa.
Patton Paint Co., Milwaukee, Wis. ("Pitcairn").
Toch Bros., New York, N. Y.
Wadsworth, Howland & Co., Boston, Mass.

VENEERS
Wood Mosaic Co., New Albany, Ind.

VENTILATING SYSTEMS
Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis. ("Badger").
Drew Carrier Co., Waterloo, Wis. ("Drew").
King Ventilating Co., Owatonna, Minn.
Louden Machinery Co., Fairfield, Ia.
Milwaukee Corrugating Co., Milwaukee, Wis.
Pullman Ventilating & Mfg. Co., York, Pa.
Shrauger & Johnson, Atlantic, Ia.
Standard Electric & Elevator Co., Baltimore, Maryland.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill.

VENTILATORS—CHIMNEY
Sterling Foundry Co., Sterling, Ill.

VENTILATORS—EXHAUST BLOWER
Geo. B. Carpenter & Co., Chicago, Ill.
Louden Machinery Co., Fairfield, Ia.
Milwaukee Corrugating Co., Milwaukee, Wis. (for creameries).
Shrauger & Johnson, Atlantic, Ia.
Standard Electric & Elevator Co., Baltimore, Maryland.

VENTILATORS—ROOF
Architectural Service Corp., Philadelphia, Pa.
Badger Corrugating Co., La Crosse, Wis. ("Badger").
Jos. Barnett & Co., Cedar Rapids, Ia.
Philip Bernard Co., Sioux City, Ia. ("O. K.").
Brasco Mfg. Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Edwards Mfg. Co., Cincinnati, O.
Hunt, Helm, Ferris & Co., Harvard, Ill. ("Queen").
International Steel & Iron Co., Evansville, Ind.
James Mfg. Co., Fort Atkinson, Wis.
King Ventilating Co., Owatonna, Minn.
Louden Machinery Co., Fairfield, Ia.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
J. E. Porter Co., Ottawa, Ill. ("Porter").
Pullman Ventilator & Mfg. Co., York, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Sargent & Co., New Haven, Conn.
Shrauger & Johnson, Atlantic, Ia.
Thomas & Armstrong Co., London, O. ("Buckeye").
Willis Mfg. Co., Galesburg, Ill. ("Willis").

VENTILATORS—SIDEWALK
American 3-Way Prism Co., Cicero, Ill.
Philip Bernard Co., Sioux City, Ia.
Hero Furnace Co., Chicago, Ill.

VENTILATORS—WINDOW
American 3-Way Prism Co., Cicero, Ill.
Badger Corrugating Co., La Crosse, Wis.
Philip Bernard Co., Sioux City, Ia.
Brasco Mfg. Co., Chicago, Ill.
James Mfg. Co., Fort Atkinson, Wis.
Kawneer Mfg. Co., Niles, Mich.
Louden Machinery Co., Fairfield, Ia.
Merchant & Evans Co., Philadelphia, Pa.
Pullman Ventilating & Mfg. Co., York, Pa.
Sargent & Co., New Haven, Conn.
Willis Mfg. Co., Galesburg, Ill.

VISES
E. C. Atkins & Co., Indianapolis, Ind. (Saw).
Geo. B. Carpenter & Co., Chicago, Ill.
Henry Disston & Sons, Philadelphia, Pa. (Saw).
Goodell-Pratt Co., Greenfield, Mass.
Hardin-Lavin Co., Chicago, Ill.
Huther Bros. Saw Mfg. Co., Rochester, N. Y. (Circular saw).
B. B. Karol, Chicago, Ill.
North Bros. Mfg. Co., Philadelphia, Pa. ("Yankee").
Richards-Wilcox Mfg. Co., Aurora, Ill. ("R. W." woodworking).
Sargent & Co., New Haven, Conn. ("Sargent").
Smith & Hemenway Co., Irvington, N. J. ("Red Devil").
Stanley Rule & Level Co., New Britain, Conn.

WALL BOARD
Beaver Board Companies, Buffalo, N. Y. ("Beaver Board").
Beckman-Dawson Roofing Co., Chicago, Ill.
Bird & Son, East Walpole, Mass. ("Neponset" quartered oak finish, "American" ready).
Bishopric Mfg. Co., Cincinnati, O.
Black Rock Wall Board Co., Buffalo, N. Y.
Cadillac Lumber Co., Cadillac, Mich.
Philip Carey Co., Cincinnati, O. ("Carey Board").
Geo. B. Carpenter & Co., Chicago, Ill.
Compo-Board Co., Minneapolis, Minn. ("Compo-Board").
Cornell Wood Products Co., Chicago, Ill. ("Cornell Wood Board").
Curtis Companies, Clinton, Ia.
Edwards Mfg. Co., Cincinnati, O.
Heppes Roofing Co., Chicago, Ill.
C. B. Hewitt & Bros., New York, N. Y.
International Insulation Co., St. Paul, Minn. (Felted fibre board, waterproofed, for inside and outside construction).
Keasbey & Mattison Co., Ambler, Pa. (Asbestos).
MacAndrews & Forbes Co., New York, N. Y. ("Fiberlic").
Niagara Wall Board Co., Buffalo, N. Y.
Upson Co., Lockport, N. Y. ("Upson Board").

WALL PLUGS
Bostwick Steel Lath Co., Niles, O.
F. D. Kees Mfg. Co., Beatrice, Neb.

WALL TIES
Badger Corrugating Co., La Crosse, Wis. ("Badger").
Berger Mfg. Co., Canton, O.
Philip Bernard Co., Sioux City, Ia.
Bostwick Steel Lath Co., Niles, O.
Geo. B. Carpenter & Co., Chicago, Ill.
Donley Bros. Co., Cleveland, O.
Edwards Mfg. Co., Cincinnati, O.
General Fireproofing Co., Youngstown, O.
Helm Brick Machine Co., Cadillac, Mich.
F. D. Kees Mfg. Co., Beatrice, Neb.
Milwaukee Corrugating Co., Milwaukee, Wis.
Sykes Metal Lath & Roofing Co., Niles, O.
Waterman-Waterbury Co., Minneapolis, Minn.
Willis Mfg. Co., Galesburg, Ill.

WARDROBES
Hart & Hutchinson Co., New Britain, Conn. (Steel).
Knape & Vogt Mfg. Co., Grand Rapids, Mich. ("Garment Care System").

WASHSTANDS
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis. (Enameled ware).
Albert Pick & Co., Chicago, Ill.
Rowe Sanitary Mfg. Co., Detroit, Mich. ("Ro-San").

WATER CLOSETS
B. B. Karol, Chicago, Ill.
Kohler Co., Kohler, Wis. (Enameled ware).
Wolff Mfg. Co., Chicago, Ill.

WATERPROOFING—CEMENT
Bitu-Mortar Waterproofing Co., New York, N. Y. ("B. M. No. 78").
Samuel Cabot, Inc., Boston, Mass. ("Cabot's").
Cadillac Lumber Co., Cadillac, Mich.
Philip Carey Co., Cincinnati, O.
Ceresit Waterproofing Co., Chicago, Ill.
Construction Materials Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y.
General Fireproofing Co., Youngstown, O. ("GF").
H. W. Johns-Manville Co., New York, N. Y.
Patent Vulcanite Roofing Co., Chicago, Ill. ("Vulcanite").
Patton Paint Co., Milwaukee, Wis.
Sandusky Cement Co., Cleveland, O. ("Medusa").
S. O. S. Mfg. Co., Kansas City, Mo. ("S. O. S.").
Toch Bros., New York, N. Y. ("R. I. W.").
Truscon Steel Co., Detroit, Mich.

WATERERS—STOCK
Sterling Foundry Co., Sterling, Ill.

WATER HEATERS
Leech Metallic Bathtub Co., Detroit, Mich.

WATER SUPPLY SYSTEMS
Buhl Machine Co., Chicago, Ill.
W. E. Caldwell Co., Louisville, Ky.
Geo. B. Carpenter & Co., Chicago, Ill.
The Deming Co., Salem, O.
Domestic Engineering Co., Dayton, O. ("Delco-Light").
Flint & Walling Mfg. Co., Kendallville, Ind.
Goulds Mfg. Co., Seneca Falls, N. Y.
B. B. Karol, Chicago, Ill.
Kewanee Private Utilities Co., Kewanee, Ill. ("Kewanee").
Louden Machinery Co., Fairfield, Ia.
Milwaukee Air Power Pump Co., Milwaukee, Wisconsin.
F. E. Myers & Bros., Ashland, O.
Phelps Light & Power Co., Rock Island, Ill.
Rider-Ericsson Engine Co., Walden, N. Y. ("Recco").
Standard Scale & Supply Co., Pittsburgh, Pa.

WAX—FLOOR
Geo. B. Carpenter & Co., Chicago, Ill.
Devoe & Raynolds Co., New York, N. Y. ("Devoe").
S. C. Johnson & Son, Racine, Wis. ("Johnson's Prepared Wax").
Eugene E. Nice, Philadelphia, Pa.
Patton Paint Co., Milwaukee, Wis. ("Patton's 17th Century Wax").
Wadsworth, Howland & Co., Boston, Mass.

WEATHERSTRIPS
Allmetal Weatherstrip Co., Chicago, Ill. ("Allmetal").
Geo. Angell Co., Detroit, Mich.
Brasco Mfg. Co., Chicago, Ill.
Diamond Metal Weatherstrip Co., Columbus, O.
Eveleth Mfg. Co., River Forest, Ill. ("Eveleth" door bottom).
Henry Airtight Weatherstrip Co., Crawfordsville, Ind.
Morgan Metal Weatherstrip Co., St. Louis, Mo.
Northern Hemlock & Hardwood Mfrs. Assn., Oshkosh, Wis.
Sager Lock Co., North Chicago, Ill.

WEATHERSTRIP TOOLS
Sager Lock Co., North Chicago, Ill.

WEATHER VANES
Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
Milwaukee Corrugating Co., Milwaukee, Wis.
Shrauger & Johnson, Atlantic, Ia.
Thomas & Armstrong Co., London, O. ("Buck eye").
Willis Mfg. Co., Galesburg, Ill.

WHEELBARROWS
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Deere & Co., Moline, Ill.
Lansing Co., Lansing, Mich.
Sheldon Mfg. Co., Nehawka, Neb.
Standard Scale & Supply Co., Pittsburgh, Pa.
Sterling Wheelbarrow Co., Milwaukee, Wis.

WINCHES—BOOM
Geo. B. Carpenter & Co., Chicago, Ill.
Sasgen Derrick Co., Chicago, Ill.

WINDMILLS
W. E. Caldwell Co., Louisville, Ky.
Mast, Foos & Co., Springfield, O. ("Imperial").
Stover Mfg. & Engine Co., Freeport, Ill.

WINDOW CASINGS—SHEET METAL
Badger Corrugating Co., La Crosse, Wis.
Edwards Mfg. Co., Cincinnati, O.
National Lead Co., New York, N. Y.

WINDOW SHADES
Albert Pick & Co., Chicago, Ill.

WINDOWS—BOXHEAD
Lunkin Window Co., Cincinnati, O. ("Lunkin Unit Window," containing a boxhead which entirely receives both sash and a pair of metal-framed, copper-cloth fly screens which can be raised like the sash and are held in the boxhead for winter storage).

WINDOWS—CASEMENT
Badger Corrugating Co., La Crosse, Wis.
Curtis Companies, Clinton, Ia.
Northern Hemlock & Hardwood Mfrs. Assn., Oshkosh, Wis.
Whitney Window Corp., Minneapolis, Minn. ("Whitney").
Willis Mfg. Co., Galesburg, Ill.

WINDOWS—HOGHOUSE
Badger Corrugating Co., La Crosse, Wis. ("Badger").
Philip Bernard Co., Sioux City, Ia.
Curtis Companies, Clinton, Ia.
Shrauger & Johnson, Atlantic, Ia.
Willis Mfg. Co., Galesburg, Ill.

WINDOWS—REVERSIBLE
Kawneer Mfg. Co., Niles, Mich.

WINDOWS—WALL
Geo. Angell Co., Detroit, Mich. (For sleeping porch).

WINDOWS—WIRE GLASS
Badger Corrugating Co., La Crosse, Wis.
A. C. Chesley Co., Inc., New York, N. Y.
Edwards Mfg. Co., Cincinnati, O.
International Woodworking Co., Evansville, Ind.
Keasbey & Mattison Co., Ambler, Pa.
Willis Mfg. Co., Galesburg, Ill.

WIRE
General Electric Co., Schenectady, N. Y. (Armored cable, automobile cable, cable bars, feeding and picking-up cable reels, cable sockets, underground material, motor driven cable).

WIRE CLOTH
Geo. B. Carpenter & Co., Chicago, Ill.
Gilbert & Bennett Mfg. Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
New Jersey Wire Cloth Co., Trenton, N. J.
Standard Screen Co., Chicago, Ill.
Wright Wire Co., Worcester, Mass.

WIRING DEVICES
General Electric Co., Schenectady, N. Y. (Adapters, combined pull socket and attaching plugs, conduit switches, door switches, double catch sockets, enclosed fuses, attaching plugs, receptacles, rotary flush switches).

WOOD FILLERS
S. C. Johnson & Son, Racine, Wis. ("Johnson's Paste Wood Filler").
Eugene E. Nice, Philadelphia, Pa.

WOODWORKERS—VARIETY
American Cement Machine Co., Keokuk, Iowa ("Boss").
American Saw Mill Machinery Co., New York, N. Y. ("American").
Geo. B. Carpenter & Co., Chicago, Ill.
Chicago Machinery Exchange, Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Crescent Machine Co., Leetonia, O.
International Steel & Iron Co., Evansville, Ind.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Novo Engine Co., Lansing, Mich. ("Novo").
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Standard Scale & Supply Co., Pittsburgh, Pa.
Woodworker Mfg. Co., Detroit, Mich.

WOODWORKING MACHINERY—FOOT AND HANDPOWER
American Saw Mill Machinery Co., New York, New York.
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
W. F. & Jno. Barnes Co., Rockford, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Oshkosh Mfg. Co., Oshkosh, Wis.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Machine Tool Co., Sidney, O.
Silver Mfg. Co., Salem, O. ("Silver's").
Standard Scale & Supply Co., Pittsburgh, Pa.
James L. Taylor Mfg. Co., Poughkeepsie, N. Y.

WOODWORKING MACHINERY—POWER-DRIVEN
American Cement Machine Co., Keokuk, Iowa ("Boss").
American Saw Mill Machinery Co., New York, N. Y. ("American").
E. C. Atkins & Co., Indianapolis, Ind. ("Atkins").
Buhl Machine Co., Chicago, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Novo Engine Co., Lansing, Mich. ("Novo").
Oshkosh Mfg. Co., Oshkosh, Wis.
Parks Ball Bearing Machine Co., Cincinnati, O.
Sidney Elevator Mfg. Co., Sidney, O.
Sidney Machine Tool Co., Sidney, O.
Silver Mfg. Co., Salem, O. ("Silver's").
Standard Scale & Supply Co., Pittsburgh, Pa.
James L. Taylor Mfg. Co., Poughkeepsie, N. Y.
J. D. Wallace & Co., Chicago, Ill.
Woodworker Mfg. Co., Detroit, Mich.

WOODWORKING MACHINERY—SECOND-HAND
Chicago Machinery Exchange, Chicago, Ill.
Sidney Machine Tool Co., Sidney, O.
Standard Scale & Supply Co., Pittsburgh, Pa.

WOODWORKING MACHINERY—UNIVERSAL
Geo. B. Carpenter & Co., Chicago, Ill.
C. H. & E. Mfg. Co., Milwaukee, Wis. ("C. H. & E.").
Chicago Machinery Exchange, Chicago, Ill.
Crescent Machine Co., Leetonia, O.
Knickerbocker Co., Jackson, Mich. ("Knickerbocker").
Parks Ball Bearing Machine Co., Cincinnati, O.
Silver Mfg. Co., Salem, O. ("Silver's").
Sidney Elevator Mfg. Co., Sidney, O.
Sidney Machine Tool Co., Sidney, O.
J. D. Wallace & Co., Chicago, Ill.
Woodworker Mfg. Co., Detroit, Mich.

WRENCHES
Allith-Prouty Co., Danville, Ill.
Geo. B. Carpenter & Co., Chicago, Ill.
Goodell-Pratt Co., Greenfield, Mass.
Hardin-Lavin Co., Chicago, Ill.
North Bros. Mfg. Co., Philadelphia, Pa. ("Yankee").
Richards-Wilcox Mfg. Co., Aurora, Ill.
Smith & Hemenway Co., Irvington, N. J.
L. S. Starrett Co., Athol, Mass.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

INDEX TO ADVERTISERS

In the December, 1919, American Builder

ON THIS and the next following pages will be found a list of concerns using display advertising space in the December, 1919, number of the American Builder giving the page number on which their advertisement appears, followed by a summary of the products they make or sell for the building industry. On the preceding fifteen pages will be found a classified list of those products arranged alphabetically. It will be seen that it is not necessary for our readers to remain long in doubt as to where they can obtain building materials, equipment, tools specialties and supplies for their building needs, because here is a world's market place in which they can do their shopping and buying. The firms named below are responsible manufactures or distributors and we recommend them and vouch for their reliabililty. Write them for catalogs and information at any time and you can be sure of receiving a courteous, prompt response.

hoisting buckets, industrial cars, concrete carts, concrete construction clamps, coal handling machinery, concrete block machines, conveying machinery, stiffleg derricks, gasoline and kerosene engines, electric, gasoline and steam hoists, electric lighting systems, wagon loaders, batch concrete mixers, mortar and plaster mixers, electric motors, paint spraying machines, pumps (contractors', house), sawmill machinery, saw rigs, tanks (pneumatic water, steel and iron), steel towers, concrete trucks, water supply systems, wheelbarrows, power-driven woodworking machinery.

Burkett Lightning Rod Co. 230
Fremont, O.
Lightning protection ("Burkett System").

C

Cabot, Samuel 200
141 Milk St., Boston, Mass.
Cement coatings (colors), cold storage insulation, sound deadeners, waterproof cement stains, creosote shingle stains, creosote wood stains, clear cement waterproofing.

Cadillac Lumber Co. 234
Cadillac, Mich.
Blackboards, casement window hardware, wood columns, barn and garage door hangers, door hardware, hardwood and veneered doors, storm doors, hardwood flooring, garage hardware, hinges (butt, floor, screen door, strap and T), hardwood interior trim, metal lath, door locks and knobs, roofing and sheathing paper, asbestos roofing, asbestos shingles, asphalt ready roofing, asphalt shingles, roofing tin, wood shingles, storm sash, sash cord, sash locks, sash pulleys, door and window screens, silos, stair treads, wall board, waterproofing for cement.

Caldwell Mfg. Co. 243
5 Jones St., Rochester, N. Y.
"Acme" cellar window sets, "Caldwell" vertical and "Empire" door holders, "Caldwell" sash balances.

Caldwell Co., W. E. 245
Brook and Brandeis Sts., Louisville, Ky.
Angle irons, friction clutches, conveying machinery, cutoff couplings, hoop fasteners, shafting and hangers, wood silos, silo lugs, silo roofs, tank lugs, tanks (pneumatic water, steel and iron, wood), steel towers, water supply systems, windmills.

Canton Foundry & Machine Co. 224
Canton, O.
Coal chutes, "Canton" portable cranes and hoists, "Universal" auto turntables.

Carey Mfg. Co., Philip 8
Lockland, Cincinnati, O.
Boiler and pipe coverings ("Air Cell," "Argentum," "Carocel," "Impervo," "85% Magnesia," "Perfecto," "Protecto," "Multi-Ply," "Pyrex," "Underground System of Insulation"), "Fibrewove" insulating paper, pipe-covering canvas, roof coatings (black asphalt paint, magnesia coating, fibre coating), "Percoproof" dampproofing, paints (black asphalt paint, "Universal" coating), roofing ("Philco," "Sterling," "Manhattan," "Lastile," "Micakote," "Premium," "Surety" asphalt ready roofing, "Asfaltslate," "Junior," "Firefiter" asphalt shingles, built-up roofing ("Carey Contract Roofing" styles B, C, D, F, "Carey Roof Specifications" 2, 3, 4), "Philco," "Sterling," "Manhattan," "Lastile," "Micakote," "Premium," "Surety," rubber roofing, "Best-o-felt" asbestos sheathing, "Carey Board" wall board.

Carpenter & Co., George B. 244
440 N. Wells St., Chicago, Ill.
Full line of building materials, carpenters' tools, contractors' equipment.

Carr, Ryder & Adams Co. 85
Dubuque, Iowa.
Building paper, wood columns, hardwood and veneered doors, storm doors, hardwood flooring, hardwood interior trim, wood mantels, wholesale millwork ("Bilt-Well"), roofing and sheathing paper, asphalt ready roofing, asphalt shingles, rubber roofing, storm sash, sash balances, sash cord, door and window screens, stair treads, stairways, store fronts.

Ceresit Waterproofing Co. 155
110 S. Dearborn St., Chicago, Ill.
Cement coatings, dampproofing, floor hardeners, cement hardeners, metal lath, mortar colors, paints, brick and cement stains, waterproofing for cement.

C. H. & E. Mfg. Co. 11
332 Mineral St., Milwaukee, Wis.
Air compressors, saw benches, building material elevators, gasoline and kerosene engines, gasoline and kerosene-engine driven hoists, mortar mixers, pumps (bilge, centrifugal, piston and triplex), portable saw rigs, saw tables, variety woodworker, power-driven woodworking machinery. Trade name "C. H. & E." for all products.

Chappell & Co., Waywell 244
408 W. Grand Ave., Chicago, Ill.
Surfacing machines (desk and table, electric floor).

Chesley Co., Inc., A. C. 236
277 Rider Ave., New York, N. Y.
Doors (bronze and iron, metal cellar, copper covered, metal covered fireproof, hollow metal fireproof), wire-glass windows.

Chicago Machinery Exchange 229
1219 W. Washington Blvd., Chicago, Ill.
Bandsaw machinery, vertical borers, boring machines, hollow mortising chisels, edgers (double and gangsaw), knives (moulding and planer), woodworking lathes, mitering machines, power planers, resaw machines, sanders, sandpapering machines, saw mill machinery, saw rigs, saw tables, saws (band, circular, grooving, jig), shafting and hangers, shaping machines, variety woodworker, woodworking machinery (power-driven and second hand).

Chicago Spring Butt Co. 218
Union Park Place, Chicago, Ill.
Door hardware, door stops, butt hinges, floor hinges, screen door hinges, spring hinges, surface hinges, screen door sets.

Chicago Technical College 113
Chicago, Ill.
Correspondence courses for builders, plan-reading home-study courses, estimating of buildings home-study courses, architectural drafting home-study courses.

Chief Draftsman 215
4008 Broadway, Chicago, Ill.
Instruction in drafting, instruction by correspondence.

Choraleon Phonograph Co. 183
Elkhart, Ind.
Phonographs, phonograph supplies and plans for building phonograph cases.

Clinton-Wright Wire Co. 5-239
Worcester, Mass.
Electrically welded sheathing, electrically welded fabric, wire lath, wire screen cloth, perforated metals, grilles, fencing, ornamental iron work, window guards, elevator cabs and enclosures, bank railings.

Coleman, Watson E. ..... ? 248
824 F St., Washington, D. C.
Patent attorneys.

Colgan Machinery & Supply Co. 233
916 New Hayden Bldg., Columbus, O.
Concrete block machines, door mortisers.

Comfort Chemical Closet Co. 246
Toledo, O.
Chemical and sanitary closets.

Compo-Board Co. 234
5777 Lyndale Ave., N., Minneapolis, Minn.
Wall board.

Concrete Machinery Co. 248
202 S. 2d St., St. Louis, Mo.
Concrete block machines, burial vault molds.

Construction Materials Co. 234
417 W. 12th Place, Chicago, Ill.
"Velvetile" composition flooring, "Kragstone" stucco, waterproofing for cement.

Cornell Wood Products Co. 247
190 N. State St., Chicago, Ill.
"Cornell" wood board.

Cortright Metal Roofing Co. 246
50 N. 23d St., Philadelphia, Pa.
"Cortright" metal shingles.

Coulson & Co., J. W. 236
Columbus, O.
Store fronts.

Creo-Dipt Co. 218
North Tonawanda, N. Y.
Thatched roofing, stained shingles, shingle stains. Trade name "Cero-Dipt."

Crescent Machine Co. 229
Leetonia, O.
Saw benches, bandsaw machinery, vertical borers, hollow mortising chisels, disk grinders, safety guards, heads (dado, jointer, shaper), jointers, knives (moulding and planer), power planers, saw (circular and swing), shaping machines, surfacers, variety woorworker, woorworking machinery (foot and hand-power also power-driven), universal woodworking machinery.

Crex Patent Column Co. 245
2300 S. Springfield Ave., Chicago, Ill.
Concrete filled steel columns.

Crown Point Spar Co. 249
663 Broadway, New York, N. Y.
Concrete facing, cement facing, dash for stucco.

D

Dail Steel Products Co. 205
229 Main St., Lansing, Mich.
Chemical and sanitary closets.

Deming Co. 202
89 Depot St., Salem, O.
Water supply systems, contractors' pumps, house pumps.

Detroit Show Case Co. 238
491 W. Fort St., Detroit, Mich.
"Silent Salesman" show cases and "Desco" copper store-front construction.

DeVilbiss Mfg. Co. 210
1276 Dorr St., Toledo, O.
The "Aeron" system portable painting equipment.

Devoe & Raynolds Co. 238
101 Fulton St., New York, N. Y.
Air painting equipment, cement coatings, drafting tables, draftsmen's scales, drawing boards, drawing instruments, architectural enamels, floor finish, kalsomine, paint and varnish removers, paints for every purpose, wood preservatives, roofing cement, roof putty, squares ("T," try and mitre), stains (brick, cement, shingle, wood), wall tints, tracing cloth and paper, architectural varnishes, waterproofing for cement, floor wax. Devoe makes a paint, varnish, stain or enamel for every surface from cellar to garret, inside and out. Trade name "Devoe" for all products.

Diddle, L. F. 249
Marshfield, Wis.
Lightning rods.

Dietzgen Co., Eugene 238
166 W. Monroe St., Chicago, Ill.
Blue print paper, drafting tables, draftsmen's scales, drawing boards, drawing instruments, engineering and surveying instruments, builder's levels, drafting pencils, boxwood rules, caliper rules, spring joint rules, steel rules, T-squares, steel measuring tapes, tracing cloth and paper, transits and levels.

Disston & Sons, Henry 214
Box 1537, Philadelphia, Pa.
Bevels, saw clamps, gangsaw edgers, floor scraper blades, saw gauges, dado heads, jointer heads, sawtooth jointers, moulding and planer knives, builders' and carpenters' levels, resaw machines, saw sets, saw swages, saws (band, circular, drag, grooving, hand, jig), screwdrivers, spoke shaves, squares (bevel, combination, steel, try and miter), trowels.

Dixon Crucible Co., Jos. 245
Jersey City, N. J.
Lumber crayons, paints, carpenters' and drafting pencils.

Donley Bros. Co. 231
74th St., near Aetna Rd., Cleveland, O.
Joist anchors, coal chutes, column bases, concrete inserts, fireplace dampers, ash pit doors, garbage receivers, jamb and corner guards, package receivers, stanchions for basement columns, wall ties, ash dumps, brick clamps, coal hole rings and covers, salamanders, ash-pit or cleanout doors.

Drew Carrier Co. 201
Waterloo, Wis.
Feed and litter carriers, barn equipment, stanchions, stable fixtures.

Dunn Mfg. Co., W. E. 85
415 24th St., Holland, Mich.
Cement brick machines, cement post machines, cement sewer pipe machines, concrete block machine, batch concrete mixers, cement drain tile moulds, ornamental concrete molds, cement drain tile machines, chimney molds. Trade name "Dunn" for all products.

E

Edwards Mfg. Co. 233
401 Eggleston Ave., Cincinnati, O.
Corrugated arches, corrugated steel awnings, metal battens, metal corner beads, cresting blocks, building paper, sheet metal capitals, sheet metal window casings, metal ceilings, chimney tops, metal siding clips, metal columns, metal building corners, sheet metal cornices, crestings and finials, barn and garage door hangers, doors (copper-covered, metal-covered fireproof, hollow metal fireproof, grain elevator, iron and steel), building material elevators, iron and steel fences, steel and wire grilles, window guards, hangers (eaves trough and pipe), garage heaters, lath (expanded metal and metal), metal letters, steel shelving, metal lockers, marquees, nails (galvanized, roofing and slating), sheet metal ornaments, roofing and sheathing paper, metal partitions, plaster board, roofing and roofing supplies, hollow metal sash, fireproof shutters, silo roofs, skylights, store fronts, steel and iron tanks, roof ventilators, wall board, wall ties, weather vanes, wire glass windows, steel rolling doors.

Elite Mfg. Co. 207
100 Ohio St., Ashland, O.
Brackets, house-moving jacks, continuous concrete mixers, scaffold brackets, steel scaffolds, shingling brackets.

Eveleth Mfg. Co. 243
13 Ashland Ave., River Forest, Ill.
"Eveleth" in-swinging weather strips for casement windows, "Eveleth" shade adjusters, "Eveleth" door-bottom weather strips, "Eveleth" batten weatherstrip for casement windows.

F

Farm Mechanics 142-143
1627 Prairie Ave., Chicago, Ill.
A monthly farm publication, devoted to farm building improvements, farm implements and machinery.

Federal Motor Truck Co. 175
Detroit, Mich.
Motor trucks.

Fink & Sons, Louis 242
56 N. 7th St., Philadelphia, Pa.
Stationery for building contractors.

Flintkote Co. 189
88 Pearl St., Boston, Mass.
Roofing cement ("Rex" plastic cement), asphalt shingles ("Rex" strip shingles), built-up roofing ("Rex" construction roofing), canvas roofing ("Paradux" roofing), slate roofing ("Rex" slate-surfaced roofing).

Flint & Walling Mfg. Co. 232
Kendallville, Ind.
House pumps, pneumatic water tanks, steel towers, water supply systems.

Fox Co., M. Ewing 226
136th St. & Rider Ave., New York, N. Y.
Calcimine ("Muralite," "Calcitrine,"), cold water paint ("Permanite").

Fox Supply Co. 245
Brooklyn, Wis.
Floor scrapers and blades, hand-power floor surfacing machines, burnishers, eye guards for emery wheels, cabinet scraper blades, box scrapers.

Frank Mfg. Co. 245
241 Century Bldg., Des Moines, Iowa.
Batch concrete mixers, mortar and plaster mixers.

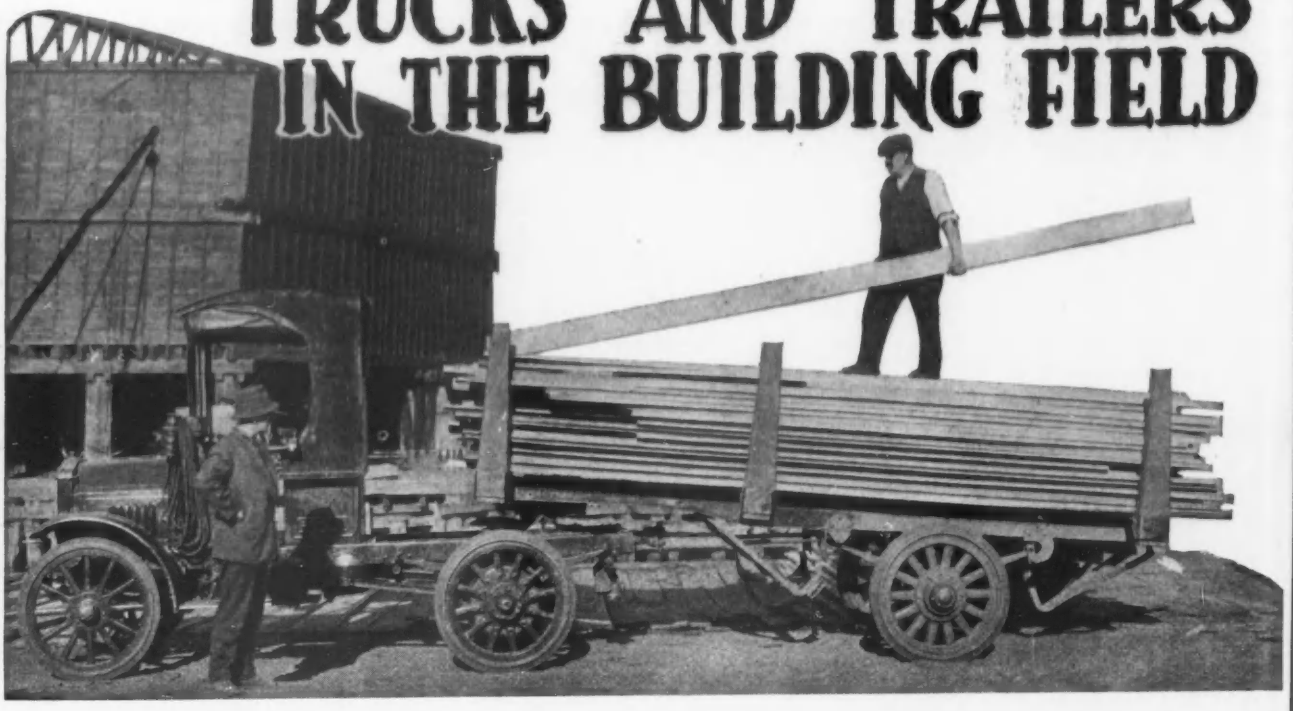
Fuller Brick Cleaning Co. 219
New Bedford, Mass.
Machine for cleaning bricks.

G

Geier & Bluhm 242
5 Front St., Troy, N. Y.
Engineering and surveying instruments, builders' levels, sun dials, transits and levels. Trade name "G. & B." for all products.

General Electric Co. 8-125
Schenectady, N. Y.
Cable (asbestos station), wire (armored

TRUCKS AND TRAILERS IN THE BUILDING FIELD



How to Choose Trucks Adapted to Your Business

By Burt R. Barr

EVERY member of the building industry knows the value and advantage of truck delivery over the antiquated horse-drawn vehicles. However, probably everyone does not know how to select the right truck, both from an economic and service standpoint, and the object of this article is to set forth some of the important features which every truck purchaser should seek when buying a motor truck.

Almost any blacksmith, in a remarkably short time, could build a truck, to your direct specifications. From any one of several concerns he could buy a motor of proven worth. From another he could purchase a strong, sturdy frame. He would have a wide selection of reliable, wear-resisting bearings. He could buy well-known axles, gears, wheels, springs, radiator and the hundreds of parts that go into a completed truck.

Every unit in that truck would be as good as could be obtained. The truck would possibly be as good as could be built by experts who had to follow your instructions to the letter. The blacksmith would only assemble the various units.

But would that truck be a good investment? Would it meet the thousand and one requirements of a good commercial car?

Probably not. It would lack one essential thing. It would lack the experienced designer, who by years of study and test had overcome the stumbling blocks that impede the way of the inexperienced.

Only One Test of Merit

Because each part is good, it does not necessarily follow that the whole is beyond improvement. Each stone in a mosaic may be perfect—but the mosaic itself will not be good if put together by an inexperienced artist.

So it is with motor trucks. Each part may be the best that can be bought—but the completed truck may not give satisfaction.

The only test of truck worth is performance. Performance inevitably reflects the ability of the designer—ability gained only thru experience and constant determination to reach perfection.

Bear this in mind when you come to select a truck that will give long, uninterrupted service—at a moderate initial outlay and reasonable operating and maintenance costs.

First of all, at any price, you will want a truck that is going to be a good investment. To be a good investment, it must operate at a profit. This means that its service must be uninterrupted. It must stay out of the shop. It must not be held up for roadside repairs. It must give constant service in the hands of the average operator. It must not be wasteful of tires and gasoline. It must have long life.

Pick the Dealer of Whom You Buy

You would be using poor judgment to buy a truck from a dealer who was not progressive and prosperous. His very prosperity is, in a measure, a guarantee of the worth of the article he sells. Only a prosperous dealer can afford to carry an investment that assures him of a full line of spare parts. Only from such a dealer can you always be sure of efficient service.

Men of that type realize the importance of "service." Their interest in the truck you buy is not ended when

Stewarts help make building business hum

Many a building contractor or supply house that hesitated about buying a truck, found that its first Stewart not only paid for itself, but brought in new business besides.

Stewarts perform their work quickly and economically, keep running and save many dollars for their owners.

$200 to $300 is saved to begin with on the purchase price, for Stewarts' simplified design does away with hundreds of needless parts that add nothing to strength or durability. This is a big advantage. It means—

The truth—

Less dead weight
Less gas and oil
Less wear on tires
Less time out for repairs
Less wear and tear from poor operation.

The proof

We have in use one of the Stewart two-ton trucks and we can very well say that we appreciate the services the car gives us.

As to our point of view this is just the thing for heavy trucking.

(Signed)
RAPID FIRE PROOF DOOR CO., Inc.
By A. E. Guinstein, Pres.
New York, N. Y.

¾ ton	1 ton	1½ ton	2 ton	3½ ton
$1195	$1650	$1975	$2575	$3500

F. O. B. BUFFALO

Thousands of Stewarts are giving exceptional service in over 600 American cities, on hundreds of farms and in 27 foreign countries.

Stewart MOTOR TRUCKS

Stewart Motor Corporation Write for free Booklet "HOW TO CHOOSE A MOTOR TRUCK" **Buffalo, N. Y.**

they receive your check. They know that their future prosperity depends upon the satisfaction given their customers. It is to their interest to see that you receive continuous economical service from your truck.

Naturally, it is to your interest to deal with men of that type. Your business experience has taught you the futility and poor policy of attempting to deal with unprogressive, unprosperous men. They will "guarantee" almost anything you ask. But what is the value of their "guarantee," with nothing to back it up?

They can't afford to keep a full line of parts. If you have an accident, it will take days, maybe weeks or months, for them to replace the damaged parts. If the truck fails to give satisfactory service, they are not in a position to make it good. A guarantee is never stronger than the man who gives it.

These things have been learned in almost every business. Don't forget them when you buy a motor truck.

Study the Truck Builders

Don't buy a truck merely because it has an excellent motor, good axles, fine bearings. You may feel sure that you can get them in any truck which, for more than a brief period, has proven satisfactory.

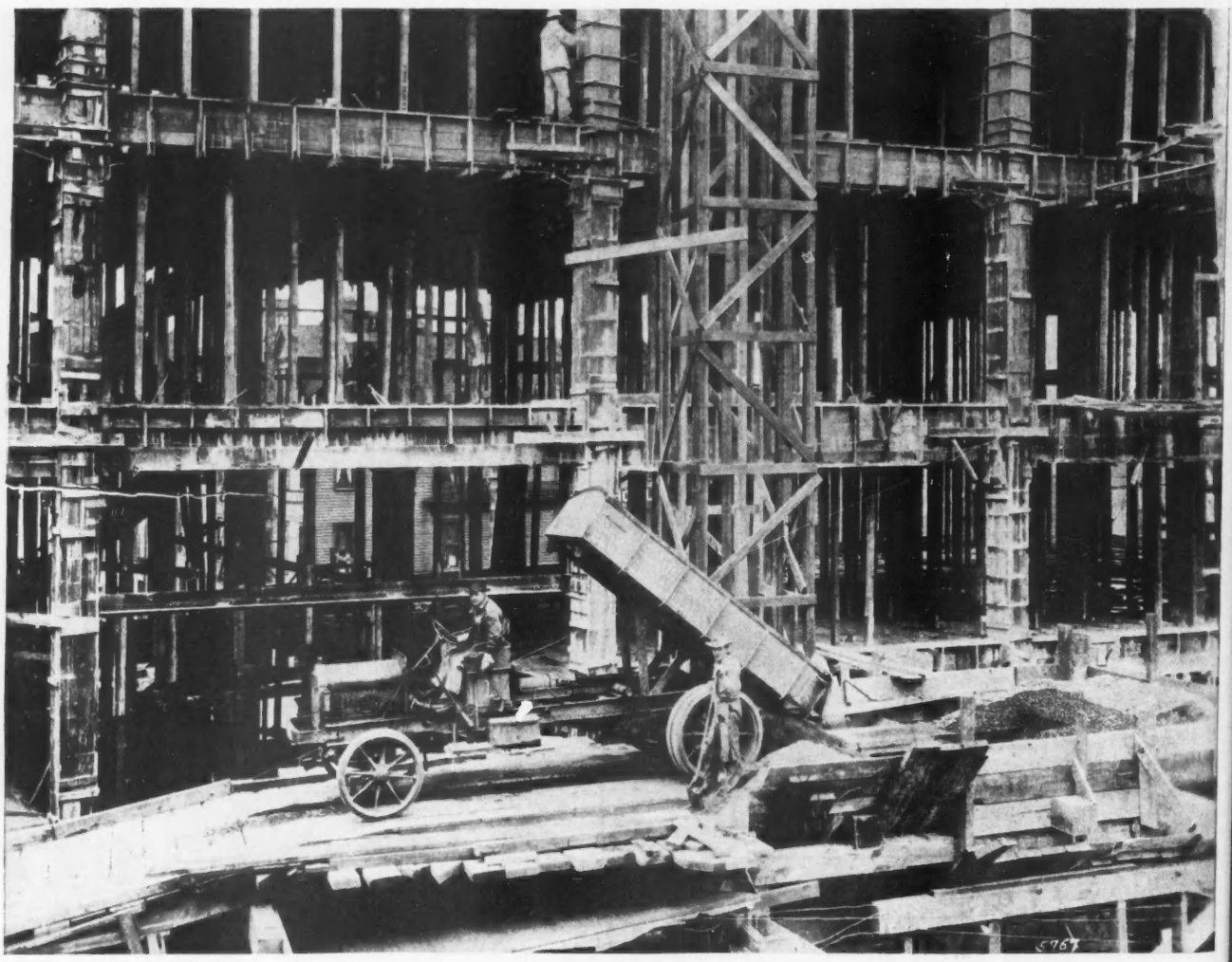
Buy rather on the basis of past history. Demand a truck that has come untarnished thru the trying test of hard, continuous usage under all conditions. Buy a truck made by men whose past success may be taken as an indication of hopes for the future. Makers of that caliber can never afford to stake their reputation and their business hopes on a mediocre truck. They can never acord to sacrifice quality for immediate profits.

Minor Details Important

Take, for instance, a seemingly unimportant detail like the location of a cross member on the frame. The frame—merely as a frame—may be the best that can be built. Unless that cross member is correctly placed in its relation to other parts, however, that frame will soon develop weaknesses. Shorten or lengthen the springs only half an inch, and a satisfactory frame may give trouble. Possibly the cross member would need to be moved only a small fraction of an inch to work in harmony with those springs.

But unless that small change is made the truck is doomed to a short life of usefulness.

You should feel confident that in the truck you buy each screw, each nut and bolt has been carefully studied in the light of actual performance and placed in its proper relation to every other screw, nut and bolt in the truck.



An Exceptional Construction Scene. The Materials for This Huge Concrete Building at Seattle, Wash., Were Furnished by the Seattle Sand & Gravel Co., and Were Delivered to the Hopper Above the Concrete Mixer by 3-Ton "White" Trucks with Dump Bodies. This Method of Delivering Aggregates for Concrete Is Economical.

Federal dump truck dumping and spreading a load of crushed stone. Owned by the Iowa Stone Company, Cedar Rapids, Iowa.

Another FEDERAL

Efficiency

"Ship by Truck" is becoming the slogan of a quickened industrial world.

Contractors—builders—manufacturers—farmers—merchants—consumers—all benefit alike thru response to this new appeal in business.

To "Ship by Truck" is to increase production, facilitate distribution, relieve freight congestion and cut the cost of living.

Because it is built for dependable service, a Federal Truck will give you years of unfailing, economical haulage—regardless of whether your business involves the long or short haul.

Ship by truck. And let your carrier be the time-tested, sturdy, steel-hard and proven Federal.

"Traffic News"—a Monthly Magazine on Better Haulage—Mailed Free on Request

FEDERAL MOTOR TRUCK COMPANY
79 FEDERAL STREET DETROIT, MICHIGAN

"Return Loads Will Cut Your Haulage Costs"

FEDERAL
One to Five Ton Capacities

A Stake Body "Acme" Truck Loaded with Roll Roofing and Roofing Tile, Owned by V. R. Jones

Wasted Power is Money Lost

The average truck utilizes only a small part of the power developed by its motor. Even that small part is greatly reduced when the truck is starting, pulling on a grade or running less than eight or ten miles an hour.

Wasted power means excessive operating costs; short life. An advanced method of power application actually delivers more than 90 per cent to the rear wheels—where it drives the truck and is not consumed in overcoming internal friction and resistance.

Simplicity Important

The performance of most trucks depends to a large extent upon the care and attention of the operator—and many drivers are negligent and careless. You should get a truck simple in design, with no unnecessary parts to get out of order. It should be as nearly fool-proof as a piece of machinery can be made.

Every hour spent in the shop or delayed for roadside repairs is a dead loss to the owner. The truck that shows a profit is the one that gives uninterrupted service. It must stay always in service, without needless delays because the driver thinks "she's not running just right and has to be 'tuned up.'" A truck that must be frequently "tuned up" is too delicate to meet the requirements of those who must have dependable transportation.

Simplified design is a factor in reducing gasoline consumption and running costs. It reduces the necessity for repairs, as there are fewer parts; and inexpert mechanics delight to tinker with adjustments—frequently necessitating a costly interruption in service. Your truck should be so designed that adjustments that invite tinkering and tampering are eliminated.

A great many parts could well be eliminated from the average truck. It should be exceedingly simple, practically fool-proof.

Simplified Lubrication

The average driver fails to give proper attention to the many grease cups and places to oil found on most trucks. And unnecessary places to lubricate mean unnecessary time—and expense—spent in oiling and greasing the truck. Neglected lubrication will soon send any piece of machinery to the junk pile. It has probably been the greatest factor in truck destruction. The truck you buy should have the fewest possible grease cups and spaces to oil. Wherever possible automatic lubrication should protect against carelessness and neglect.

The Test of Popularity

You will find some of those features in almost every truck. In some trucks you will find many of them. But you may feel sure that very few builders can put out a commercial car of such high quality at a price which would prove a good investment value for the average user.

You should insist upon a truck which is proving its value in a large number of lines of business. If it is a good truck, its value should be recognized thruout the country. It should be giving daily service in the metropolis and on the farm. Its popularity should not be localized. It should be in service in every principal foreign country.

The James C. Goff Co., Dealer in Building Materials, Boston, Mass., Require a Staunch Truck to Handle the Heavy Tile. This Picture Shows the Company's "Packard" Truck Taking on a Heavy Load to be Transported to the Yard.

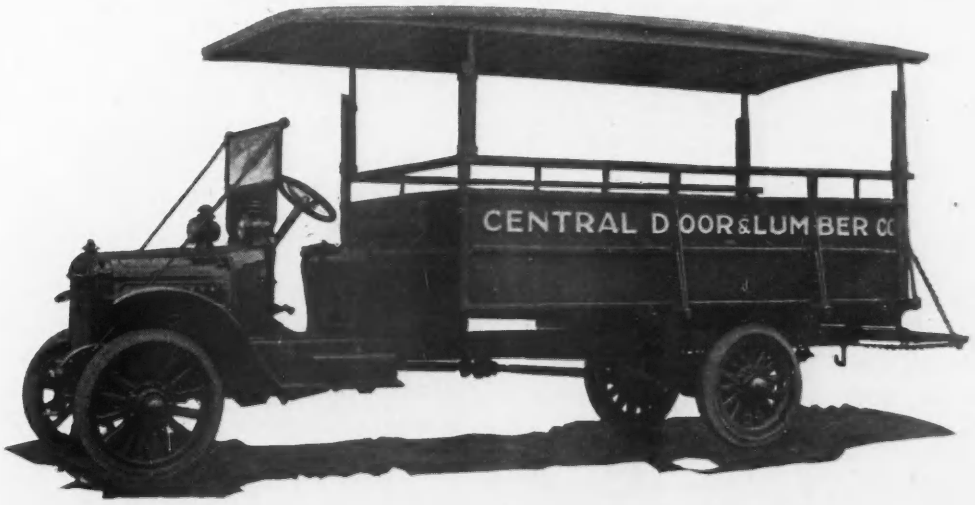
Trailer Saves Hauling Cost

LUMBERMEN in all parts of the country are finding in trailer hauling the method that greatly reduces the cost of getting logs from the woods to the mill—and greatly reduces the original cost of the equipment that is necessary for the work.

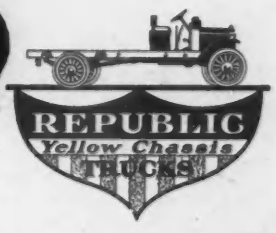
For instance, the W. J. Steele Lumber Co., of Martinsville, Ind., find that with a 3½-ton reversible trailer they are able to haul twice as many logs to the mill as they formerly did with the 3½-ton truck alone.

The truck was equipped with a loader for getting the logs aboard

Sixty thousand Republic Trucks are daily doing not only extraordinary things—but positively *heroic* things, in every conceivable kind of hauling. The volume of proof back of the Republic is greater than any other truck in the world is able to present.

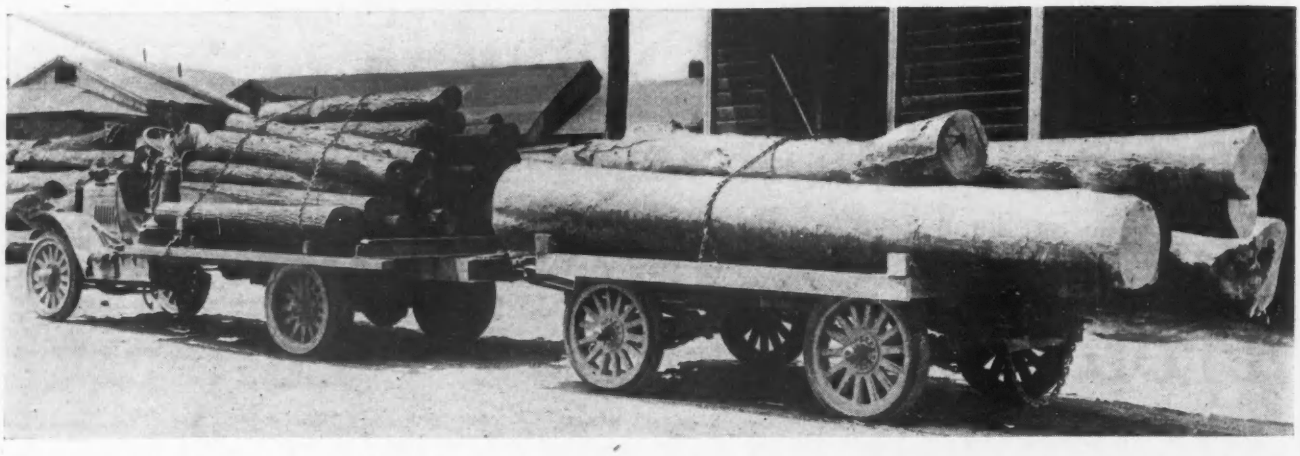


REPUBLIC TRUCKS



Republic Motor Truck Co., Inc., 953 Michigan Avenue, Alma, Michigan

National Truck Shows
New York, 8th Coast Artillery Armory, January 3 to 10
Chicago, International Amphitheatre, January 24 to 31



Truck and 3½-Ton "Trailmobile" of the W. J. Steel Lumber Co., Martinsville, Ind. The Trailer Doubles the Capacity of the Truck with Only a Small Increase in the Cost of Operation.

and the company has found that it can use the loader on the truck to load the trailer also.

Thus the initial expenditure for equipment has been reduced 50 per cent—the difference between the cost of the trailer alone and the cost of a 3½-ton truck plus the cost of another loader.

The operating cost of the truck and trailer, hauling practically the same tonnage that would be possible for two trucks equipped with loaders, is only 25 per cent greater than for the truck alone. So the company saved 50 per cent on equipment and is saving 75 per cent of the cost of operating the additional equipment.

This is an example which proves the point that the lumber business—either in carrying logs to the mill or finished products from the yard to the job, can use trailers more advantageously than any other business.

✣

Motor Trucks Enlarge Material Dealers' Territory

ONE of the most valuable features of the motor truck as hauling equipment for lumber and other building material dealers is that it enlarges the territory from which they can draw customers. Deliveries as far as 25 or more miles away from the yard are just a part of the day's work when motor trucks are used.

That statement is verified by the experience of the Franklin Lumber Co., Leavenworth, Wash., dealer in lumber and building materials. Of his company's experience with motor trucks, H. A. Franklin says:

"Motor trucks are a wonderful improvement over teams. At the present time we are operating only one 1½-ton truck, but are contemplating putting on another one, as we know that they are a paying proposition. We do the work of two good teams and do it easier with our truck, while the cost of operation is 50 per cent less than with teams, with feed at the present prices.

"We figure there are five good reasons why the motor truck is an improvement over teams, when it comes to making and saving money.

"First, they cost less to operate; second, they do much more work, enabling one to handle more orders, and, consequently, to get more profits; third, we are able to haul farther, thereby taking in much larger territory, and we get business from as far as 25 miles out in the country that we would not get were it not for our efficient delivery equipment; in fact, a majority of our business requires average hauls of from eight to ten miles; fourth, our customers know that when they order from us they can get their materials when they want them; and, fifth, it is the modern way."

The accompanying illustration was made from a photograph showing the Franklin company's truck loaded and ready to start out into the country. This is the "sudden service" which dealers promise.

A Load of Shingles the Franklin Lumber Co., Leavenworth, Wash., Delivered 25 Miles from Its Yard. This 1½-Ton "Federal" Truck, Mr. Franklin Says, Has Saved Hauling Costs and Has Greatly Enlarged the Territory in Which His Concern Does Business.

ACME

The Pinnacle of Performance

2-ton Acme owned by W. H. Patterson & Sons, contractors at Barnesville, Ohio.

Solving the Contractor's Hauling Problem

It takes more than the average truck to answer satisfactorily the demands put upon it by the average contractor. But why take a chance and make costly experiments. Be safe. Buy an Acme—the proved unit truck, and you will be sure of getting a standard of service which will more than make good in your work.

We have yet to hear of an Acme truck that did not make good under the gruelling service expected of it by contractors everywhere. The truck shown above is typical of what Acmes are doing. The W. H. Patterson people do all their contract hauling with Acme and find it very satisfactory.

The Secret Lies in Proved Units Carefully Selected and Well Balanced

Acme is conceded by the industry to be one of the best trucks built, capable of rendering the highest kind of service over a long term of years. This kind of service is assured by the adoption of only units of known standard like Continental motors, Timken bearings, axles, and drive, Borg & Beck clutch, Ross steering gear, Cotta jaw clutch transmission with gears always in mesh, heat treated pressed steel frame, etc., all carefully assembled in a well balanced truck.

Built in 1, 1½, 2, 3½ and 5 ton models. Every model consistent in design. Bodies built in Acme factory.

Contractors are enthusiastic owners of Acme. It makes good for them and they stick by it. If you want to know what Acme has done for hundreds of contractors all over the country and what it will do for you, write for our book, "Pointers to Profits." Address Department 163.

The Seal of Dependable Performance

ACME
THE TRUCK OF PROVED UNITS

Trade Mark Registered U. S. Patent Office

ACME MOTOR TRUCK COMPANY, CADILLAC, MICH.

KISSEL TRUCKS are employed in the building business to eliminate transportation delays, maintain shipping schedules and increase transportation efficiency.

The most important factors in designing a truck for industrial purposes — total weight of trucks, motor size, motor speed, rear axle ratio, tire size — have been properly selected and combined in Kissel Trucks, giving an incomparable chassis of perfectly balanced moving and fixed units, headlined by the powerful Kissel-built engine — trucks built to maintain schedules the year 'round.

The necessity of Uninterrupted Transportation throughout the winter months prompted Kissel to originate the ALL-YEAR Cab that protects truck drivers, increases their efficiency and keeps trucks operating the year 'round.

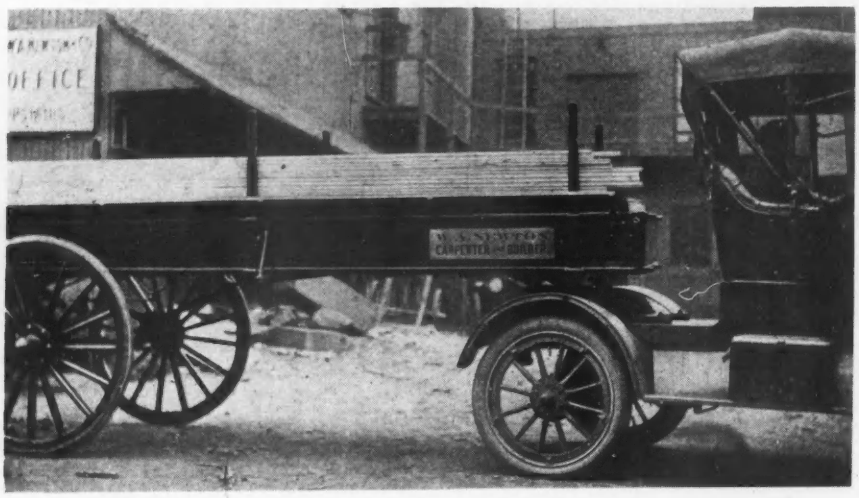
5 different sized models from the ¾ ton to the Goliath. Our nearest Kissel dealer is thoroughly competent to make a survey of your requirements. Make an appointment with him. This incurs no obligation.

KISSEL MOTOR CAR CO.

Hartford, Wis. **U. S. A.**

KISSEL TRUCKS

5 CAPACITY MODELS



W. A. Newton, Carpenter and Builder, Springfield, Mass., Uses a 1-Ton "Martin" Trailer Attached to a Small Passenger Automobile to Haul Materials to His Building Jobs.

Contractor Uses Truck for Many Purposes

THAT a motor truck is extremely useful to a contractor whose work is both in town and in the rural sections is demonstrated by the experience of E. T. Sheeler, contractor and builder, Millersburg, Ky. Mr. Sheeler has had a one-ton truck for eight years, and uses it to haul equipment, his men and materials to and from the building job. Besides, the truck comes in handy as the power to raise barns, hoist shingles, brick and heavy timbers; and to haul scrapers in grading and excavating.

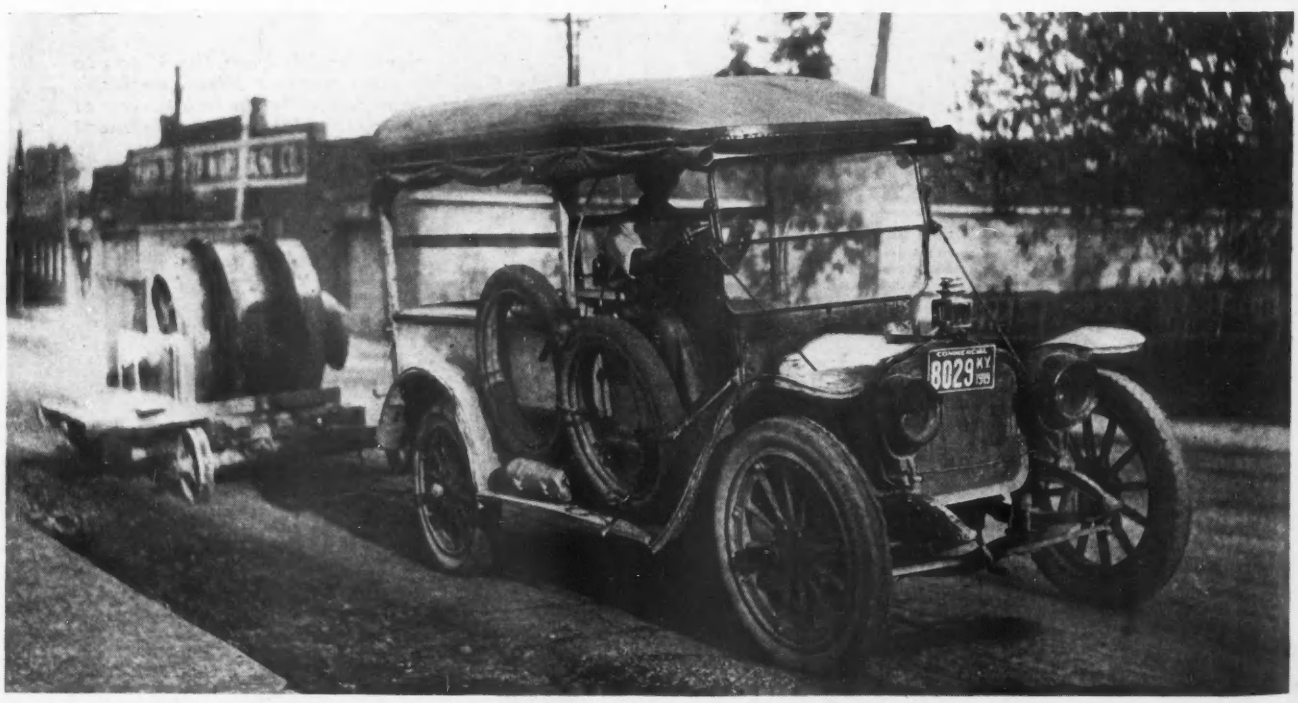
Here is what Mr Sheeler says regarding his experience with trucks:

"A motor truck is more profitable than teams; that is, if you use a good truck. I have been using a truck for eight years and find it gives a great deal more service and satisfaction than teams and wagons. I have been using my truck for hauling men to and from work, but I do a great deal of material hauling with it also. I find I save one-half or two-thirds of the time formerly consumed when I used a horse and wagon. I have a one-ton truck and haul my men as many as 18 miles a day to and from the job. I believe that the truck is a great deal cheaper—I would say one-half—than teams and wagons, for you save much time in going and coming and in loading and unloading. And, furthermore, you can get to places with a truck that you cannot go with a wagon.

"To get the best results with a truck you ought to be able to drive one yourself and understand its mechanism. I find that a great many contractors blame their trucks for not giving good service, when it is their own fault, for they do not understand how to drive them and how to keep them in good condition. I use my truck to raise barns, hoist shingles, brick and heavy timbers and have pulled scrapers and plows in excavating and grading. So you see I get some good use out of the truck. I would be lost without it."

The accompanying illustration shows the one-ton truck that Mr. Sheeler has run for eight years, hauling a concrete mixer. This is only one of the many things Mr. Sheeler says his truck accomplishes for him.

Hundreds of contractors are using motor trucks. And without exception they find that they save time, do a great deal more work, and are, consequently,



E. T. Sheeler's Eight-Year-Old "White" Truck Hauling His Concrete Mixer to the Job. Mr. Sheeler, who Is a Millersburg, Ky., Contractor, Says He Would "Be Lost" Without a Truck.

Trailmobile

Trade-Mark Reg. U. S. Patent Office

The Motorless Motor Truck

Thousands in Use

DIVISION No. 1
Light Four-wheeled Trailmobiles for use with passenger cars or light trucks; 1,250 lbs., ¾-ton and 1 ton.

DIVISION No. 2
Heavy-duty Four-wheeled Trailmobiles for use with trucks; 1½-tons, non-reversible; 2 tons; 3½ tons; and 5 tons, reversible and non-reversible.

DIVISION No. 3
Semi-Trailmobiles: 2½ tons, 4 tons, 6 tons and 10 tons.

The Least Costly Hauling For Contractors

WITH either passenger car or light truck the Trailmobile hauls building materials, tools and supplies at exceptionally low costs for the equipment itself and for maintenance and operation.

M. R. Ammerman, a contractor of Salina, Kansas, has hauled 1,100 bricks weighing 8,250 pounds on two light Trailmobiles drawn by a one-ton truck. As many as 46 round trips of one mile each way have been made in a day moving in all 190 tons. Two Trailmobiles were always loading, two unloading and two in transit with the truck.

The owner has found the equipment the best investment he ever made. It is equally efficient where smaller loads are to be handled. A Trailmobile that doubles the capacity of a truck or hauls a ton behind a passenger car adds only about 12½ per cent to the usual operating cost of the vehicle.

Good roads are preserved by reducing the load carried on each wheel

Write for booklet "Economy in Hauling"

The Trailmobile Co.

583 E. Fifth Street Cincinnati, O.

This is a Model 1 Miami Trailer

CAPACITY 1250 Pounds

Five men in the auto—ten on the Trailer. This contractor's job was four miles from town. He took his men out on the trailer—back at night—besides hauling everything needed in a hurry.

YOU will find a Miami Trailer to meet your particular requirements. "Miamis" are made in twenty different models varying in capacity from 800 to 12,000 pounds. Sound construction, simple, non-bothersome operation and moderate cost.

Write for our big folder illustrating and describing every type of Miami Trailer.

Miami Trailer Company, Troy, Ohio

Two "Federal" Trucks at Work Hauling the Materials from the Excavation for the New Annex to the U. S. Treasury Department Buildings, Washington, D. C. Tons of Dirt Were Dug by the Steam Shovels and Carted Away by the Trucks in Preparing for the Building.

more economical means of transportation than teams and wagons. The motor truck has the power to transport materials and men directly to the job, thru soil that would balk a team. They have speed, which enables them to save time in getting needed equipment or materials to the building site, so that the work is kept going at top speed.

These capabilities of the motor truck are what is making them essential pieces of the contractors' equipment.

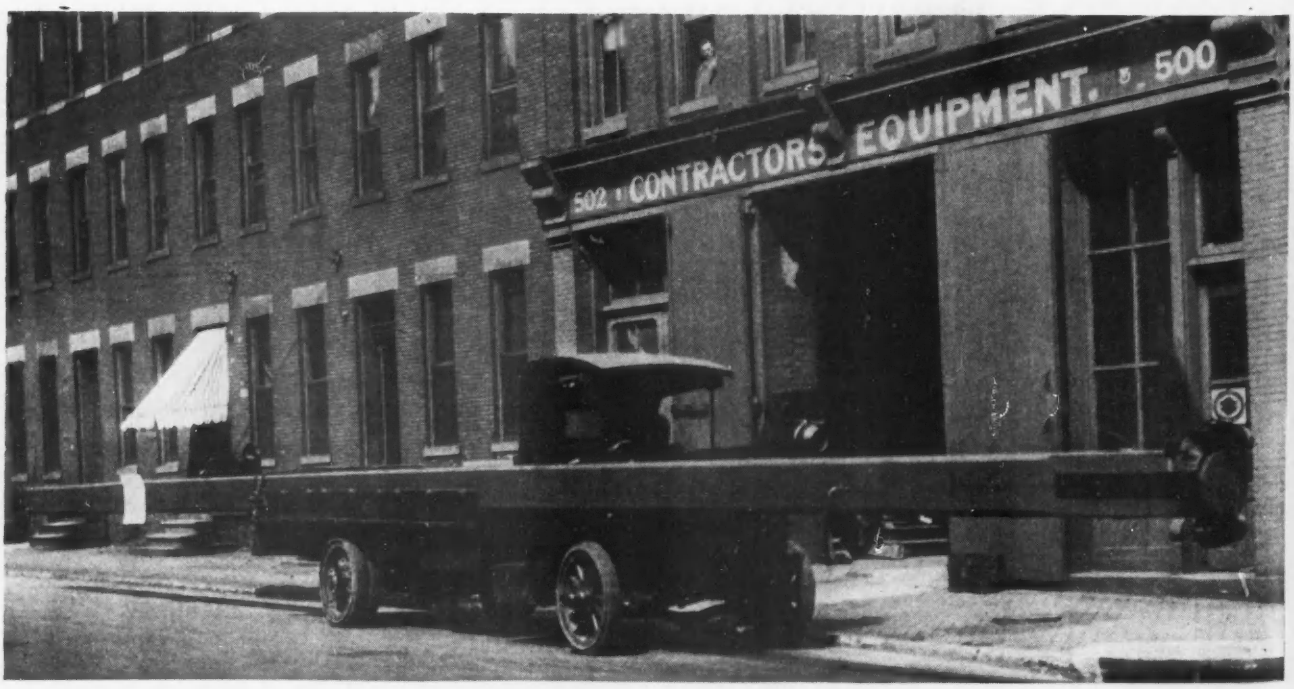
✣

Special Trucks for Derrick Timbers

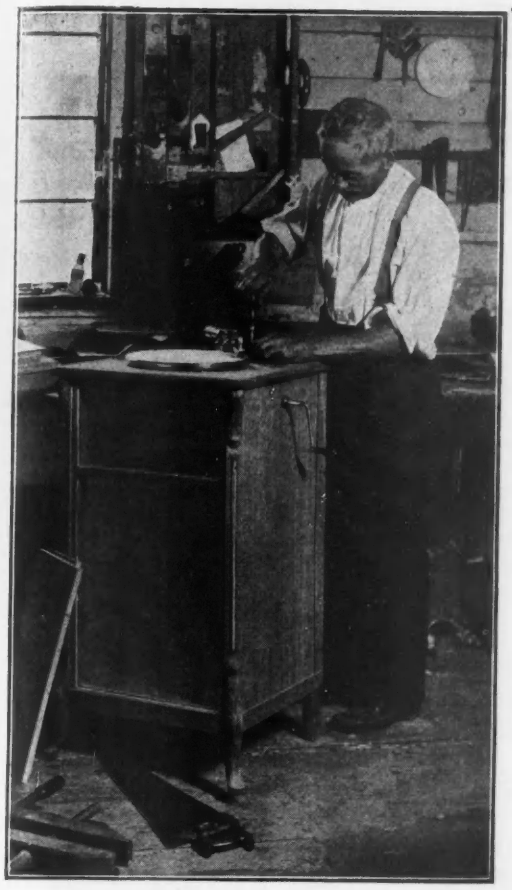
SPECIAL bodies or beds to accommodate the needs of the owner whose truck is used to haul loads of extraordinary shapes are built to specifications by the manufacturers of motor trucks. These bodies are put on standard chassis, so that the extra cost of the truck is not great.

A truck with a special body was designed for the Beckwith Machinery Co., Pittsburgh, Pa., and is shown in the accompanying illustration. The company hauls a great many derrick masts and booms, and to accommodate them had this truck made. The bed is so constructed that it extends beyond the sides of the cab, and permits the mounting of long timbers directly in the truck body. The timbers extend to the front of the truck as well as the rear, and permit a better balance and the truck can be operated thru crowded streets more easily.

The photograph shows the truck loaded with a stiff leg derrick, having a boom 16 by 1 inches by 60 feet. The truck body is about 20 feet long.



The Special Body "Packard" Truck for Hauling Derrick Masts and Booms by the Beckwith Machinery Co., Pittsburgh, Pa.



Make Money Building Choraleon Phonographs

You can do it easily and have a lot of fun, too. Build one for yourself and then for your neighbors and friends. Here's Charles Leaderer of Goshen, Indiana, at the left working merrily away. Down in the lower right hand corner Mr. Chris. Kusenstrintz is trying out his latest model. In the other corner Mr. F. L. Claire of Lewiston, Me., is standing beside a beautiful Choraleon he made, with special inlaid work. Mr. Lawrence Hansen of Gibson City, Ill., in the center has just finished a beauty. Read what some of our customers have to say elsewhere on this page.

Make $50 to $175 on Each One You Build

We furnish plans, blue prints, motors, tone arms, case material—everything required, and full instructions. Of course, being a carpenter or cabinet builder, it will be the easiest thing in the world for you to build these phonographs.

CHORALEON PHONOGRAPHS are unsurpassed in tone. They play any record. You can't tell them from the highest priced phonographs. Everything guaranteed.

We have been running small ads in the AMERICAN BUILDER for two years. Maybe you missed them because they were small. But many others have seen them and many are now building phonographs and making money. If you want to while away some pleasant hours and make some big money, write today or free particulars.

Choraleon Phonograph Co.
1201 Choraleon Bldg., Elkhart, Ind.

Isn't This Convincing?

430 Charlton Ave.
Hamilton, Ont., Canada
Choraleon Phonograph Co.,
Elkhart, Ind.

Dear Sirs :—Please send me one of your circuiars entitled, "How to Build Your Own Phonograph," as I would like to make one. Mr. Gallie, 339 Wentworth street, has built one and installed one of your motors and tone-arms, and if he hadn't told me that he had made it himself I would have taken it for a $150.00 model.

Yours very truly.
F. C. STRONG.

38 Mescott St., Jamestown, N. Y.
Choraleon Phonograph Co.,
Elkhart, Ind.

Gentlemen:—I have my Choraleon all finished now and I am well pleased with it. Every one who has heard it says it sounds just as good as a $200.00 one. I wouldn't sell mine for that.

Yours truly,
EDWIN JOHNSON.

143 Pacific St., Patterson, N. J.
Choraleon Phonograph Co.,
Elkhart, Ind.

Dear Sirs:—We are perfectly satisfied with the machine, and everyone who hears it says it is as clear as any machine they ever heard. We are playing it every night and having lots of enjoyment with it. I have orders for two machines the same as mine.

Yours truly,
C. H. BULTMAN.

Wants Method for Turning Cornice Shingles

To the Editor: Los Angeles, Cal.

I've never asked the AMERICAN BUILDER a question, but as I've been a subscriber of the valuable magazine a long time, am about to ask something on a circular turned cornice, a quarter turn, for shingles, where the corners are all on a true circle to conform with the eaves and rakes.

Recently I spent about three weeks working such a cornice over an eight gabled house. I would like to know if there can be worked out a system of getting all points by such method, as it seems to me there ought to be a method for it, as well as other points about buildings. The boss said there is no system, saying have to go by looks. I told him I'd write in to Chicago and find out about that. WILL LACEY.

✣

Another Method of Squaring a Building

To the Editor: Sonora, Texas.

Mr. H. R. Seager is correct about squaring a building with a chalk line being inaccurate.

A better method, than using 6, 8 and 10 as a diagonal on a corner of the building, is to use a steel tape and make the diagonals of the building equal; i. e., measuring from opposite corners of the building.

This method is accurate and practical. J. L. MARTIN.

✣

Is This Good Roof Truss Construction?

To the Editor: Croswell, Mich.

I would like to ask thru the columns of your paper if I could truss a building in the manner which I have drawn a rough sketch, the building to be 52 feet wide, 90 feet long, walls 10 feet high to beam, the wall being built of cement blocks, 14 feet between beams and the roof to be put on of felt shingles; there will be double windows between the strusses in the upper deck or roof. If it could not be trussed in this manner, what is the best way to truss it? It is to be used as a garage. WM. MILLER.

✣

What Should We Charge Per Day for Mixer?

To the Editor: Pontiac, Ill.

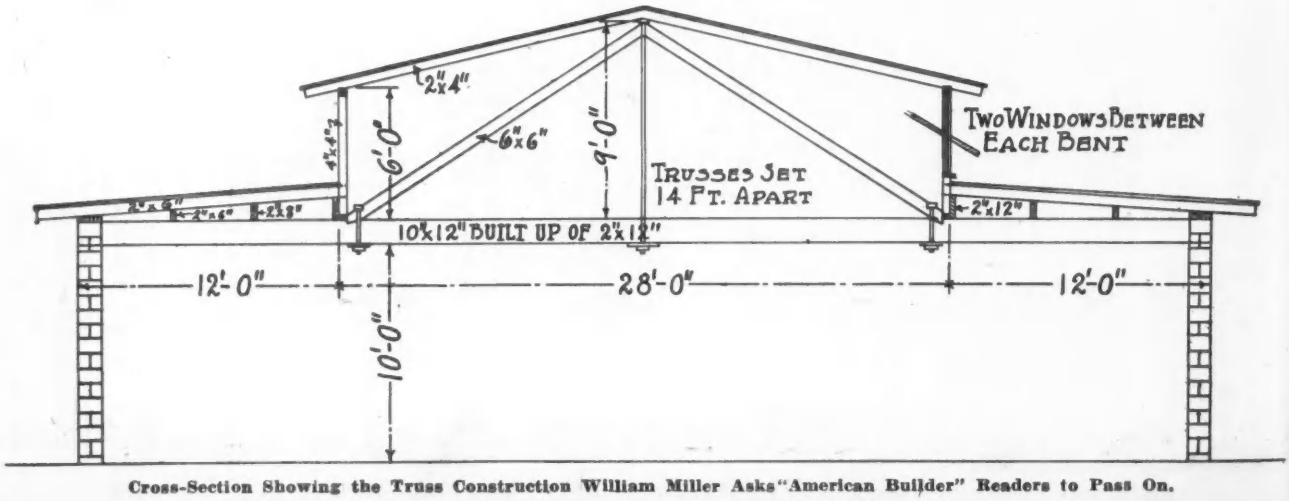
In the November AMERICAN BUILDER, W. R. Davis, of Dublin, Ohio, asks, in the Correspondence Department, how to determine the rental he should receive for his equipment. That is just what I have been thinking about for some time. I have a concrete mixer, a five-foot machine, that cost new, three years ago, $312. I loaned it once and the party broke it, so now I don't let it go unless my son goes with it. The wages for common labor here are 50 cents to 60 cents an hour. What I want to know is, how should I figure the charge by the hour? Most of the jobs here are done in less than a day. I have been charging $1 an hour. Is that enough or is it too much? W. F. DAVIS.

✣

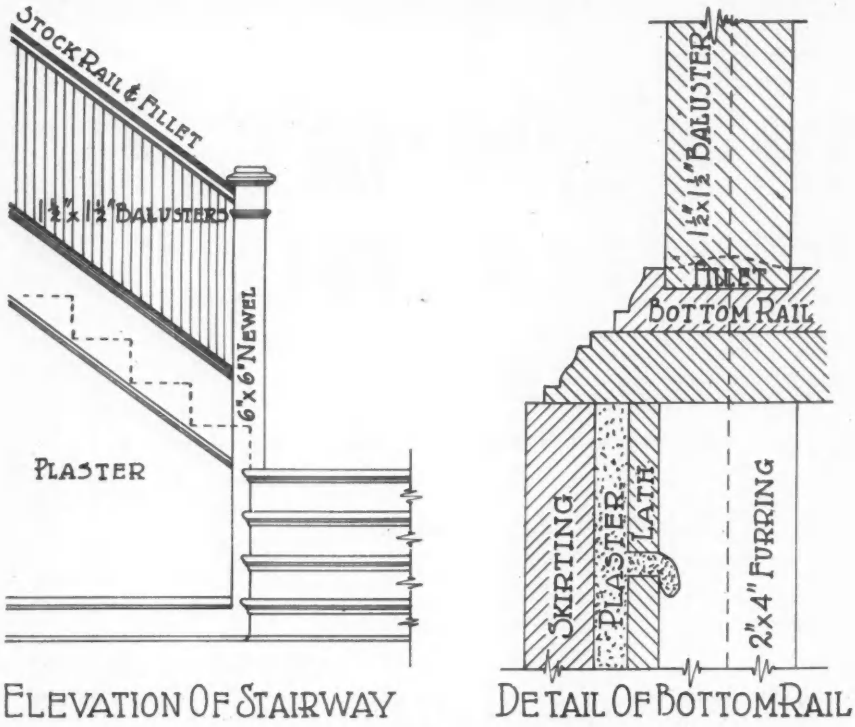
Tile Roof on Church Leaks

To the Editor: Lyons, Kan.

About three years ago a $40,000 church was built at this place. The contract was let to an outside builder, who put on a "green tile" roof and it has always leaked. The roof was sheathed tight with 6-inch flooring and paper put on. There was a good deal of walking over this paper before the tile was laid. The tile is nailed on and no cement used. This building was put up without any superintendent as the official board wanted the honor of building it, and now they come



Cross-Section Showing the Truss Construction William Miller Asks "American Builder" Readers to Pass On.



Elevation of Stairway and Detail of Bottom Rail, Furnished by E. Lange.

to me wanting me to tell them how to stop the leaks, but I am up against it. Have been a building superintendent for about thirty years, have a number of tile roofs put on and never seen one go on without cement before.

If someone can help me out of this trouble it will be greatly appreciated. F. W. MARTIN.

✣

Suggestions for Stair Builders

To the Editor: Dayton, Ohio.

In regard to question of H. R. Fraser requesting suggestions for building stairs.

I am enclosing pencil sketch of stairway which I am using in houses. I am in charge of building. I build my stairs "open" four risers to the first landing. From first landing up, I build the stairs boxed with foot rail and balusters. You will find full size detail of bottom rail and fillet on 8½-inch tread. I would use 3 balusters, which makes it look more complete on narrow tread.

✣ E. LANGE.

How to Build Concrete and Tile Door

To the Editor: Akron, Ohio.

Enclosed find rough sketch of reinforced concrete and tile floor as per S. Edgar Tuthill's request. Temporary supports of 4x4 should be set every two feet, then put on joint of 2x8 or 2x6—16-in. on centers. Lay 8 by 12 hollow tile 16 inches on centers. Then put in one-inch iron rods about one and one-half inches from bottom of tile. Iron rods should be laid so as to cross as shown. Then fill in between tile with concrete, including finish coat. Extreme care should be taken not to let rain fall on this until thoroly set, as it will only crush the concrete and cause it to leak. He should have no trouble with floor laid this way. CHAS. S. KING.

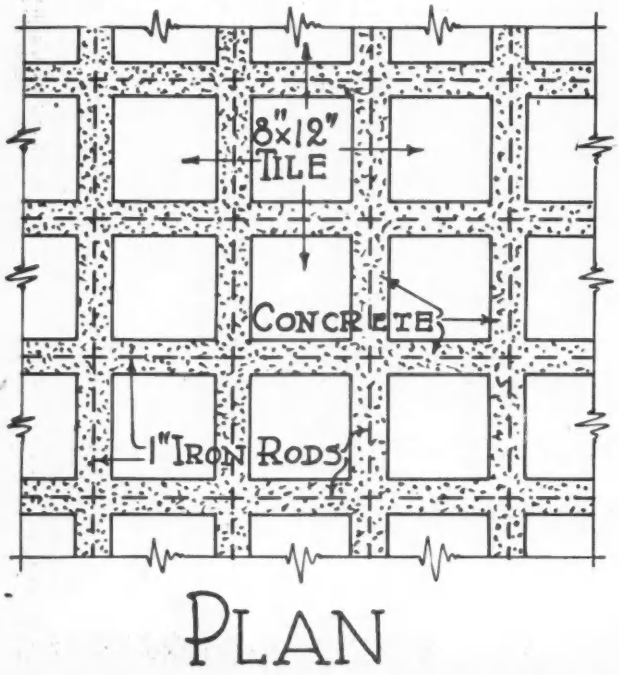
✣

Rules for Getting Radius of Circle

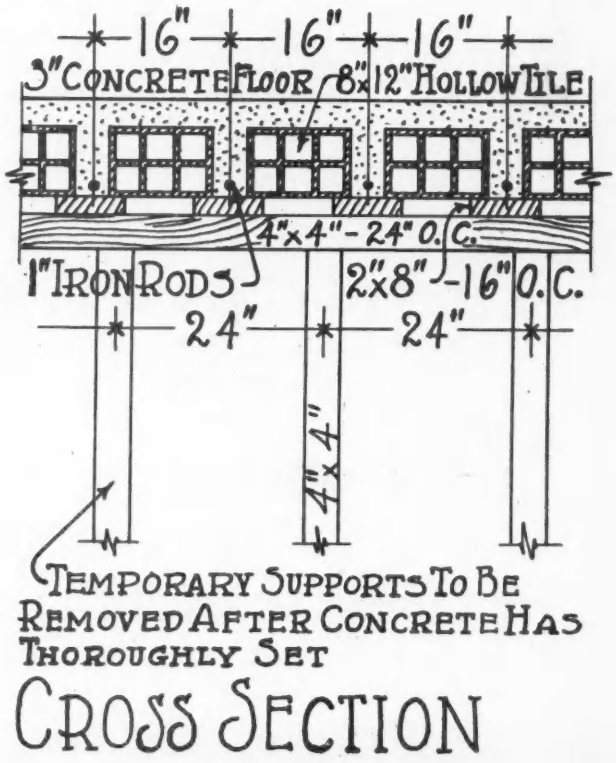
To the Editor: Vallejo, Calif.

The discussion which has been going on in your valuable magazine in regard to the radius of any segment of circle has been very interesting.

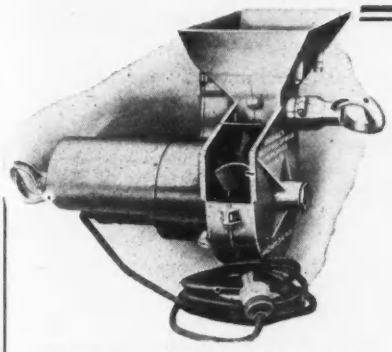
The rule which has been given by many—squaring ½ chord, dividing by the rise, adding the rise and then dividing by 2, which gives the radius, is correct. I do not remember seeing anyone giving the proof of this, which I will at-



Plan of Reinforced Concrete Floor, as Built by Charles S. King.



Cross-Section of Tile and Concrete Floor.



Can be attached to any electric light socket, weighs but 30 lbs., and hangs from shoulder of operator. Centrifugal force of blades projects stucco completely embedding lath and producing enamel surface. Any artistic effect can be produced.

3 Men and a "Hodges"

WITH that combination you can tackle any job of projecting whether it be stucco, plaster or concrete aggregate on concrete, hollow tile, brick, block, stone, metal or wood lath. Yes, and save from 50% to 75% on the job. One mixes, one supplies the operator, and the third operates the machine. With good teamwork a building is stuccoed in an artistic and thorough manner and in a remarkably short time.

The "Hodges" is simply another time and money-saver—and every builder realizes what that means in *these days.*

You will want to know more about this compact, efficient little machine. Write us and let us send you folders describing it completely, together with testimonials explaining its work in the field.

Sent promptly on request.

Hodges Stucco Machine Works
Dept. A and B, Union Central Tower, CINCINNATI, O.

If You Use LIVING-STONE You *Know* That Your Concrete Is Bonded

TRADE MARK

LIVING—STONE

Since 1905 we have been bonding concrete

Millions of feet have been bonded to date

OUR TRADE MARK SINCE 1905

The test of time is a fine guarantee

"Living-Stone is the best material we have found for bonding new concrete to old," write Gagnon & Co., of Billings, Mont. "We believe from actual results that *a perfect bond* is secured. We have no 'come backs' where Living-Stone has been used."

That's the substance of many other letters we should like to show you. They prove conclusively that LIVING-STONE should be used *wherever there is bonding to be done*—even if it is only over the noon hour. *Let us mail you our catalog.* It gives the details.

The Living-Stone Company
703 Law Building, Baltimore, Md.

tempt with your permission, as shown on separate sketch.

This simple problem opens up the possibilities contained in this sketch, as many men are apt to forget this formula, but, knowing the principle, would never forget the rule or possibilities contained in the diagram.

Rule 1. Draw any angle within the circumference of a circle, as A B C. If a line be let fall from the circumference C to its diameter B forming two right angle triangles, A B C, also B C D, these two angles are similar, then it follows that they are proportional.

Rule 2. Then it follows that sine 3 feet is to 16 feet of small angle as 16 feet is to long angle leg B D, or 3:16::16: (85.333), then if you add 3 feet sine to B D leg you have 88.333, which is the diameter; ½ of diameter = radius 44.1666 feet, or 44 feet 2 inches approximately.

Rule 3. Areas of similar figures are to each other as the squares of their corresponding dimensions. The area of triangle B A C = 24 square feet. It follows in proportion than 9:256::24: (682.666 area) of angle B C D, which is 682.666 square feet.

The proportion ration would be stated like the following as sine 3 squared is to 16 squared as area 24 is to area in large angle—682.666.

Rule 4. Areas of similar figures are to each other as the squares of their corresponding dimensions. As the area of the circle under discussion is 6128.2873 square feet, the area of a circle whose diameter is only 20 feet would be in ratio or proportional—as the following:

88.333 squared is to 6128.2873 area of 88.333 foot circle as 20 feet squared is to 314.1593 area of 20-foot circle.

I hope I am not tiring you with this sketch or its possibilities, but am sure that many of your readers would be pleased to know the theory of the radius formula, as it will assist them in their work. At least, anyone that has work in circles and angles—inside of a circle.

To illustrate the value of this sketch, supposing you and I wanted to know the radius of a railroad curve and I should take out an ordinary 2-foot pocket rule and open it to 2 feet length and place it on the inside of the rail, and the space between the rail and rule at the 12-inch junction of the rule was ⅛ inch very close—the radius of the circle which the rail was bent is easily obtained by the same rule of similarity of angles as follows:

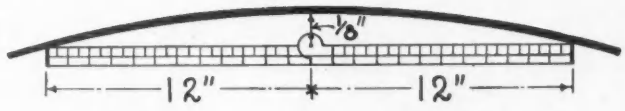


Diagram Showing Use of Rule in Finding Radius of Circle.

sine .125: 12 inches:: 12 inches: long leg B D + .125 = sine 1152-125 inches diameter, or 96.0104 feet diameter = radius 48 feet. CALIFORNIA READER.

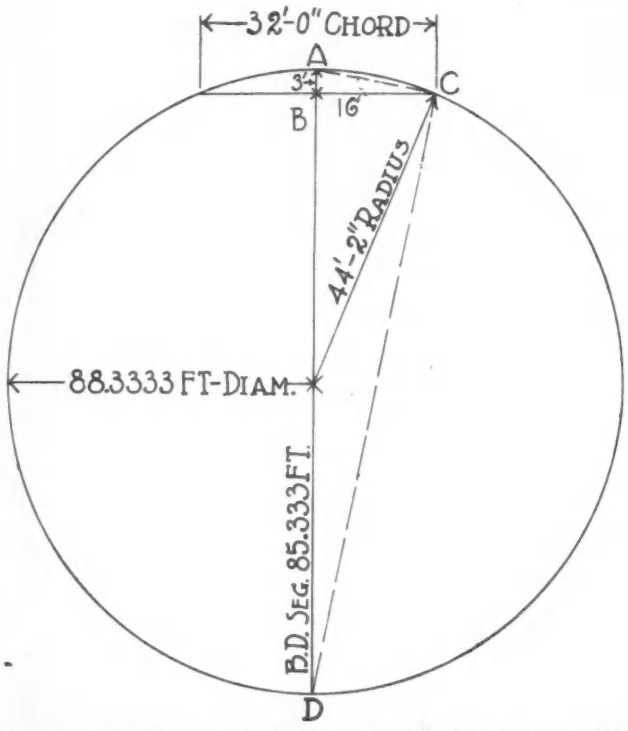


Diagram Explaining a "California Reader's" Solution to the Problem of Finding Radius of Circle.

Uses His Tools Forty-Two Years

To the Editor: Danville, Pa.

Recently I saw in the AMERICAN BUILDER a picture of a carpenter who had tools that he had used 40 years. Enclosed is a photograph of some tools I have used 42 years, and by

Henry F. Williams and the Tools He Has Used 42 Years.

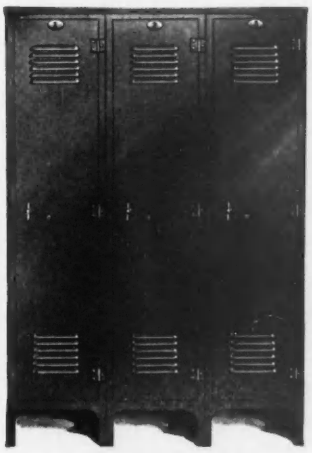
good care can be used many more years. The photograph does not show more than two-thirds of the tools I have used many years. I have done a very large amount of carpentry and mill work. I take great pride in my tools and keep them in trim, and, as I work a great deal with heavy timbers need nearly all kinds of tools. They are shown leaning against my tool box. HENRY F. WILLIAMS.

Simple Method of Getting Rise and Run of Rafters

To the Editor: New Castle, Ind.

After reading in the November AMERICAN BUILDER the answer to S. M. Doyle's problem, published in the October issue, I decided to submit a method I use. I would subtract the rise per foot of the rafter—in this case 6 inches—from the rise per foot of the brace, or 12 inches, which leaves 6 inches, the amount the brace gains on the rafter each foot of run. Divide 36 inches, the distance apart at the starting point, by 6, the number of inches gained each foot. The result is 6, the number of feet both the rafter and brace must run to come to the same level. This is taking the corner of the plate as a working line. An addition must be made for the part of the rafter coming above this line. To obtain the top cut of the brace lay the square on at 12 and 12 and you will have a level line. Then deduct the pitch of the rafter, using 6 and 12, cutting on 12. J. E. BUZBEE.

STEEL LOCKERS AND STEEL WARDROBES



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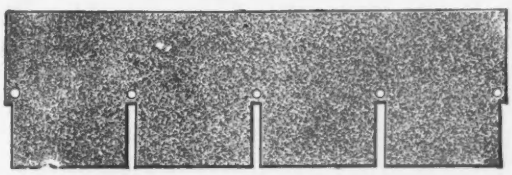

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In them you have a roof that is:—

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WEATHERPROOF
ECONOMICAL
GUARANTEED

Catalogue and Samples sent on request

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Let us send you portfolio of wood panels free. With it you can show your clients just how their woodwork and floors will look when finished with Johnson's Wood Dye, Prepared Wax, Under-Lac, Flat Wood Finish, etc.

In this portfolio the Johnson finishes are shown on all popular woods—panels of other woods sent on request. The portfolio also gives full specifications and instructions, as well as covering capacities. Any good painter can successfully use Johnson's Artistic Wood finish.

JOHNSON'S WOOD DYE

is a dye in every sense of the word—it is made in twelve different shades—it goes on easily and quickly without a lap or streak—and it is put up in glass jars so there is no possibility of color changing.

We will also be glad to send you free a copy of our booklet, "The Proper Treatment for Floors, Woodwork and Furniture." It is full of valuable ideas and information for any one interested in the proper finishing of wood. Its practical suggestions may mean money to you.

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How to Estimate Shingles

To the Editor: Hayden, Colo.

In regard to C. W. Baker's inquiry about estimating shingles of various or random widths, a very simple way is to take length of rafter from top point to projection of cornice. Double this so as to get both sides of roof. Multiply this by the length of building, cornice included. Divide the total by 125 for 5 inches to weather, as 1,000 shingles 5 inches to weather will lay 125 feet; 1,000 laid 4½ inches will lay just 100 feet, or one square. J. F. Bruce.

✣

Wants Plans for Wood Material Storage Bin

To the Editor: Alexandria, La.

We would appreciate any information you could give us regarding the proper manner in which to construct a wood bin for the storing of gravel and sand. We want a bin whereby the gravel and sand could be unloaded from the cars into the bin, and at the same time have it so constructed to permit a truck to pass under or back up to it, so that material could be loaded.

Thanking you or any of your readers in advance for the desired information, we are, Gehr Construction Co.

✣

Builds Huge Tobacco Warehouse

To the Editor: Millersburg, Ky.

I am sending you a picture of a large tobacco warehouse I am building. It is 128 feet wide and 290 feet long. I am standing by the transit, back of the second wheelbarrow to the left. I have had a great deal of work this season—barns and other buildings, and this warehouse. The latter is of timber frame construction, set on concrete. The picture shows my concrete crew and the carpenter crew at work.

E. T. Sheeler.

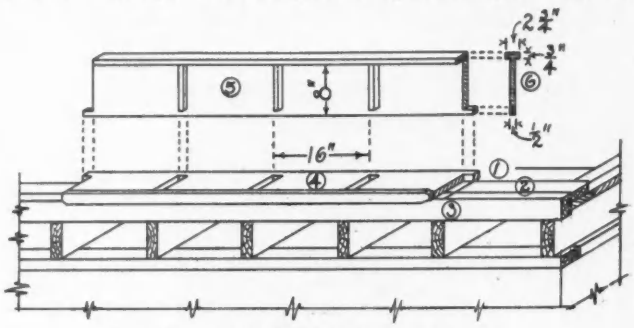
✣

Template to Lay Out Partition Studs

To the Editor: Millersburg, Ky.

I am sending you a drawing and explanation, to be published in the paper, of what I call a studding template used in laying out partition studs 16 inches on center. This is a time-saver and if slid along right will not make a mistake. I have used this a great many years. Fig. 1 is first floor of the house. Fig. 2 is the bottom plate, or toe sill. Fig. 3 is the top plate which is tacked temporarily to the outside of the frame even with the top of the bottom plate so both plates can be marked at the same time.

Fig. 4 is the template laid on top of the two plates ready to mark off the studs. In the gains cut 16 inches on center. Then this section is marked, the template is moved and another section laid out in the same way. The stub at each end is a guide to go by in sliding the template.



Studding Template Used by A. P. Stone.

Fig. 5 is elevation of template with gains cut in the thickness of the studs standard size 1⅝ inches wide, which is better than using the 2 inch blade of the square. Also the headers of the windows can be cut by this template and windows framed while the partition is lying on the floor and set in place.

Fig. 6 is a cross section. I think the other dimentions are plain enough for most anyone to make out.

Now I hope this article helps some carpenter to progress as it is a time-saver, and no mistake will be made if handled right.

At some future time I will write an article on arranging a newel post to attach three rails to, without making land post larger than the other posts, using straight rails.

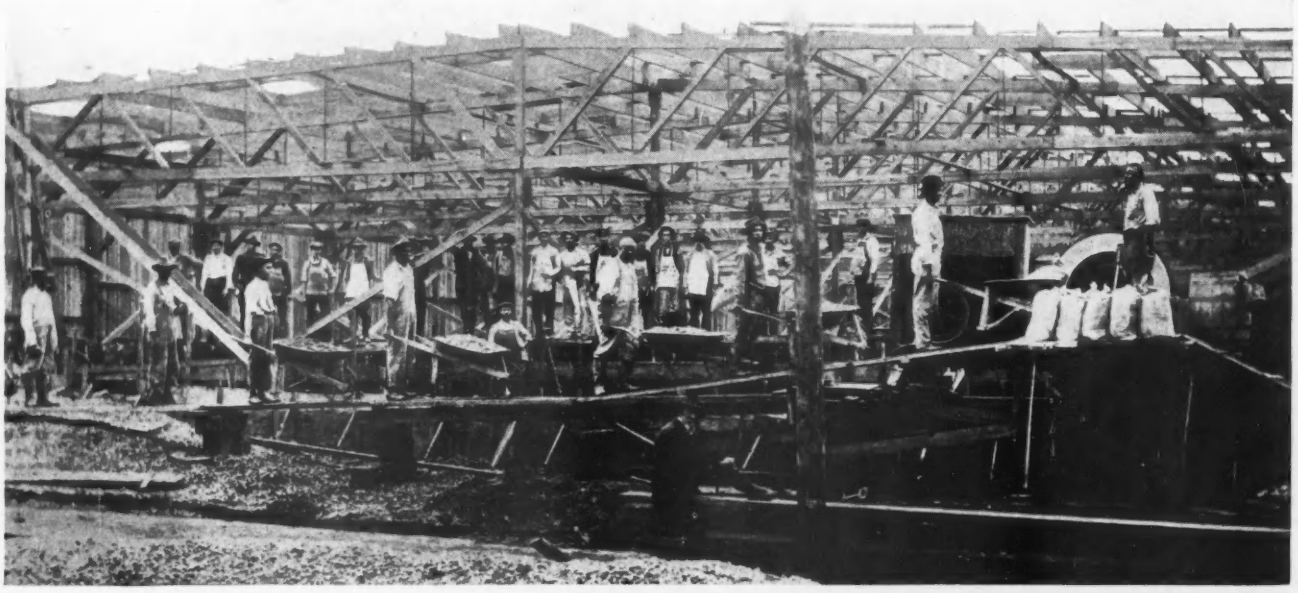
A. P. Stone.

✣

Wants Design for Roll Top Desk

To the Editor: Fort William, Ont.

I have been a subscriber to the American Builder for 10 years and like it very much. I get a lot of information from it. I would like to get a design and plans, if possible, for a roll top desk, one suitable for a house. Please put this before your readers, and perhaps some brother "chip" will help me out. Fred Gayton.



E. T. Sheeler's Carpenter and Concrete Crews at Work on Huge Tobacco Warehouse.

Points of Law the Builder Should Know

USE OF BUILDING BY OWNER IS NOT AN ACCEPTANCE.

By Leslie Childs

WHETHER the use or occupancy of a building by the owner, either before or after completion, amounts to an acceptance has been threshed over for several hundred years. The law books contain many cases dealing with the question from the early English decisions down to the present time. The question crossed the pond with the Plymouth Rockers, and the American courts have probably blackened as much good white paper in discussing the point, as on any other subject relative to building law.

And with all this, the question has not been settled conclusively, as witness the cases that are every day being brought to the attention of the courts, dealing with some phase of it. And, it probably never will be settled, because of the individual circumstances surrounding each case. But the general rule is well settled in the United States, and unless a given case presents some facts that would make it an exception, it would in all probabilities be measured by this established rule.

This general rule was stated in the case of Pope vs. King et al., 69 Atl. 417, in a very clear and well written opinion, and is without doubt supported by the great weight of authority. The facts in this case were substantially as follows.

Points in the Controversy

The plaintiff, John W. Pope, entered into a written contract with the defendants, King et al., to make certain alterations on some church property. The plans and specifications were prepared by an architect, and the contract stipulated that payment should be made in three payments, as the work progressed, upon certificate of the architect.

The agreed price for the job was $2,611.00, and the defendants paid $1,790.90 on account, but refused to pay the balance. The plaintiff thereupon filed suit on the contract to recover the balance alleged to be due under the terms of the contract.

The defendants based their refusal to pay the balance on the ground that the work was done in an unskillful, unfaithful, improper and imperfect manner; claiming that the plaintiff had already received more money than he was entitled to, when the proper deductions were made for the imperfect work done. All of this was denied by the plaintiff, who claimed that the work had been faithfully and properly performed.

At the trial of the case it was shown that the architect had refused to furnish a certificate, claiming that the plaintiff had not done the work according to the terms of the contract. The plaintiff attempted to overcome this by showing that the defendants had used and occupied the building, contending that such use and occupancy would amount to an acceptance; at least would constitute a waiver of the condition to produce a certificate from the architect.

The trial resulted in a judgment for the defendants, under an instruction from the court given at the close of the plaintiff's case.

What the Court Decided

The plaintiff appealed to the Court of Appeals, and in passing on the points raised it was held:

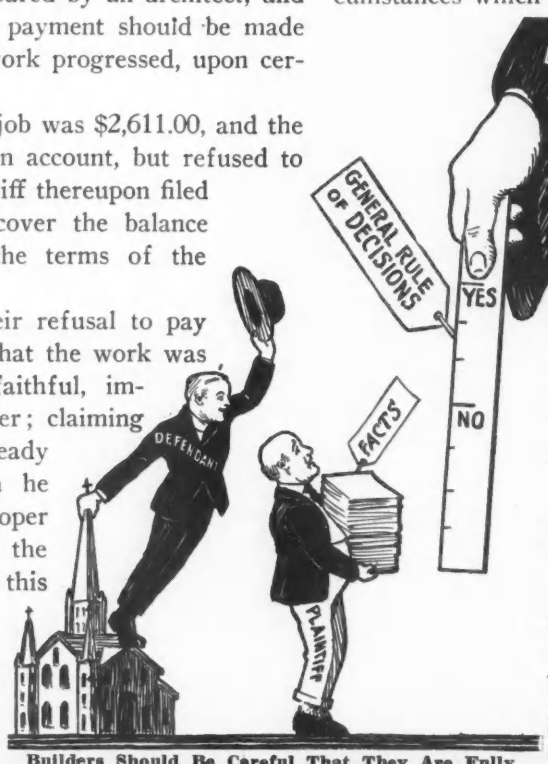
That as the contract provided that payments should be made on a certificate from the architect, this certificate must be obtained, or it would have to be shown that its refusal was due to fraud or bad faith. It was pointed out, that in this case, there was no claim that the architect wrongfully, or fraudulently, refused to give the certificate. On the contrary, the evidence showed that the architect had refused the certificate, because, in his judgment, the work did not measure up to the terms of the contract.

In disposing of the contention on the part of the plaintiff, that the use and occupancy of the building constituted an acceptance, or at least a waiver of the condition to produce the architect's certificate, the court said:

"It was settled that the use of a building under circumstances which negative the intention of the owner to accept the work under the contract does not constitute an acceptance of the work. * * * Upon a consideration of the whole evidence, we are of the opinion that there was no intentional waiver of the production of the architect's certificate." * * *

The Court of Appeals thereupon affirmed the judgment in favor of the defendants rendered in the lower court.

This case is in accord with the general rule that the use and occupancy of a building by the owner will not IN ITSELF constitute an acceptance. Before it will ever amount to that, the act of use must be coupled with some act, or language, that would indicate the owner meant such use, or occupancy, to be an acceptance.



Builders Should Be Careful That They Are Fully Protected by Their Contracts, as the Facts in a Lawsuit May Be Against Them.

Building Operations for 1919 Break All Records

THE F. W. DODGE COMPANY'S REVIEW OF BUILDING ACTIVITY DURING THE MONTH OF OCTOBER, AND FOR THE FIRST TEN MONTHS OF THE YEAR

BUILDING contracts awarded during the month of October, 1919, in the territory north of the Ohio and East of the Missouri rivers, amounted to $311,382,000, which was greater than the figure for any previous month of this year. This was an increase of $76,801,000, or 33 per cent over the total for the month of September, the September total having been somewhat less than that for August.

Of the total amount for October, 34 per cent, or $105,663,000, was for residential buildings; 25 per cent, or $78,249,000 was for industrial plants; and 15 per cent, or $45,939,000 was for business buildings. Public works and utilities amounted to $42,334,000.

The October figures brought the total for contract awards for the first ten months of 1919 up to $2,111,452,000, which is greater than the total for any entire year previous to 1919. In fact, these figures indicate an actual volume of building operations during the first ten months of 1919 somewhat greater than the actual average annual volume for the five years previous to 1919.

New England

Contracts awarded during October thruout the New England district amounted to $32,384,000, of which $7,351,000 was for new residential buildings; $13,621,000 for manufacturing structures; and $6,536,000 for business purposes.

The gross total shows an increase of $2,581,000 over the figures for September and brings the total for ten months' business to $188,109,000, which is the record figure for any ten months of the New England district since the records began in 1901.

New York State and Northern New Jersey

The total of contracts awarded for the district which includes the state and city of New York and Northern New Jersey, for the month of October is $53,219,000, which is less than the amount for the month of September by $14,081,000. The records show the expenditure of $21,922,000 for new residential buildings; $11,409,000 for manufacturing buildings; and $6,245,000 for business structures.

Philadelphia, Baltimore and Washington District

A marked increase in the construction of new buildings and engineering works is shown to have taken place in the Philadelphia district during the month of October, 1919, when the returns are compared with those for September. The total for October is $46,425,000, an increase over September of $10,576,000, or about 30 per cent. Of this total of $46,425,000 there was expended for residential buildings $19,137,000; for manufacturing structures $6,427,000; and for new business buildings $10,927,000.

Pittsburgh District

The total for contracts awarded in the Pittsburgh district, which includes western Pennsylvania, Ohio, and West Virginia, for the month of October, 1919, is $61,622,000, of which $15,385,000 is for residential buildings; $18,245,000 for manufacturing buildings; and $6,977,000 for business structures.

Central West

The Central West district, which includes the states of Illinois, Indiana, Iowa, Wisconsin, Michigan and parts of Missouri and eastern Kansas, expended during the month of October, 1919, a total of $106,314,000, of which $36,877,000 was for new dwellings, $27,546,000 for manufacturing buildings, and $13,655,000 for business structures.

The Northwest

In the Northwest district, which includes Minnesota and North and South Dakota, the contracts awarded during October, 1919, totaled $11,418,000, of which $4,992,000 was for dwellings, $999,000 for manufacturing structures and $1,597,000 for business buildings.

Comparative Statistics of Building and Engineering Operations From January 1 to November 1, Based Upon Contracts Awarded

Comparative statistics of building and engineering operations in the states north of the Ohio and east of the Missouri rivers, viz.: New England, New York, New Jersey, Pensylvania, Maryland, Delaware, District of Columbia, Virginia, Ohio, West Virginia, Illinois, Indiana, Iowa, Wisconsin, Michigan, Minnesota, North and South Dakota and portions of Missouri and eastern Kansas, as compiled by the F. W. Dodge Company.

Contracts awarded January 1 to November 1:

1919	$2,111,452,000	1914	$ 632,462,200
1918	1,501,596,000	1913	743,758,000
1917	1,433,092,000	1912	743,331,500
1916	1,121,616,397	1911	667,433,813
1915	769,173,100	1910	694,007,066

New England

Comparative statistics of building and engineering operations in New England.

Contracts awarded January 1 to November 1:

1919	$188,109,000	1909	$ 137,124,000
1918	136,267,000	1908	90,741,000
1917	183,752,000	1907	114,505,000
1916	176,551,000	1906	102,989,000
1915	147,071,000	1905	92,192,000
1914	140,832,000	1904	84,166,000
1913	145,899,000	1903	88,766,000
1912	165,124,000	1902	102,949,000
1911	149,401,000	1901	97,123,000
1910	135,704,000		

New York State and Northern New Jersey

Comparative statistics of building and engineering operations in New York State and Northern New Jersey.

Contracts awarded January 1 to November 1:

1919	$453,093,000	1914	$112,360,500
1918	237,689,000	1913	223,782,000
1917	286,276,000	1912	206,392,500
1916	225,106,500	1911	200,027,500
1915	137,108,500	1910	205,844,000

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S-t-u-c-c-o Spells "Economy"

Stucco is the ideal construction from every standpoint—beauty—economy—durability. No painting is required, and being airtight, less coal, or gas, is required for heating. A stucco house is naturally artistic and beautiful. An old, draughty frame house can be made into a handsome and cozy home with an overcoating of stucco. The best lath for this purpose is

SYKES EXPANDED CUP METAL LATH

It is self-furring, and this alone saves you from 5c to 10c per square yard. Sykes is heavier, and therefore more rigid and durable than other expanded laths cut from the same gauge of metal, because Sykes is cut with a wider strand. For new construction, for overcoating, or for interior work Sykes is best and most economical.

Free sample and booklet on request

SYKES METAL LATH & ROOFING COMPANY
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SPEED EASE TRADE MARK

Bishop's "High Speed" Saws No. 250

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RUN FAST CUT EASY

Long years of hard usage only makes them more valuable to you. They are made of the finest steel carefully tempered—tough and flexible.

The mechanic of today wants the best. He isn't satisfied with the ordinary saw that continually needs attention.

Discriminating Workmen

will find that BISHOP'S "HIGH SPEED" No. 250 meets his every demand and more than fulfills his expectations.

We have made the "High Speed" for Mechanics who appreciate REAL merit in their tools.

Careful attention is given them through the entire process of manufacture, and we know that we are giving you the best saw you can buy at any price.

We have a leaflet describing the various kinds of Bishop saws.

"A Saw For Every Purpose"

Write for it today

GEO. H. BISHOP & CO.
LAWRENCEBURG, IND.

Philadelphia, Baltimore, and Washington

Comparative statistics of building and engineering operations in eastern Pennsylvania, southern New Jersey, Maryland, Delaware, District of Columbia and Virginia.

Contracts awarded January 1 to November 1:

1919	$328,424,000	1914	$ 77,715,000
1918	374,631,000	1913	77,012,000
1917	190,541,000	1912	122,424,000
1916	136,780,000	1911	84,666,000
1915	81,179,000	1910	87,161,000

Pittsburgh

Comparative statistics of building and engineering operations in western Pennsylvania, West Virginia and Ohio.

Contracts awarded January 1 to November 1:

1919	$341,052,000	1914	$119,434,000
1918	331,292,000	1913	138,692,000
1917	179,620,000	1912	96,643,000
1916	141,178,000	1911	115,782,000
1915	103,775,000	1910	94,801,000

Central West

Comparative statistics of building and engineering operations in Illinois, Indiana, Iowa, Wisconsin, Michigan and portions of Missouri and eastern Kansas.

Contracts awarded January 1 to November 1:

1919	$749,120,000	1914	$182,120,700
1918	389,965,000	1913	158,373,000
1917	548,787,000	1912	152,748,000
1916	381,021,897	1911	117,557,313
1915	249,414,600	1910	170,497,066

The Northwest

Comparative statistics of building and engineering operations in Minnesota and North and South Dakota.

Contracts awarded January 1 to November 1:

1919	$51,654,000	1916	$60,979,000
1918	31,752,000	1915	50,625,000
1917	44,116,000		

✣

Sand and Gravel Foundations

FOR foundation beds, gravel gives less trouble than any other material. It does not settle under any ordinary load, and will safely carry the heaviest of buildings if the footings are properly proportioned. Also gravel is not affected by water, provided it is confined laterally, so that the sand and fine gravel cannot wash out. It is also not greatly affected by frost.

Sand also makes an excellent foundation bed when confined laterally, and is practically incompressible, as clean river sand compacted in a trench has been known to support 100 tons to the square foot.

If the sand is confined on all sides, and the footings are all on the same level, no trouble whatever will be encountered, unless it be in the caving of the banks in making the excavations. When a cellar is to be excavated to different levels, however, sufficient retaining walls must be erected to prevent the sand of the upper level from being forced out from under the footings, and care should be taken to keep water from getting under the upper footings.

✣

The One-Story School House

WITH the opening of school this fall the shortage of school buildings was everywhere emphasized, for comparatively few of the several hundred thousand new school houses which the Department of Labor announced in the spring as necessary, have been built.

The one-story school house, no matter of what material built, has disposed forever of life peril, with reference to the terrible menace of fire and it has beauty, low cost and elasticity.

This type of school house has many advantages over other kinds aside from the greatest one of freedom from fire peril. There are no stairs to climb, no room wasted in halls and stairs, no sweeping of dust from one floor to another, no overhead noise; quicker exits and better light and ventilation are obtainable.

The bulk of small American schools are of wood construction and undoubtedly will continue to be of such, 6,000 small schools in the state of Nebraska alone in 1917 giving some idea of the tremendous volume of rural school building in America. An idea which is widely applied in a standard type of industrial building deserves consideration for one-story school buildings. This is the slow burning or mill construction floor design, in which the interior frame and floors are of timber arranged in heavy solid masses and smooth flat surfaces so as to expose the least number of corners, and to avoid concealed spaces which may not be readily reached in case of fire. This type of construction will not only mean freedom from life peril, which the one-story structure insures by its very nature, but it will reduce property damage to a minimum

✣

Statement of Ownership, Management, Circulation Etc., Required by the Act of Congress of August 24, 1912, of American Builder, Published Monthly at Chicago, Ill., for October, 1919.

State of Illinois, } ss.
County of Cook }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared E. L. Hatfield, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the AMERICAN BUILDER, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:

Publisher, American Carpenter & Builder Co., Chicago, Ill.
Editor, Wm. A. Radford, Chicago, Ill.
Managing Editor, Bernard L. Johnson, Chicago, Ill.
Business Manager, E. L. Hatfield, Chicago, Ill.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

Wm. A. Radford, Chicago, Ill.; H. M. Radford, Chicago, Ill.; Roland D. Radford, Chicago, Ill.; Wm. A. Radford, Jr., Chicago, Ill.; E. L. Hatfield, Chicago, Ill.; G. W. Ashby, Berwyn, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiants full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is..... (This information is required from daily publications only.)

E. L. HATFIELD,
Business Manager.

Sworn to and subscribed before me this 1st day of October, 1919.

[SEAL] MAME C. BRUSH,
(My commission expires April 24, 1922.)

NEWS OF THE FIELD

Beaver Board Companies Bring Out New Wall Board Paint

The Beaver Board Companies, Buffalo, N. Y., manufacturers of Beaver Board, have placed on the market "Beavertone," a new flat wall paint, especially designed for the painting and decorating of Beaver Board.

The development of Beavertone, the announcement of the companies says, was in response to an oft repeated question of the purchasers of Beaver Board, "How shall we decorate?" Beavertone is the companies' answer. It secures a smooth, velvety, washable finish for side walls and ceilings and can be applied to Beaver Board, other wall boards, plaster, wood, metal, burlap or canvas.

The companies will market Beavertone thru its wall board dealers, enabling them to give complete service to Beaver Board customers. Beavertone is made in ten shades, and is contained in cans of a capacity of from one quart to one gallon.

✣

F. W. Ruggles Secures Control of Republic Truck Co.

F. W. Ruggles, president of the Republic Motor Truck Co., Inc., Alma, Mich., formally announces that he has, in conjunction with John N. Willys and W. J. Baxter of New York City, acquired control of the Republic Motor Truck Co., Inc., and the Torbensen Axle Company of Cleveland, Ohio. The interests formerly held in these corporations by parties located in Cleveland, Alma and other points, were purchased outright. The men whose holdings were purchased, including Charles G. Rhodes, former secretary of the Republic Company, C. F. Hepburn, former vice-president and general manager, J. O. Eaton, and others, have no further connection with either of the organizations.

F. W. Ruggles further announces that in spite of conflicting rumors which have been published recently, the Willys-Overland Company, of Toledo, Ohio, is in no way connected with the transaction, which was a purely personal investment by himself, John N. Willys and W. J. Baxter.

Mr. Ruggles also announced that the original administrative policies of the Republic Motor Truck Co. will in a large measure, be continued, and predicted a period of continued growth and prosperity for the institution.

✣

Concrete Block Makers Organizing

A small but enthusiastic meeting was held at Rochester, N. Y., on September 21 for the purpose of forming an association for improvement and promotion of concrete block. All of the manufacturers were represented, with one unavoidable exception. There is unanimous desire on the part of Rochester manufacturers to put a better product on the market and enter into a spirited promotive campaign. The city fire marshal was present and made an address in which he strongly advised the new organization to work for better block and for fire-safe buildings.

On Wednesday evening, October 22, Cleveland concrete block manufacturers met to reorganize the Concrete Block Association of Cleveland. Every concern in the city and vicinity making structural block was represented. There were also present one or two representatives from each of the following cities: Erie, Lorain, Elyria, Rocky Falls, Bedford and Painesville. Most of the latter attended for the purpose of getting information helpful in organizing block associations in their respective cities. Robert Scholl was elected president and E. G. Barnett, of the Geist Building Material Co., secretary. Short reports on conditions of the concrete block business in Cleveland were made by Clarence Echle, Wm. Hoag, Harry Bennett and Robert Scholl. The condition of the block business at Erie was described by Grant Smith; at Paynesville by Platt Rust; at Elyria by Chas. Crehore; at Chagrin Falls by Chas. Giles; at Lorain by H. F. Fraley and at Bedford by Herman Doll. The meeting resulted in a permanent organization which will meet at an early date to adopt a broad plan for promotion work.

Similar meetings were held at Milwaukee on November 7, at Indianapolis on Nov. 10, at Detroit, November 12, at Windsor, Ont., November 13, and at Kalamazoo on November 14. At each of these points preliminary steps were taken to form local concrete block associations. At Milwaukee, Wm. Yonker acted as chairman and a committee was appointed to present constitution and by-laws. At Indianapolis, O. L. Miller, president of the local block association, was instructed to place before that body a plan for reorganization, including a new constitution and by-laws, taking in block manufacturers at Anderson, Pendleton, Worthington, Carmel, Knightstown, Noblesville, Lebanon, Greensburg, Richmond and other nearby cities.

There was an attendance of 51 at the Detroit meeting, where a permanent association was organized and dues paid down by a large proportion of those who attended. At Windsor, Ont., all of the block makers of Windsor, Walkerville and surrounding towns were present and a permanent organization established, all concerns represented paying their dues at the meeting. There was an attendance of 14.

The second meeting of the Concrete Block Machinery Association was held at Chicago on October 13, at which time constitution and by-laws were adopted and dues fixed for the remainder of 1919. The organization is looking forward to an intensive promotion campaign, and several of the members are preparing splendid new catalogs for 1920.

The National Cement Stave Silo Association will hold its fourth annual convention at the Fort Dearborn Hotel, Chicago, on December 2, 3 and 4. A special committee is assisting A. W. Clyde, secretary, in the arrangement of an elaborate program. President E. M. Heim has been in touch with a large number of the members and reports that the convention will be the biggest ever held. It is expected that reports made at that time will indicate the greatest silo season ever experinced by cement stave builders.

The concrete roofing tile manufacturers are planning a rejuvenation of the Concrete Roofing Tile Association, which became inactive during the war. Preliminary arrangements are being made for a meeting at Chicago about January 1. Readers of the AMERICAN BUILDER who may be interested in membership in the association may communicate with D. Helmuth, president of the Empire Tile Co., Scofield Building, Cleveland, Ohio.

✣

ALMOST every building has girders resting upon piers or columns laced from eight to fifteen feet apart; and in many cases beams can be obtained which will span two and even three of the spaces between the piers or columns. When this is the case the question arises, whether it will be better construction to use a long continuous girder, or to have each girder of only one span.

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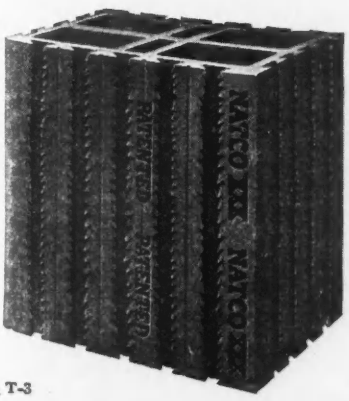

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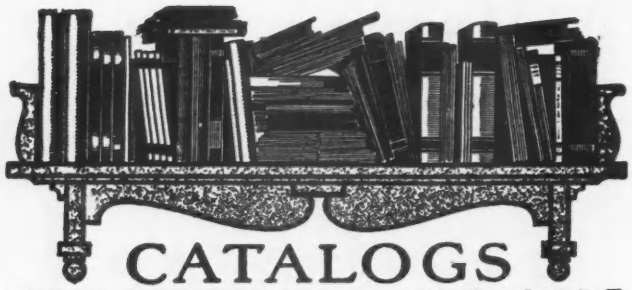

CATALOGS BULLETINS & BOOKS RECEIVED

The following literature, dealing with subjects of interest to builders is now being distributed.

The American Concrete Pipe Association has just issued a handsome booklet on concrete pipe for sewers, drains, house connections, pressure lines, culverts and other uses. Copies can be obtained by addressing the secretary, G. E. Warren, 210 South LaSalle Street, Chicago.

How to do concrete work in cold weather is the principal subject discussed in the November-December number of "The Concrete Builder," issued by the Portland Cement Association, Chicago. This number is especially valuable to contractors who do concrete construction in the rural districts.

Stucco over metal lath as fire-resistive construction is treated at length in the September issue of "Expanded Metal Construction," published by the North Western Expanded Metal Co., Chicago. Fire tests of metal lath and stucco walls and other phases of this type of construction are discussed by text and illustration.

Designs for banks and public buildings are contained in an exceptionally well-printed and illustrated 24-page and cover booklet issued by the International Casement Co., Jamestown, N. Y., manufacturer of rolled steel and drawn bronze window casement and composite windows. Details of this class of window construction also are contained in the booklet.

Hardware specialties, such as galvanized wall ties, wall and veneer ties and brick bonds, are listed in the 80-page and cover catalog and price list No. 25, issued by the Niagara Falls Metal Stamping Works, Niagara Falls, N. Y.

Standards of the American Society for Testing Materials are contained in a bound supplement of 64 pages to the annual report of the society. The latter is a 300-page book, containing the association by-laws, membership list, etc.

The Selflock Eaves Trough Hanger is described in a four-page folder, issued by the Milwaukee Corrugating Co., Milwaukee, Wis. Illustrations show how the hangers are locked around the trough. The hanger is made of steel and will support a weight of 50 pounds.

"Surgical and Dental Lavatories" is the title of an attractive 24-page and cover booklet issued by the Crane Co., Chicago. The booklet describes the fixtures, especially designed for surgeons and dentists, that this company makes. The illustrations, of which there are many, are excellent.

The Austin Wagon Loader, a portable power-driven piece of equipment for handling building materials, is described by text and illustrations in a 12-page and cover booklet issued by the F. C. Austin Co., Chicago. The illustrations show the loader in operation.

"Thatch Roofs" is the title of an exceptional book issued by the Creo-Dipt Co., North Tonawanda, N. Y. There

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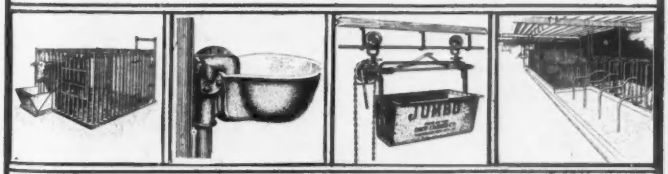

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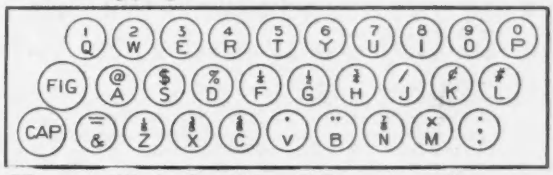

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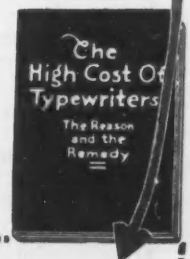

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are 48 pages of illustrations, showing attractive homes with thatched roofs. Two of the illustrations are printed from color plates.

"Specifications for Linwax Interior Flooring" is an eight-page booklet for architects, issued by the Reilly Co., Indianapolis, Ind. As its name implies, the booklet contains specifications for laying Linwax blocks over different floor materials.

"Ten Designs for Houses of Indiana Limestone" is the title of a 24-page and cover booklet issued by the Indiana Limestone Quarrymen's Association, Bedford, Ind. The booklet contains the prize designs for homes submitted in a contest held in 1917.

The history of walnut is contained in a booklet entitled "American Walnut," issued by the American Walnut Manufacturers' Association, New York City. The booklet contains 48 pages and is well illustrated with photographs showing furniture made of walnut.

Portable belt conveyors for economical and speedy handling of building materials are described in a booklet of 32 pages and cover issued by the Barber-Greene Co., Aurora, Ill. The booklet not only describes the equipment the company makes, but illustrations show them in use.

"Willys Light, a Complete Light and Power Plant," is the title of a booklet announcing that this plant has been placed on the market. The booklet is issued by the Electric Auto-Light Corporation, Toledo, Ohio, and is addressed to contractors and others, describing the advantages of selling individual light systems.

Pictures of the country's famous buildings are contained in a 32-page and cover booklet, issued by the Stanley Works, New Britain, Conn. The buildings shown are equipped with Stanley builders' hardware. "Stanley Garage Hardware for Rolling Doors" is another booklet the company issues, showing its rolling and sliding garage door hardware.

"Receivador, the Automatic Servant" is the title of a booklet that describes by text and illustration the kitchen doors equipped with package receivers manufactured by the Hardwood Products Co., Neenah, Wis. The receivers have a novel lock, which prevents entrance to the house when the outer door is open, and unlocks the inner door when the outer is closed.

Engineering bulletins on "Passenger Train Resistance" and "The Orifice as a Means of Measuring Flow of Water Thru a Pipe" have been issued by the Engineering Department of the University of Illinois, Urbana. Both bulletins give the results of extensive experiments conducted at the university. ✣

A SMALL percentage of hydrated lime or lime putty added to the cement mortar will make the mortar work, adhere better to the tile, and will give a more waterproof better mortar mixture. Not over 15 to 20 per cent of the volume of the cement should be used; too much lime weakens the mortar and reverses the above-mentioned advantage by making the mortar more absorbent. A straight line mortar, however rich a mixture, is not suitable for setting hollow tile.