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Table of Contents

	Page		Page		Page
American Building Methods Abroad.....	81	Design of Safe Construction.....	117	A Roof Truss in Rural France.....	142
Cartoon:		Strength of Stiffness of Beams.....	117	Out on the Job.....	144
Factory Buildings in Big Demand....	82	Fred Beard Says:		Paint Gun Covers 2,000 Square Feet	144
Sharp Contrasts in Oriental Building... 83		People Want Quality in Their Homes		Per Hour.....	144
Our Front Cover Modern Theater Design	86	and Are Ready to Pay for It.....	120	Oil-Burning Apparatus for Coal-Burn-	
Motion Picture Theater Has Latest		Argentina's Building Program.....	121	ing Heating Plants.....	144
Features.....	86	Architectural Suggestions.....	122	Making the Ford Work in the Shop....	146
Making the Roof Efficient.....	89	Window Displays for Architects.....	122	Recommended Concrete Tile and Block	
Charming Home with Roofing Details	90	Law for the Builder.....	124	Practice.....	148
Methods of Applying Various Roofing		Making Electrical Construction Safe....	125	Motor Trucks and Trailers.....	156
Materials.....	91	Practical Novelties in Electrical		Loading Devices Aid Busy Contractor..	156
Quaint, Comfortable Colonial House....	92	Switches.....	126	Trucks vs. Horses in Lumber Business..	160
Homeless Families Find Unique Homes	93	When to Heat Wood Before Gluing....	127	Truck Going Strong After Three	
Metal Lath in Stucco Construction.....	98	Building Contracts Break All Records..	128	Years' Work.....	164
Stucco Bungalow with Metal Lath Details	94	Correspondence Department.....	129	Lumber Dealer Increases Hauling	
Blueprint—Metal Lath.....	95	Undertaker Built Own Garage.....	129	Service.....	164
If I Were a Building Contractor I'd....	96	Builder Has Busy Year.....	129	Line Level Valuable Builder's Instru-	
Substantial Home for Suburban Site....	98	Solution for Prosser's Problem.....	129	ment.....	170
Bringing the Country to the City Dweller.	99	How to Mark Tools with Acid.....	129	News of the Field.....	172
Modern Two-Flat Design.....	100	Another Method for Renewing Oil-		The Largest Saws in the World.....	172
Setting Floor and Wall Tile.....	101	stones.....	130	Automobile Advertiser Joins New-	
Blueprint—Floor and Wall Tile.....	102	How to Lay Slate Roof.....	130	Way Company.....	172
Attractive Farm Home with Floor Tile		Builds \$4,000 Barn.....	130	American Mixers in India.....	172
Details.....	103	Favors Sheathing on Outside.....	130	Westinghouse Opens Large Employes'	
Cost Plus vs. Lump Sum.....	104	Enterprising Carpenter Has Unique		Cafeteria.....	174
How to Build with Terra Cotta.....	105	Shop.....	132	Paper Manufacturer Wins \$1,000 Prize..	176
Modern Bank with Terra Cotta Details..	106	How to Prevent Dripping Wall.....	132	E. C. Simmons, Hardware Merchant,	
Blueprint—Terra Cotta.....	107	Renewing Old Oilstones.....	132	Dead.....	176
Built-in Service Features in Modern		How to Repair Cracks in Stucco.....	132	Keiser Joins Lakewood Engineering	
Apartments.....	108	Roof Framing Easily Memorized.....	134	Co.....	176
Blueprint—Space-Saving Beds.....	111	Wants Pointers on Making Library		Save Those Cement Bags.....	176
Design for Modern Three-Story Apart-		Lamp.....	136	Preserving Old Buildings by Waxing..	178
ment Building.....	112	Professor Leigh Answers Stress Prob-		To Keep Doors and Windows from	
Design for Well-Ventilated Calf Barn... 113		lems.....	136	Swelling.....	178
Installation for Corn Crib Elevator.... 113		Carpenter Designs Time Card.....	138	Selling Paint Specialties.....	178
Corn Crib with Elevator Details.....	115	Steel Square.....	138	Catalogs, Bulletins and Books Received..	180
An Inviting Retreat.....	116	Possibilities of the Steel Square.....	140	Spring Painting.....	184

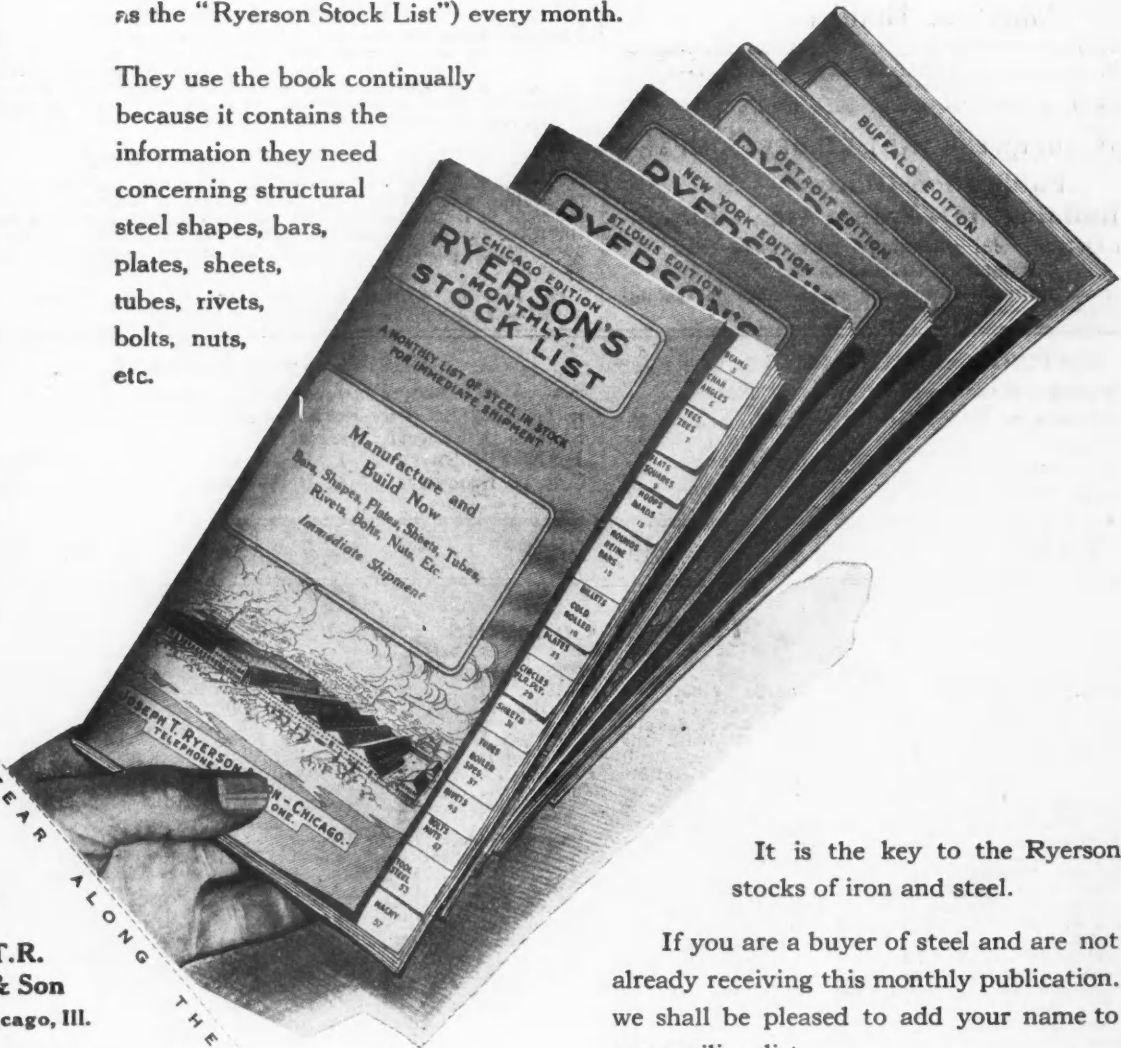
Every subscriber to the AMERICAN BUILDER is urged to read without fail the special announcement printed on goldenrod paper that follows page 116 in this issue. It is a message from the editors and publishers of the AMERICAN BUILDER to its old friends that not a single one of them would intentionally miss. TURN NOW TO THIS SPECIAL ANNOUNCEMENT AND READ IT.

Editors and Publishers, AMERICAN BUILDER.

The Five Guide Books For the Steel User

The majority of those who buy steel receive one of these Steel Guide Books (commonly known as the "Ryerson Stock List") every month.

They use the book continually because it contains the information they need concerning structural steel shapes, bars, plates, sheets, tubes, rivets, bolts, nuts, etc.



It is the key to the Ryerson stocks of iron and steel.

If you are a buyer of steel and are not already receiving this monthly publication, we shall be pleased to add your name to our mailing list.

The Coupon is for your convenience.

JOSEPH T. RYERSON & SON

CHICAGO NEW YORK ST. LOUIS
DETROIT BUFFALO

Short Talks by the Editor



American Building Methods Abroad

A WORLD-WIDE demand is developing for American building equipment, the whole civilized world now realizing the advantages of our American methods of construction.

The boys of our engineering corps and construction units went over to France, and opened the eyes of the world as to what can be accomplished by the speed, system, and aggressiveness of American construction methods. It mattered not whether the job was to build a railroad, lay a paved highway, construct a hospital or set up 10,000 homes, the job was done with businesslike thoroughness and in such quick time as to astonish the Old World.

This wartime introduction to American building methods has led to various developments of great interest and potential value to the American building industry. All over the world there has developed a demand for more information regarding the equipment and tools used by American building contractors and also relative to many of the items of improved mechanical equipment which we in America put into our buildings.

Mr. Wm. A. Radford, Jr., is finding on personal investigation abroad the extent of this foreign interest in the American building industry, and is collecting data of great value to American man-

ufacturers as to just how our American building industry can be profitably expanded to meet and encourage this foreign demand.

It is logical that the AMERICAN BUILDER should have been the one publication to carry abroad the message of American building methods, building materials, and building equipment. As the big dominant publication of the American building industry it is being welcomed abroad, and the ideas contained accepted as typically American. A copy of the AMERICAN BUILDER goes each month to every United States Consul and Consular Agent in every foreign country. There also hangs in every Consul's office all over the world a complete set of AMERICAN BUILDER posters, which call attention to the information and service which the AMERICAN BUILDER organization is prepared to furnish to anyone anywhere in the world who is interested in learning more of American building methods, building materials or building contractor's tools and equipment.

There is a natural patriotic pride which we of the American building industry feel for the methods and materials which we have developed and which serve us in this country so well. Now is the time for us all to do what we can to cultivate this great potential foreign market for American goods and American ideas.



William A. Radford, Jr., on the Terrace of the Gall Face Hotel, at Colombo, Ceylon.



Dear Mr. Contractor when can you build my factory?

Can you take the contract for an auto plant?

How about figures on doubling my shoe factory?

I've got to build an addition to the store.

Hey! Mr Contractor My building comes next

CARTOON BY ED. QUIGLEY.

Sharp Contrasts in Oriental Building

BUILDERS IN CEYLON AND INDIA RUN TO EXTREMES—CRUDE METHODS STILL IN USE—GREAT OPPORTUNITY FOR AMERICAN BUILDING MATERIALS AND BUILDERS' EQUIPMENT IN THE ORIENT

By William A. Radford, Jr.

(On a 'Round-the World Trade Mission in the Interests of the AMERICAN BUILDER)

DELHI, INDIA, MARCH 15, 1920—Just a month ago I arrived in Colombo, Ceylon. But during those thirty days I have visited several places in Ceylon; have been in Bombay, and from Bombay have traveled to Delhi, the seat of British government in India and one of the famed places of the world.

While my principal object in coming to this section of the world was to find out the future possibilities for the members of the building industry and American manufacturers of building materials and equipment in the Orient, I have had time to observe what they build and how they build in these tropical countries.

Building here runs to two classes—the extravagant and the crude. By the photographs that are reproduced with this article some idea of the extravagant are given. Also one of the pictures (that of a street scene in Kandy, Ceylon) shows the crude buildings that are generally found in the poorer sections of the cities and in the smaller places.

In Ceylon I happened onto a building brick plant. The building itself was erected along side a clay bank. It was a crude affair, but as it is only needed during bad weather, it is sufficient. The method of producing brick in use there must be the same by which the brick were made a thousand years ago. Men, naked, with the exception of a piece of cloth wrapped around their middles, kneaded the clay in the clay pit with their feet.

When it was kneaded to the right consistency, it was packed into a form. When taken out, the brick were piled in the sun to bake—and as the thermometer in the shade registers about 120 most of the time, the natural kilns are hot enough to do the business.

In bad weather the brick are piled indoors, and are stacked so that a wood fire underneath the tiers does the baking. Somewhat different method than those used by the American brick manufacturers—also the brick are somewhat different, to say the least.

In Ceylon most of the buildings are roofed with tile. A few buildings were covered with corrugated iron, but I was unable to find out where it comes from. If American manufacturers of shingles and the different kinds of patent roofing would introduce their products here, they would find a most remarkable market for them, I am sure. It is not lack of money that prevents the use of our modern building materials here, it is inability to get them. This is the richest of rich countries, and the natives are ever ready to spend their money, if they can only get the goods.

While on the subject of buildings, I could not help but think what wonderful opportunities there are here for such materials as wallboard. It would be an ideal building material for almost all dwelling houses in this torrid climate.

Home equipment is of the crudest kind. There is no plumbing, except in the homes of the wealthy and in



William A. Radford, Jr., and Group of Youthful Native Beggars, at Kandy, Ceylon.

the better class of hotels. Chemical closets would be a boon to those people.

The woods that we think of only for use in building fine furniture and for expensive interior trim are common in these countries. The three principal woods in use are teak, satin and mahogany. In Ceylon they make the railroad ties, or sleepers, of satin wood.

Lumbering is done in a crude way. The lumber manufacturers have little machinery. The best of all their machines is the elephant. He is their donkey engine and their railroad locomotive. However, the elephant has a bad habit of lying down on the job and passing on to the elephant heaven. In one lumber district recently eight of them died in a few days and the veterinary couldn't find out why. There is a great chance for the manufacturers of machinery in the lumber districts. Some of the more progressive manufacturers already are introducing machinery, and I believe it will not be long before their operations are conducted in an efficient and economical way, thru the use of machinery.

Bombay is a great big city, and a progressive city, too. Building there, like in almost every place on

earth, was stopped during the war, but now they are going ahead in good style. The buildings, especially government buildings, are all decorated up with towers and fancy exterior trim. They would delight the eye of architects.

It certainly is hot in these countries. On the train from Bombay to Agra, where I stopped before coming to Delhi, the glass in the train windows was so hot you couldn't put your hand on it. People wear as few clothes as possible. I am wearing a shirt, a pair of short pants, such as are used by basket ball players, stockings and shoes, with a "toppee" or helmet to protect my head. When making my first public appearance in this rig in Bombay, I was self-conscious, to say the least, but as everybody else, especially foreigners, wore the same sort of an outfit, the embarrassment soon wore away.

A month in this country has impressed me with one big outstanding fact. That is that American businessmen are overlooking a great market here. One merchant that I talked with said that he would buy many hundreds of thousand dollars worth of American manufactured products if he could get them. Americans,

he said, do not seem to be interested in selling their goods in these countries, and the Europeans have little to offer. When business at home slacks up, as it is bound to some of these days, this is the place to turn to. But maybe by that time the Europeans again will have this market cornered, and Americans will have lost the opportunity to increase their foreign trade, which was given them by the war and the stoppage of production in Europe.

In the large cities, such as Bombay, foreigners like myself, excite little interest among the natives. In the smaller cities, however, they are objects of curiosity. In Kandy, Ceylon, I was followed by a bunch of native children, all begging. I got them to pose with me for a picture. They are a nuisance, but are everywhere and the officials pay no attention to them, other than to shoo them away, but they soon are back.

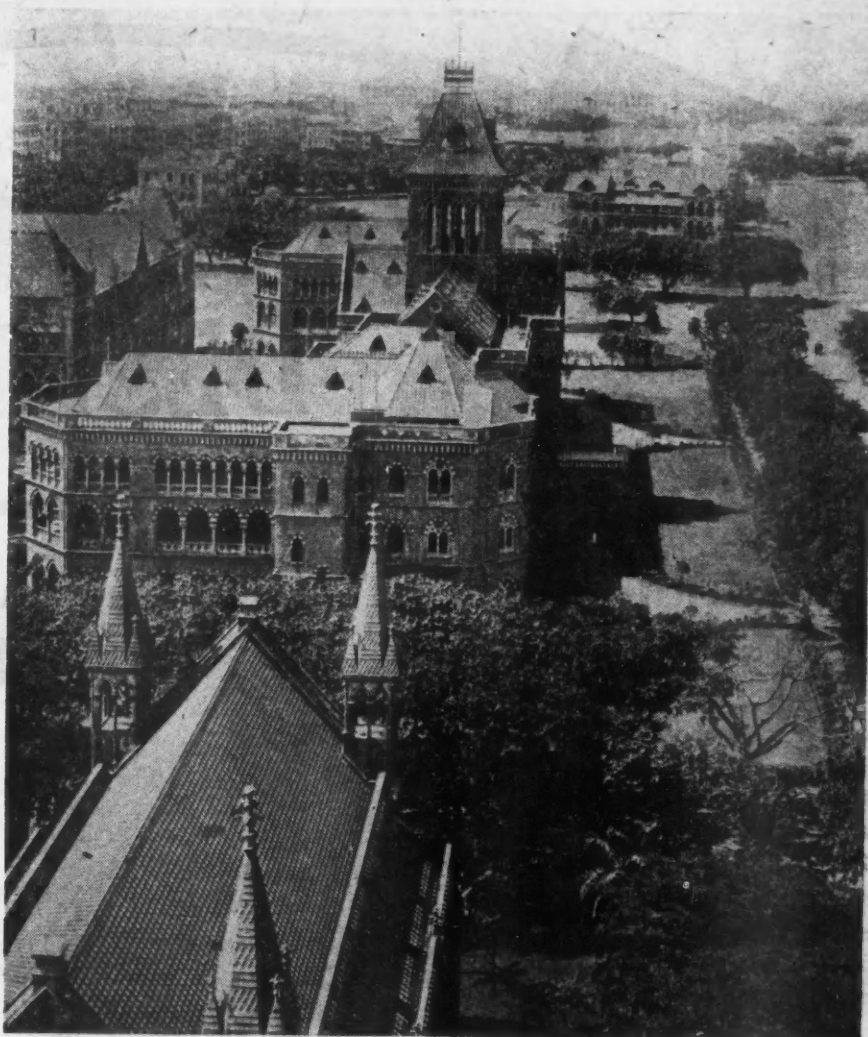
Transportation in these countries is slow and uncertain. The railroads are not nearly adequate for the needs, either of freight or passengers. The hauling of freight to the railroads is done by ox carts, that move about half as fast as the ordinary man walks. Motor trucks



Street Scene in Kandy, Ceylon. Foreigners Arouse a Great Deal of Curiosity Among the Natives and They Turn Out in Crowds When One Appears. This Picture Shows the Type of Buildings in the Smaller Places.

are coming into use here, but there is a wonderful market for them that remains to be developed. I met one sales representative here in the interest of one of the largest of American manufacturing companies, which has, among other machinery, motor trucks. He says that he expects to sell many of them, and I am certain he will not be disappointed. Taxicabs are numerous in the cities, and there are quite a few automobiles.

Some idea of the financial condition of India is given by the fact that American money is below par here, just as English, French and other European money is below par in the United States. Yes, they have money and are willing to spend it. All that is necessary to get it is to give them the American manufactured goods they want and need.



Contrast the buildings shown on this page with those in the picture on the opposite page. Above on this page is a view of Bombay, showing how well they build in the large cities. Below is a similar photograph showing the roofs of some of the public buildings in Madras.

While great progress has been made in building methods and building design in such cities as Bombay, Madras, Calcutta and others, in the smaller places the buildings are crude and the building methods unchanged for hundreds of years. The opportunities for American building materials and equipment and American builders' machinery and tools, and for American building methods are unlimited. These people are anxious to progress; all they lack is the education which Americans can give them. Truly, the opportunities for American building methods in this country are great.



Our front cover MODERN THEATER DESIGN

Motion Picture Theater Has Latest Features

ARCHITECTURAL AND LIGHTING SKILL LAVISHED ON MODERN PICTURE THEATER TO MAKE IT ATTRACTIVE

“DID you see ‘Fatty Arbuckle’ in his latest comedy? It’s a scream.”

The capitalist pauses in the midst of a big deal to chuckle as he recalls the vivid antics of the famous comedian. Poised high in the air on a narrow steel beam, the ironworker flings the same question as a fellow worker and risks his life to laugh again.

Some people go to grand opera; others prefer legitimate to drama, but they all go to the “movies.” To the poor family it is a blessing, and the tired business man finds it a solace where quiet is supreme and a thrill available. Rich, poor, laborer and savant, each has his particular favorite, whether it be the inimitable Chaplin, “Little Mary,” “effervescent” Fairbanks or some of the other well-known screen stars. The moving picture is the great democratic influence in American life.

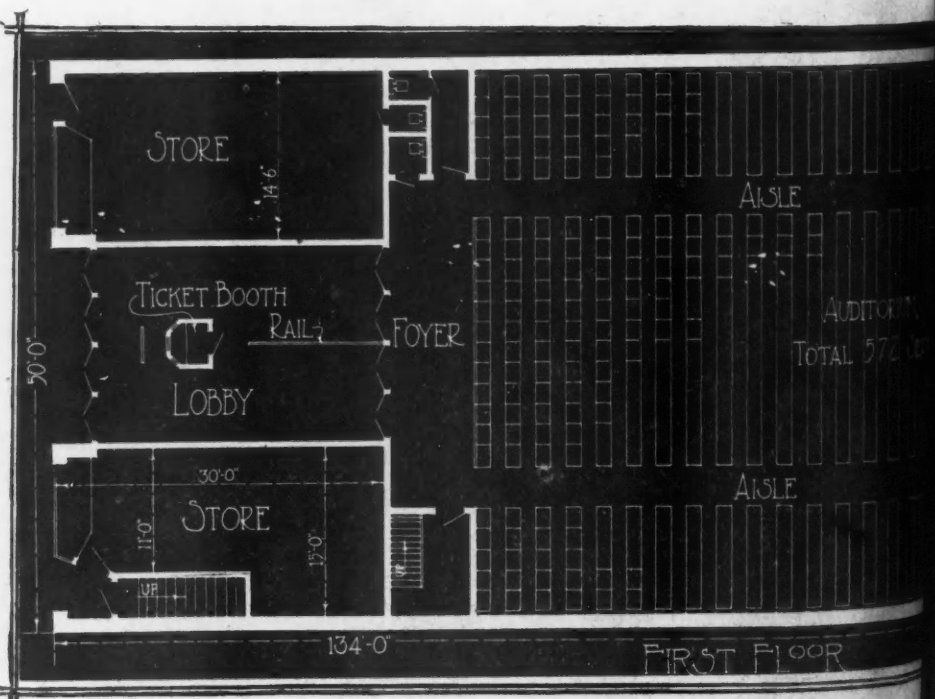
Yet only a decade ago this industry was an infant in swaddling clothes. It has developed in manner that is amazing, not only in finesse of production, but in the clientele and surroundings in which it holds forth. From the stuffy “hole in the wall” with very few seats and less ventilation it has grown until today it is



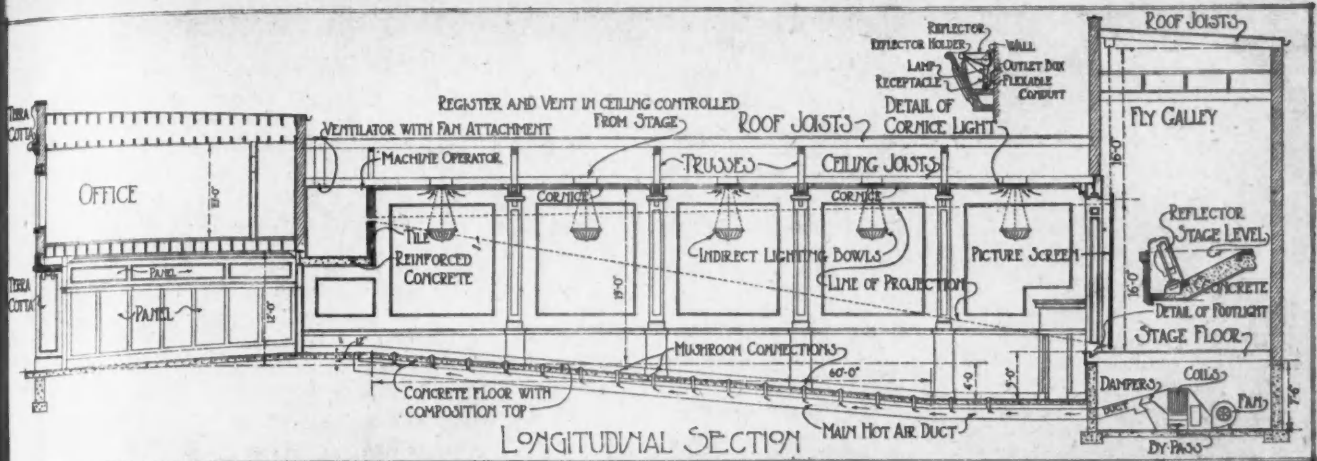
“Here’s Luck to You, Charlie.”
“Same to You, Doug.”

housed in veritable palaces and creations of architectural and building art and skill, such as shown on our front cover this month.

Today the facade of the neighborhood theater is the most imposing in the vicinity, the building itself attractively designed with exterior lighting effects, radiating a hospitality that lures the wavering passerby. Upon buying his ticket he finds himself in a spacious and elegant lobby whose



Floor Plan of Our Front Cover Moving Picture Theater, Showing Arrangement of Lobby, Auditorium, etc. Building Is 50 Feet Wide and 134 Feet Long



Longitudinal Section of Theater, Showing Indirect Lighting System and Fixtures, Ventilating Outlets and Fans, and Line of Projection from Booth to Screen. Note the Construction of the Sloping Floor and Location of Heating and Ventilating Systems Under Stage.

broad sweep and pretentious arrangement makes some of the famous playhouses look cheap and shoddy. Fitted with rich upholstered furniture and lighted with beautiful fixtures which reflect brilliant rays indirectly on highlycarved and delicately tinted walls and ceiling, it typifies the architectural fairyland into which the bewildered patron ventures. And the remarkable feature of this development is that it is not confined to great centers, but is just as marked in the suburban town and small city. For the moving picture is by no means

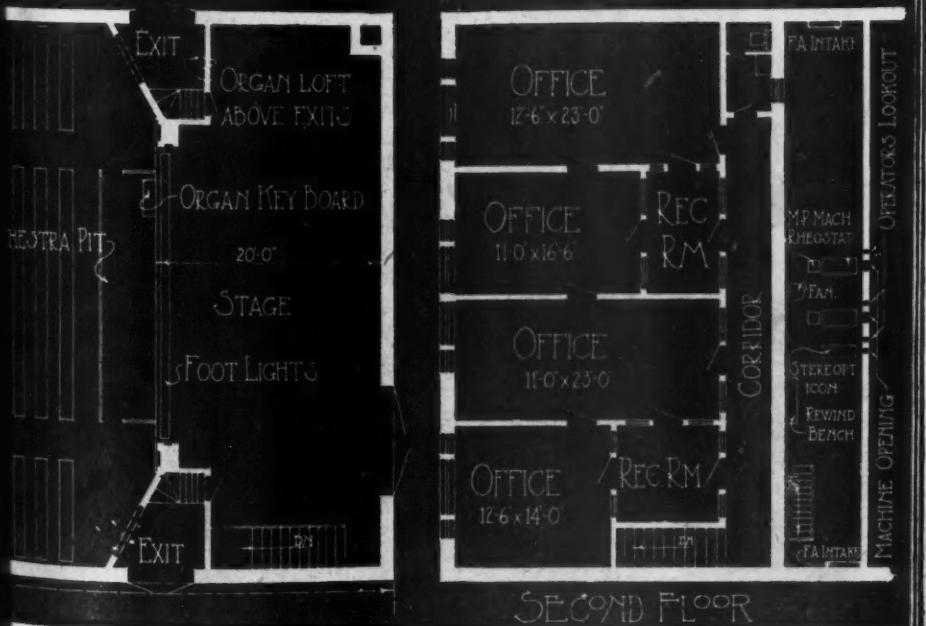


"Fatty" Should Smile. The \$3,000,000 Contract in His Hand Will Be Paid in Part by the Crowds That Throng This Lobby Nightly.

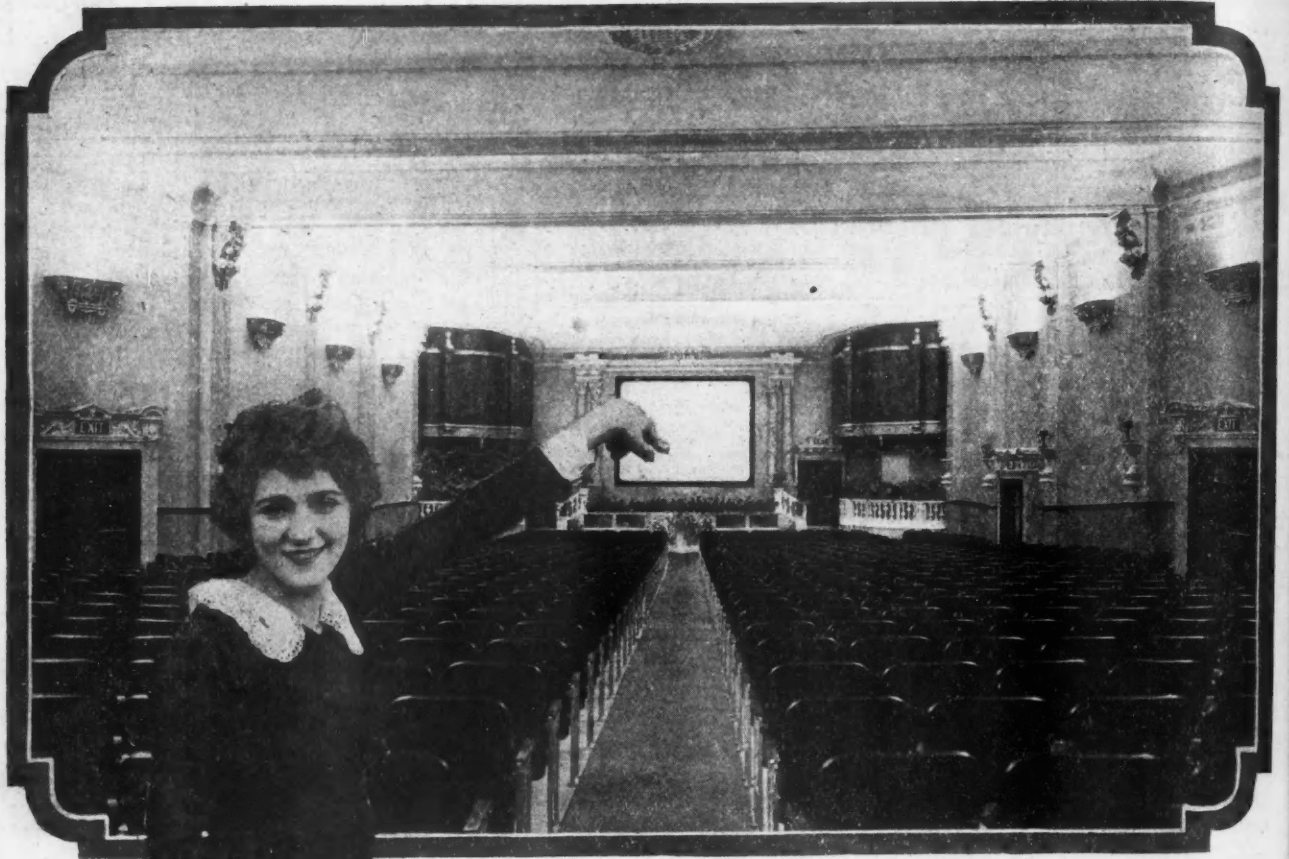
sectional—it permeates the daily life of every city, town and hamlet.

As a result the architect and builder find the way open to a tremendous field in which to display their art and skill in construction. Producers of moving pictures have found that sumptuous and artistic surroundings attract and increase business.

But the dazzled visitor has yet to see the real beauties of the cinema palace, the auditorium. It is here that the architect, decorator, electrician, and painter have lavished their utmost skill to turn out a luxurious result. To take care of the enormous crowds which nightly flock to



Small Stores on First Floor; Doctors' Offices and Projecting Booth on Second Floor. The Plan of the Projecting Booth Is Very Clearly Shown.



"Little Mary" is pointing out the reason for her success, financial and otherwise. The brilliant light which floods the ceiling is produced indirectly from the ornamental wall boxes on the side walls.

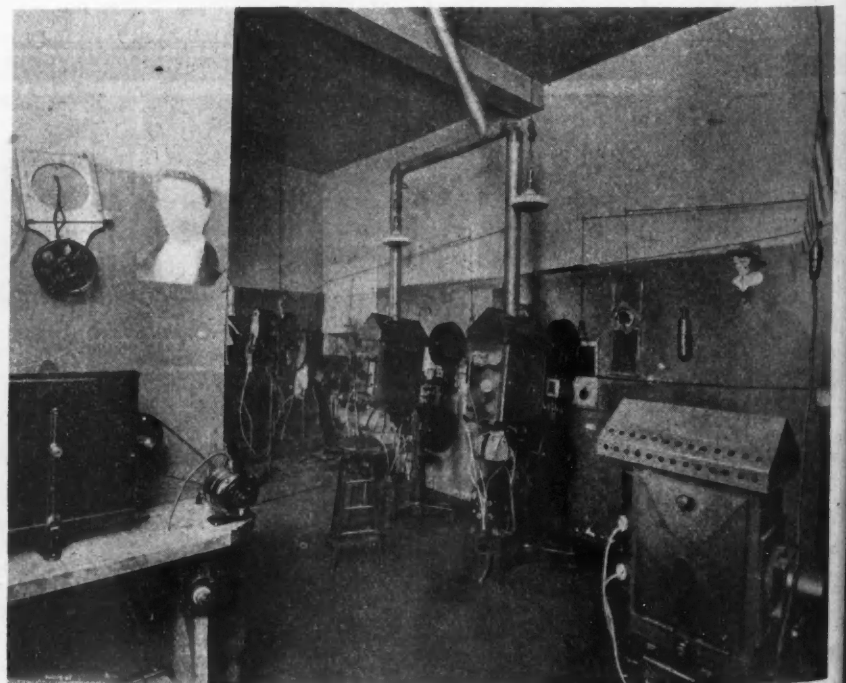
close to the ceiling it is desirable to have side wall equipment so as to give the projection a clear path. To provide for dim lighting during the performances one lamp in each box is usually wired on a separate circuit and made to give just enough light for patrons to find seats, but not strong enough to mar the pictures.

The location and construction of the projecting booth

the theater, the auditorium is built wide and extensive. The longitudinal section gives a good idea of the elaborate construction.

Most important is the lighting arrangement. The success of the picture depends upon a carefully regulated system. Much of the illumination in the large show houses at the present time is accomplished from lights entirely concealed, without resorting to the use of hanging ceiling fixtures. The light sources are worked into the decorative elements, all lamps and reflectors are carefully hidden from view, yet the interior is flooded with a clear comfortable illumination by means of equipment, which appears to be a decorative feature rather than a lighting fixture. They are concealed in cornices, coves, or wall boxes.

In buildings constructed so that the projection of the machine is

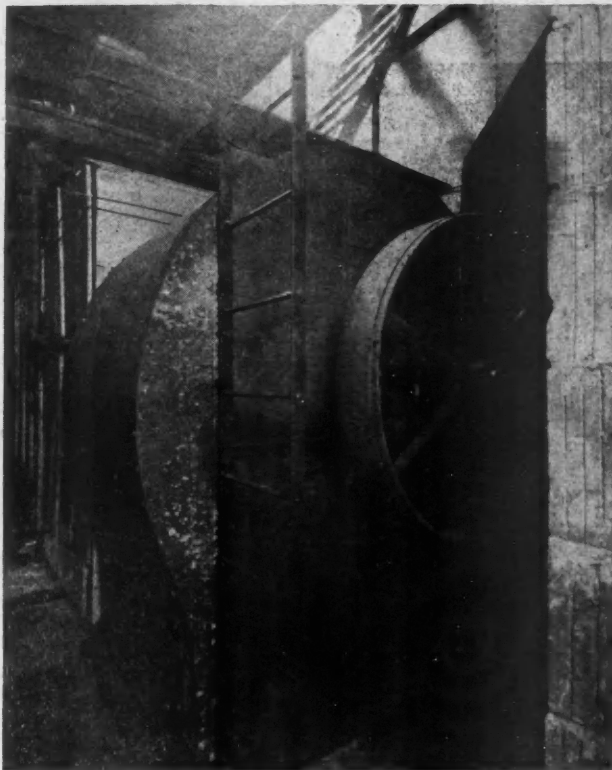


Close-Up View of Interior of Projecting Booth, Showing Location of Moving Picture Machines, Stereopticons, and Other Machinery Used in the Large Modern Moving Picture Show House. The Construction Details of a Projecting Booth Are Shown on the Other Page.

in which the various moving picture machines and stereopticons are placed is naturally very important because the successful projection of the picture is most essential. In the detail shown here and in one of the illustrations the arrangement and type of equipment used in a large picture house such as is shown on the front cover are fully explained.

A glance into the basement of the May front cover theater reveals an insight to the great mechanical processes involved in a screen palace. Here we find the sources of heat, power, light and air, the big factors in making a theater both comfortable and habitable. Tons of deadly carbon poured out by breathing thousands bunched close together must be carried off, and for this work the great blower shown in the accompanying illustration is designed. By providing a continuous current of fresh air, warm in the cold season and cool in the hot months, it not only makes the auditorium healthful and stimulates the audience into an active appreciation of the picture, but makes the moving picture theater a successful all-year institution. A poorly ventilated theater will lose its patrons and become an investment loss.

The heating plant is also fundamentally important. Comfort is the watchword for the successful builder of this type of structure. Extra expense and time spent on good construction and careful attention to equipment bring ample returns by increased business. The moving picture palace is perhaps the most con-



This Giant Blower Furnishes the Fresh Air That is Absolutely Necessary in a Large Theater. It Draws off the Carbon-Dioxide Exhaled by the Thousands Who Are Seated Above. In the Summer It Supplies Cool Air, and in the Winter Warm Air.

spicuous example of the tendency in present-day construction—comfort and convenience emphasized.

Making the Roof Efficient

DETAIL SHEET ON PAGE 91 SHOWS SKILLFUL APPLICATION NECESSARY TO MAKE WIDE VARIETY OF ROOFING MATERIAL SERVE PURPOSE

"EVERY time it rains, I need a dozen buckets to take care of the leaks in the roof of my house."

This complaint is by no means a new or odd one, but is the too frequent result of careless laying of imperfect materials. In the final analysis a good roof generally possesses three qualities; it is a complete shelter, it is attractive, and last, it is inexpensive to maintain. The contractor should not find the task of selecting such a combination difficult because the roofing field offers perhaps one of the greatest varieties of all building materials. Once he has selected the type he is going to use, the method of laying is his important task.

Each type of roofing has certain specifications for laying, as the detail sheet on page 91 will show. There is a vast field to pick from and he must be acquainted with each type; for instance, he should know how to lay the roll-roofing, which is often called "ready" or "prepared," built-up roofing, tin and metal roofing, asphalt shingles, asbestos shingles, wooden shingles, slate and tile.

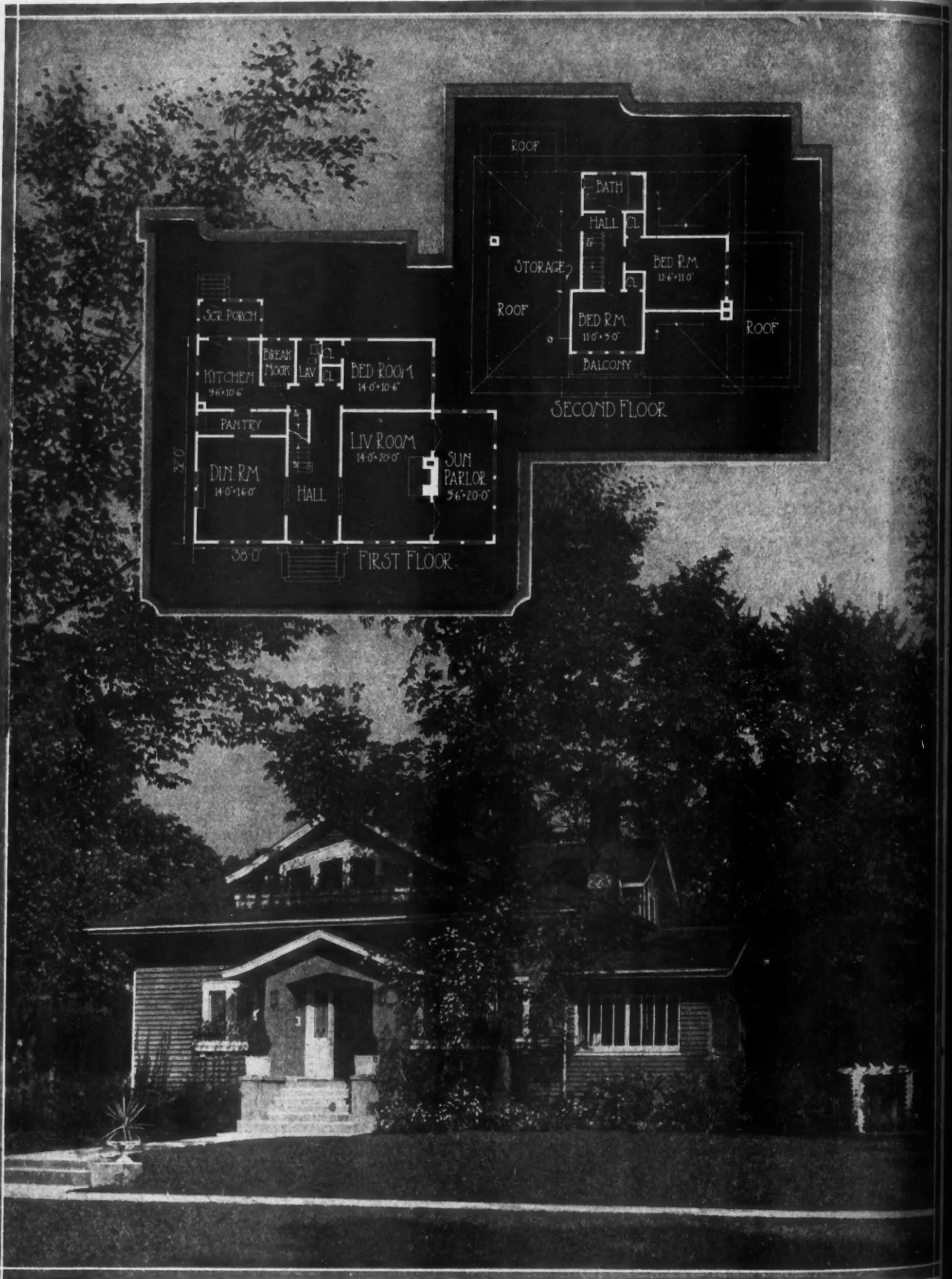
Asbestos shingles are laid on sloping roofs in much the same way as wooden shingles. The roof boards are laid in the usual manner and then covered by a

layer of felt. Then a furring strip applied parallel and flush with the eaves, and then the first course of shingles are laid. The nails should not be driven down tight, but similar to the handling of slate. All chimneys and valleys are flashed with copper or some other approved material.

Most contractors are so familiar with the laying of wooden shingles that it need not be explained, but a thatched effect has been worked out with wooden shingles which requires special specifications as the detail on the next page indicates. These shingles have been sawed into numerous patterns to give the wavy effect of a thatched roof. Shingles over rounded surfaces should be nailed as closely to the exposed part of the butt as possible with six-penny nails.

Built-up roofing requires special treatment. The laying is begun at the lowest point of the roof. The first felt is nailed down, then coated with asphalt or some other preparation. Then another layer is applied. In this way the roof is gradually covered. Very often the flashings are made by extending the roofing a few inches up all projections.

In laying slate, the nailing is one of the most important steps in the operation. Care should always be observed that the nails are not hammered down tight.



HOSPITALITY AND COMFORT. Homelovers will find it difficult to resist the inviting appeal of this charming story-and-a-half six-room home with its comfortable living room, cheerful fireplace, and large and roomy sun parlor. The delightful little entrance is in itself a distinctive feature which helps to reflect the charm of the home. Built of frame clapboard on a substantial concrete foundation, it has a hip roof which can be very attractively covered with any of the variety of roofing shown in the detail sheet opposite. The dormers break up the regularity and add to the general beauty. This house measures 38 by 32 feet on the ground, and lends itself to a garden setting.

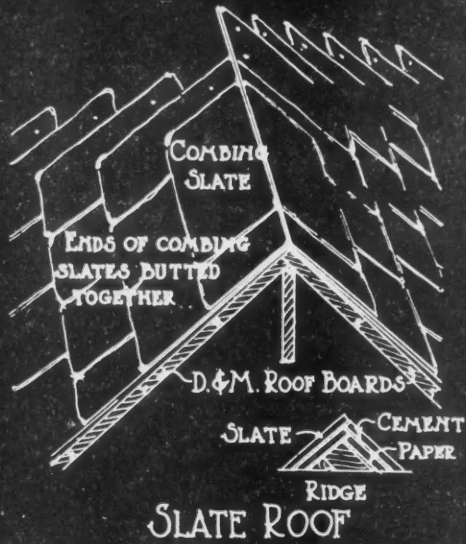
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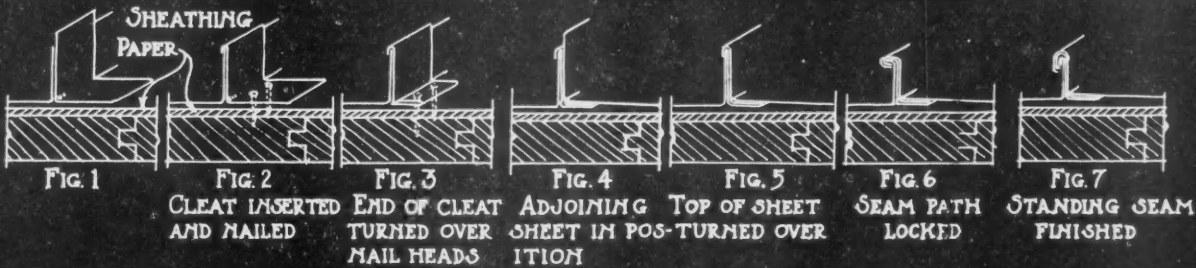
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RECOMMENDED CONSTRUCTION

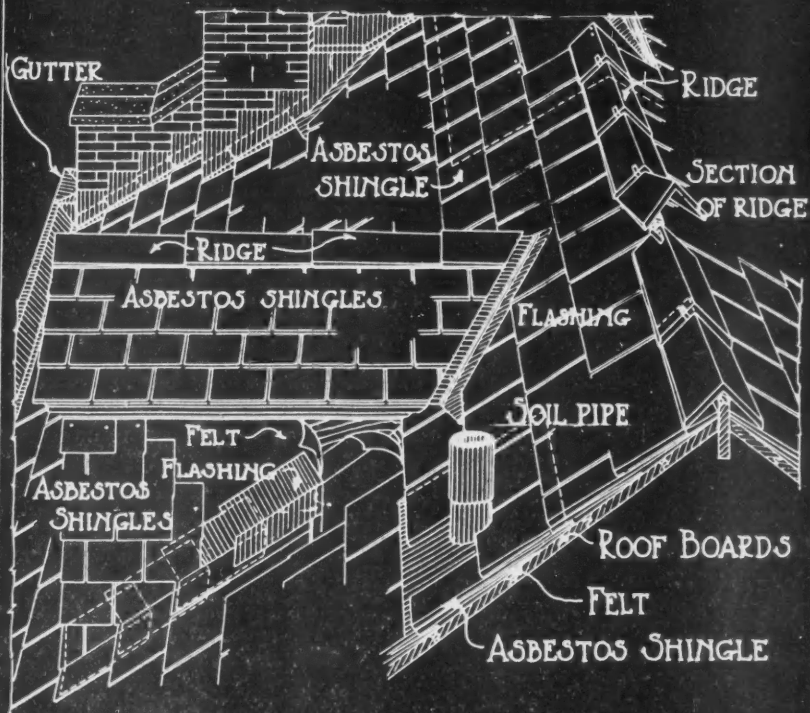
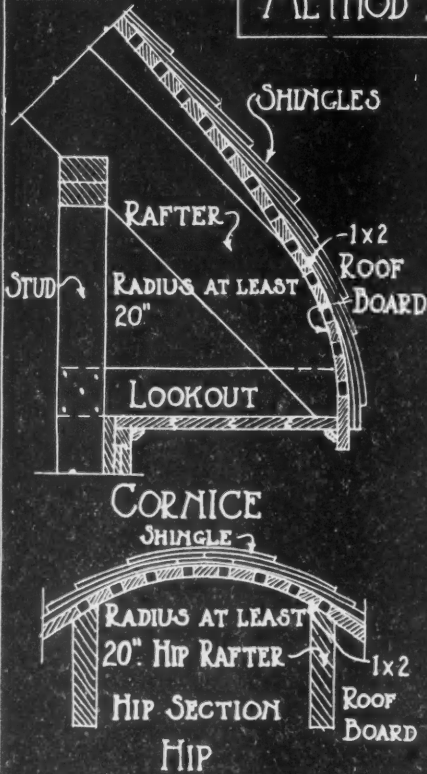


ASPHALT SHINGLES & COMPOSITION ROLL ROOFING

ROOF BOARDS TO BE D.&M. BOARDS LAID WITH TIGHT JOINTS. SHINGLES ARE GENERALLY LAID WITH 4" EXPOSED TO WEATHER. WHERE USED FOR SIDE WALLS OF BUILDINGS, SHINGLES ARE SOME-TIMES LAID WITH EVERY ALTERNATE COURSE 3" & 6" TO WEATHER. WHEN LAYING ROLL ROOFING AMPLE LAP SHOULD BE ALLOWED AND LAPS WELL CEMENTED. IN RE-COVERING AN OLD ROOF, THE PRESENT ROOFING SHOULD NOT BE REMOVED. FLASHINGS SHOULD BE PAINTED ON BOTH SIDES BEFORE BEING PUT IN PLACE.



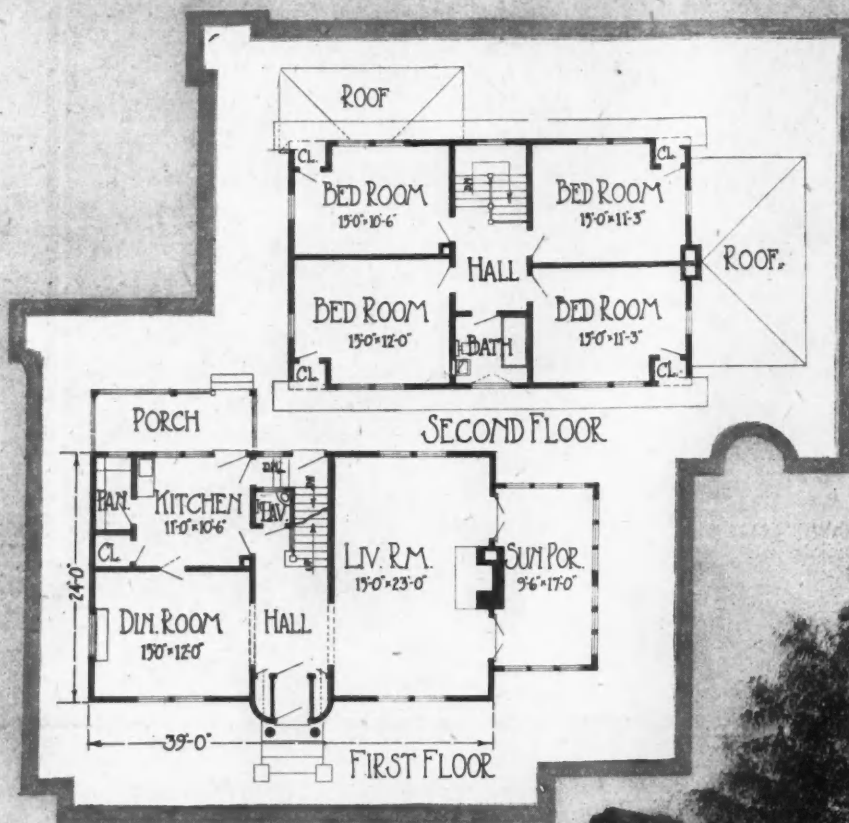
METHOD OF LAYING STANDING SEAM TIN ROOFING



ROOF OF ASBESTOS SHINGLES

THATCHED EFFECT BY THE USE OF WOOD SHINGLES

METHODS OF APPLYING VARIOUS ROOFING MATERIALS



ARE YOU SEEKING A SYLVAN RETREAT? This should satisfy you, without doubt. Here we have a quaint reminder of Colonial days before the rush and commercialism of the present age was in vogue. It is a gentle reminder of the past, with all the conveniences of modern construction, as the floor plans show. Seven comfortable rooms, three on the first floor, and four on the second, make up this desirable home. The large living room boasts of one of those wide, open fireplaces with a great, roaring chimney; certainly a most desirable feature in the cold months. Extending the full width of the house is a sun parlor, reflecting the modern influence on the old type of architecture. An added touch is found in the pergola decoration of the entrance. Size, 39 by 24 feet.

Homeless Families Find Unique Homes

SERIOUS HOUSING SHORTAGE IN LARGE CITIES FORCES PEOPLE TO SEEK MAKESHIFT SHELTERS

FEW people fully realize the seriousness of the housing shortage all over the country. In some cities conditions are so acute that homeless families have been forced to resort to extreme and novel measures to get a shelter.

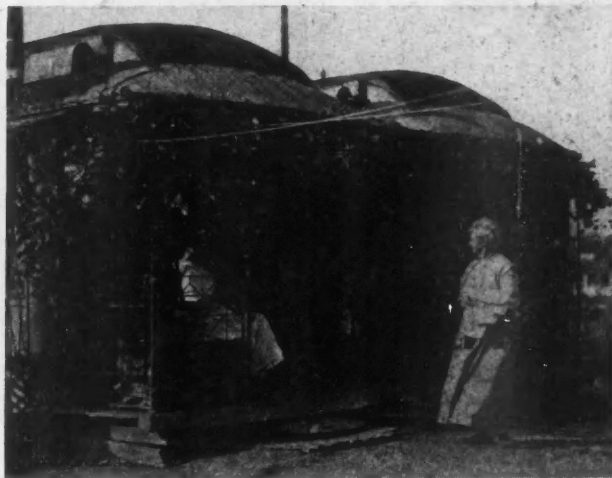
In Staten Island an ingenious family deprived of a home by the exorbitant demands of a landlord took possession of one of the derelict trolley cars which had been abandoned by the company and had been consigned to a fiery end. The car was divided into rooms and the rear platform made an attractive sun porch by the addition of a few vines and flowers. This set the pace and now many families are living in "trolley car residences."

Some of the crowded eastern cities confronted with the same problem believe they have found a real use for the unused and unsold wooden ships built by the government during the war. Philadelphia proposes to take over thirty or forty of them and convert them into floating apartments. They intend to roof the upper deck and cut windows in the lower levels.

In Chicago the home shortage is driving some of the people to the river. They are building houseboats with five rooms each: parlor, dining room, kitchen and two bedrooms; finished in white pine. With no charge for land and a small mooring expense they

have solved one phase of the high cost of renting. In addition they have unlimited bathroom facilities.

While most of these instances seem humorous they



"Trolley Car Apartments." The Latest Thing in Staten Island, Where the Housing Shortage Is Beginning to Plac.

really reflect the almost tragic condition of the housing situation today. They show the desperate straits in which the large cities are, and emphasize the need of an increased building program, and a concerted effort on the part of the whole building industry.

Metal Lath in Stucco Construction

RECOMMENDED PRACTICE FOR ALL KINDS OF MECHANICAL BOND SHOWN IN DETAIL SHEET ON PAGE 95

VERY closely connected with stucco and plaster construction in the last few years is the mechanical bond which has become widely known and extensively used—metal lath. It was found especially suitable for this work because metal and stucco have about the same expansion and contraction coefficients. Today it is used for both interior plastering and exterior stuccoing in all kinds of houses. The detail sheet shows its use in a stucco house.

There are two general types of stucco construction metal lath. In the first type, $\frac{1}{2}$ inch crimped metal furring or $\frac{3}{16}$ inch rods are stapled to the studs without sheathing, and lath applied in the ordinary way, then back plastered, the rear covering the edges of the studding completely and forming a shoulder, giving sufficient lateral brace. In the other type, furring and lath are applied over sheathing thoroly covered with waterproof paper.

When applied to wood studding or furrings the lath should be stapled every 8 inches with $\frac{1}{4}$ -inch staples made of No. 14 gauge wire.

Care should be taken to wire the edges of the two sheets midway between the studs so that they cannot separate when the plaster is applied. The last edge of the sheet should not be stapled until the next edge

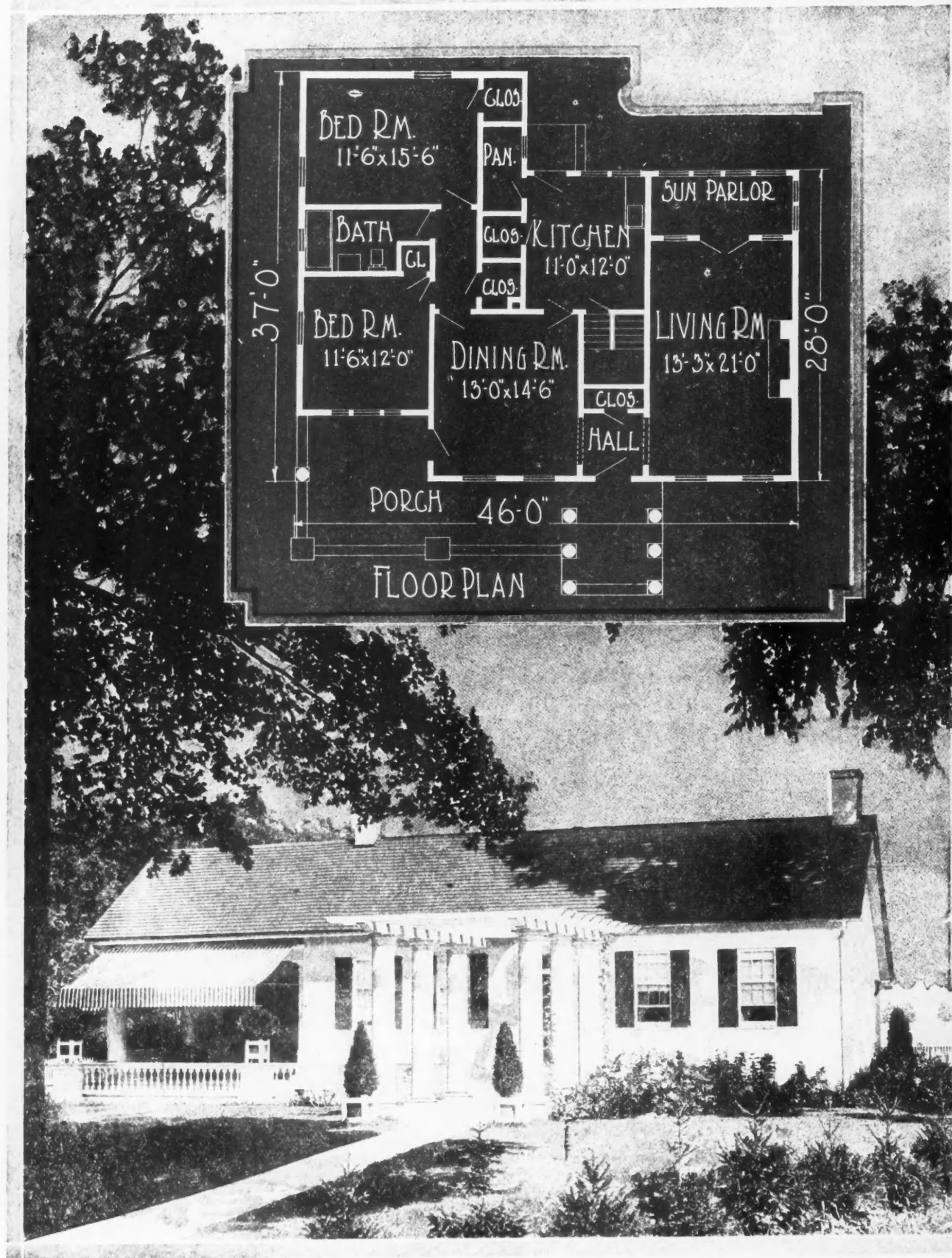
has been applied, giving $\frac{1}{2}$ -inch lap when both edges may be fastened by the same staple.

The ends of the sheets should be staggered alternately, each sheet running at least one stud on the other side from corner. This ties the corner in such a way that cracks will not occur. For exterior stucco metal lath shall be galvanized or painted and shall weigh not less than 3.4 pounds per square yard. For interior walls and partitions metal lath shall not weigh less than 2.5 pounds per square yard.

Metal lath should be applied horizontally on walls or partitions, commencing at the top or ceiling and working down.

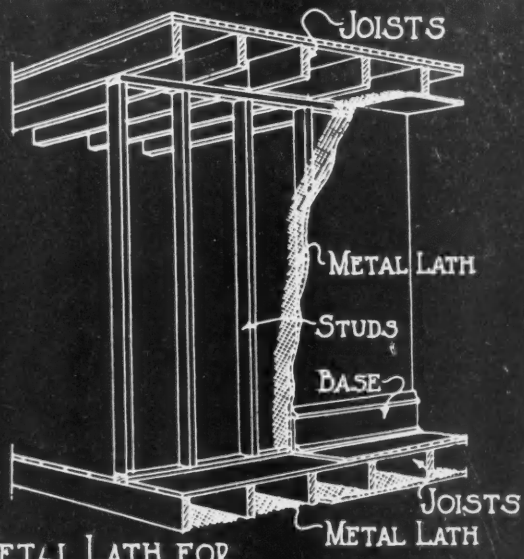
Metal lath is also extensively used in remodeling and overcoating frame houses, each of which must be treated according to its physical condition. When furrings are used and the space back of the lath is not entirely filled with plaster provision should be made for extending old window and door frames for increased thickness of wall. If applied to clapboards or shingles in good condition waterproof paper should be first applied, the surface furred with metal furrings.

Lath is generally described as painted or galvanized, weighing not less than $3\frac{3}{8}$ pounds per square yard.

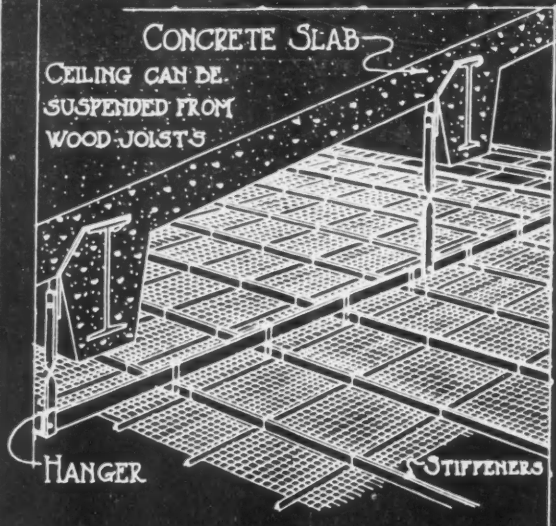


THE BUNGALOW BEAUTIFUL. This attractive stucco bungalow contains several distinctive features that make it different. Note the pergola entrance with its heavy columns that lead the way to the open sun porch with its attractive porch rail. The touch of Colonial is seen in the quaint green shutters on the windows and the low rambling layout of the house itself. This bungalow contains five rooms, of which two are bedrooms, and a sun parlor on the other side of the house next to the living room. With its almost immaculate white exterior it certainly makes an attractive picture, very suitably adapted for a suburban setting. In the detail sheet on the opposite page the technical details of metal lath stucco construction which were used in this work are shown.

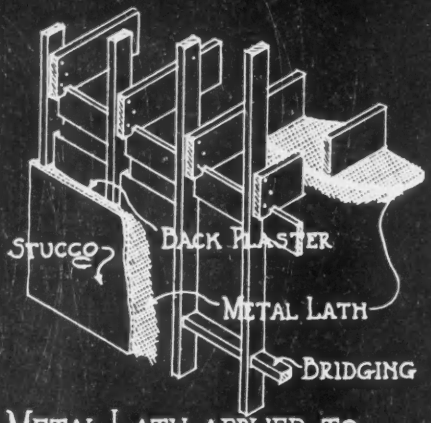
RECOMMENDED CONSTRUCTION



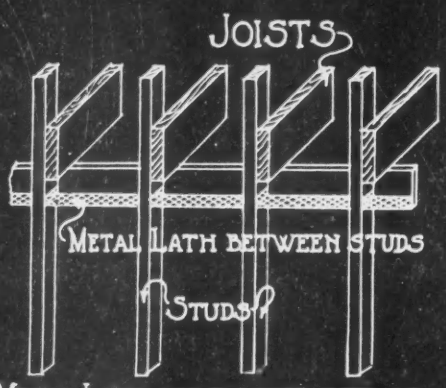
METAL LATH FOR INTERIOR PARTITION



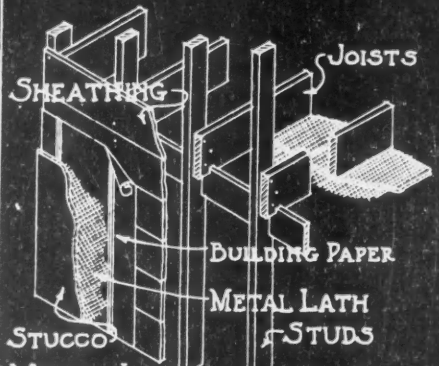
METAL LATH USED FOR SUSPENDED CEILING



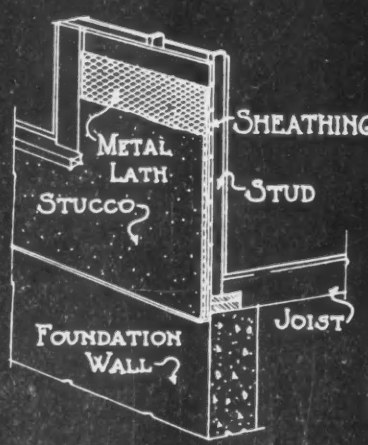
METAL LATH APPLIED TO OUTSIDE STUDS. NO WOOD SHEATHING



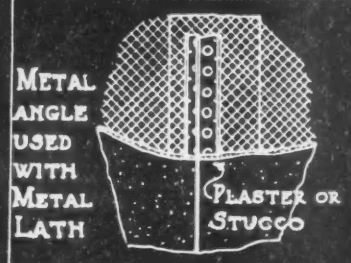
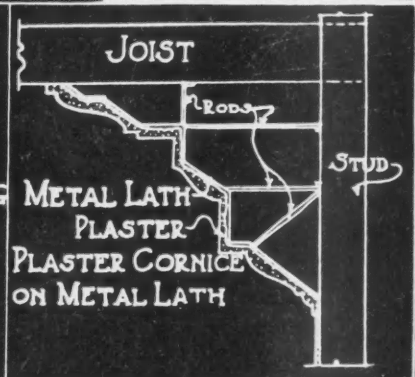
METAL LATH AND PLASTER USED AS FIRE STOP



METAL LATH APPLIED TO WOOD SHEATHING ON OUTSIDE STUDS



METAL LATH APPLIED TO SHEATHING OF OLD BUILDING



METAL LATH

If I Were a Building Contractor I'd—

SOME SUGGESTIONS FOR WORK IN A FIELD WITH GREAT OPPORTUNITIES

By H. Colin Campbell

IF I were a building contractor I think I'd specialize in something which so far few building contractors seems to have recognized as an almost virgin field. I'd be a garage builder; and I'd stick to it until I'd exhausted its possibilities. I have a good many reasons for this motion of mine. Of course, practically every car in the country today, every one you'll say, is in or under some kind of a shelter, but if you stop to think of it, how well are the cars of today sheltered and how well are they protected from fire from without and protected so that they cannot be directly responsible for the cause of fire?

When you think of the possible market for garages, it is staggering. Practically 7,000,000 automobiles and motor trucks waiting to be protected from fire, theft and weather in a permanent, fireproof structure—one that will need no upkeep, one that is attractive, reasonable in first cost and sure to be a satisfaction to the owner and a good advertisement to the builder. And before the end of the present year, it is estimated that this almost untouched market will have increased by a demand for 3,000,000 more. The motor car manufacturers predict that there will be 10,000,000 regis-

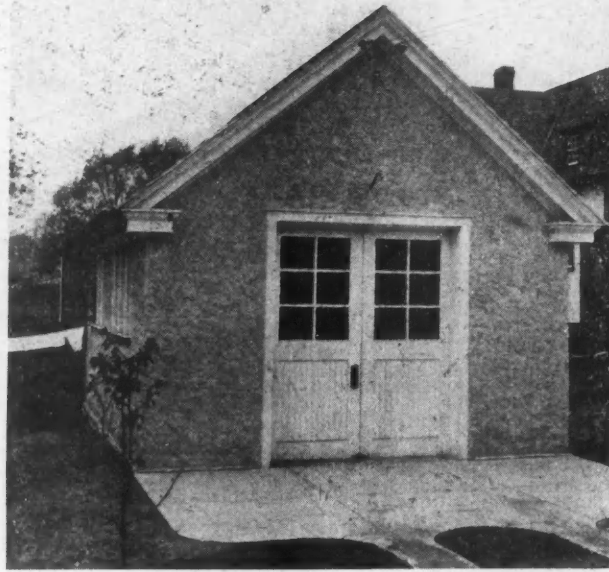
tered cars in this country within another year.

I'm thinking of concrete. Of course, the first object of a garage is to protect a valuable piece of property from injury or deterioration due to the elements and to protect adjacent buildings or property from damage that may result from the very fact that materials needed for fuel and maintenance of a car are highly inflammable and therefore dangerous in themselves.

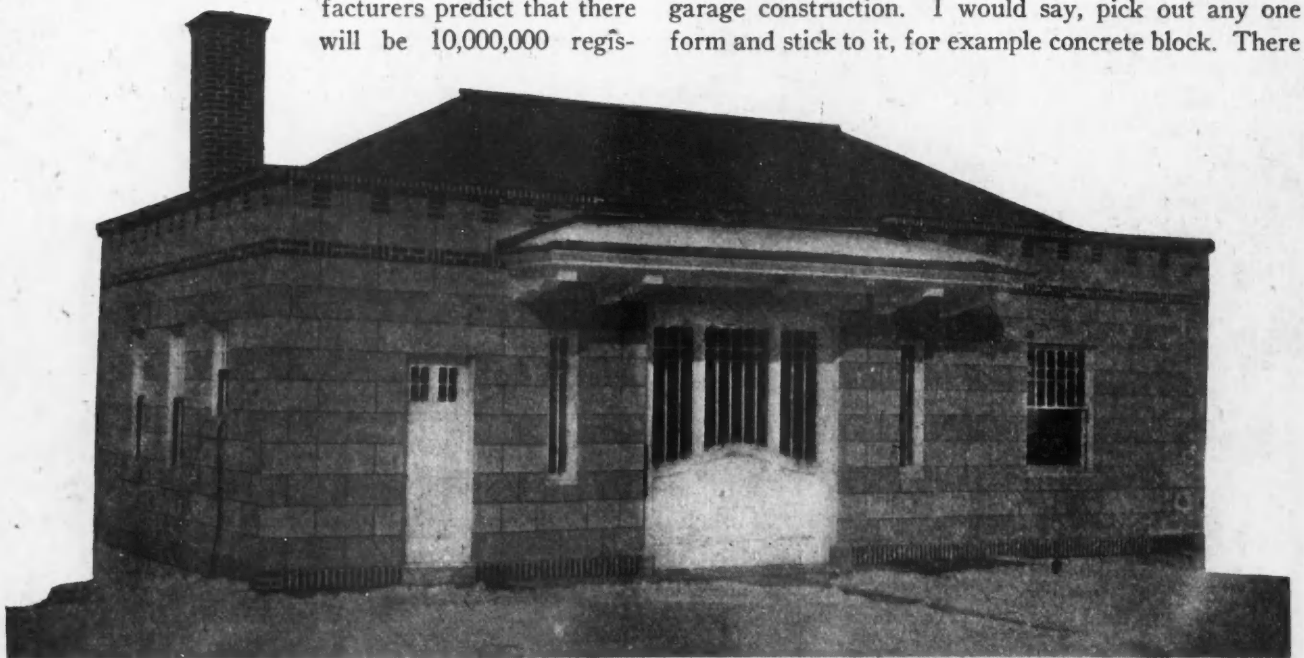
So far the majority of city dwellers have satisfied themselves with housing their cars in one of the commercial garages "just around the corner." Such accommodations will always be necessary to some, because dwellers in apartments cannot always find garage accommodations available as a part of their lease for residence quarters; but wherever the car owner owns his own home, it seems foolish for him to

have his car anywhere except at the rear of the residence, where it is convenient for sudden needs and where he can without loss of time give it the necessary cleaning and overhauling.

There is no reason why the builder should not specialize in any one of several forms of concrete garage construction. I would say, pick out any one form and stick to it, for example concrete block. There



An Attractive Garage Like This Will Add to the General Charm of a Home Scene. It Represents an Economical Type of Two-Car Garage with Cement Trackways.



Concrete Block Provides Plenty of Variety in Construction. This Ornate Structure Has Been Worked Out with Very Minute Details and Is Built for a Large Residence. The Specialist in Garage Construction Will Find a Large Field in This Line of Activity.



Concrete Block for a Structure Like This Can Be Made Up in the Dormant Winter Season and Hauled by Motor Truck to the Job. The Hip-Roof Effect Is Very Popular in Garage Construction.

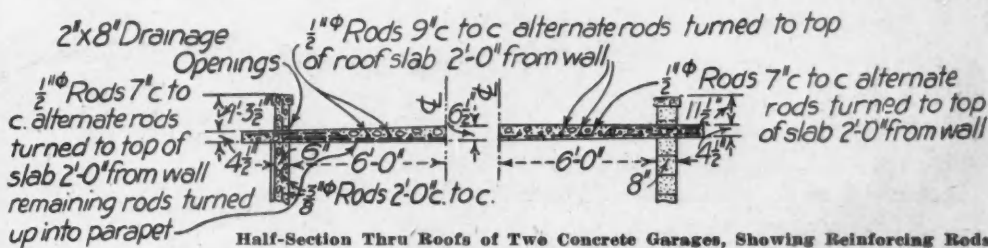
proposition attractive enough to him so that he would go out and keep customers always waiting for me to come around and witness their signature on the dotted line. As sales aids I would enlist the good will of all automobile and car accessory dealers in the community, supply them with neat literature showing several designs and illustrations or exteriors of attractive concrete block garages that I could deliver on short notice and would make a commission offer to each one of these fellows, contingent on my getting an order from any person giving me a contract.

Every car owner needs a garage and knows it, but frequently he is not impressed sufficiently with the urgency of this need to act upon it,

is probably no way in which concrete garages can be built with greater variety than by developing concrete block to its full possibilities. There is another advantage. Within a considerable radius of the builder's headquarters, the block can be hauled by motor truck a considerable distance where good roads are available and, of course, every live building contractor has a motor truck. Also there are many building contractors who to all intents and purposes are alive, but nevertheless, rather dormant during the winter and spells of bad weather when they might be building block and concrete trim stone, thus accumulating a stock of material for early start when the construction season opens.

If I were not a good press agent for myself, I'd hire a good salesman and make the

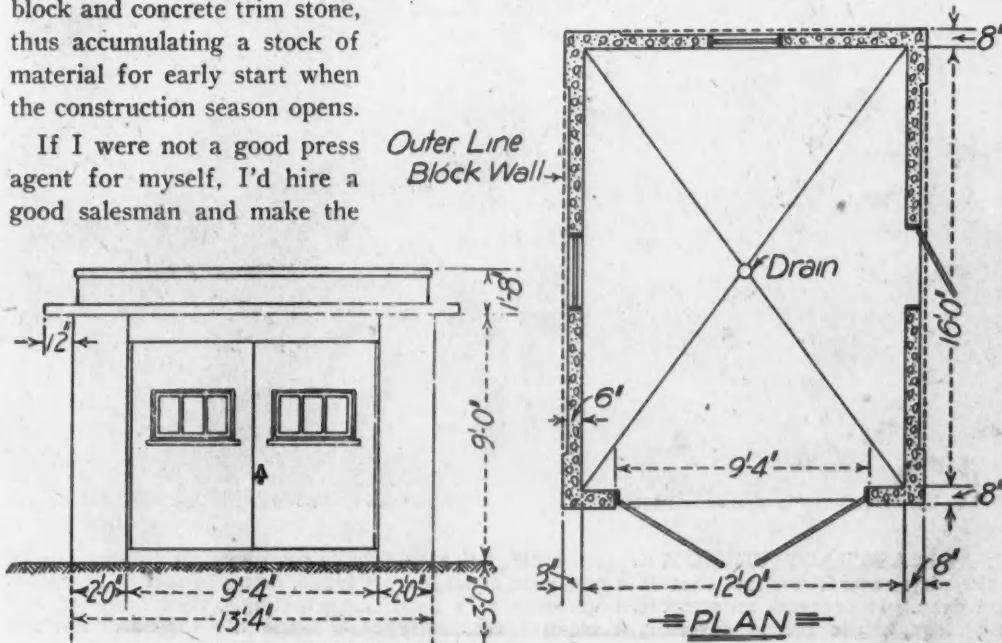
or if he does not act upon it, was not been sufficiently informed as to how he should invest in such a structure. In the country every car owner must make some



Half-Section Thru Roofs of Two Concrete Garages, Showing Reinforcing Rods.

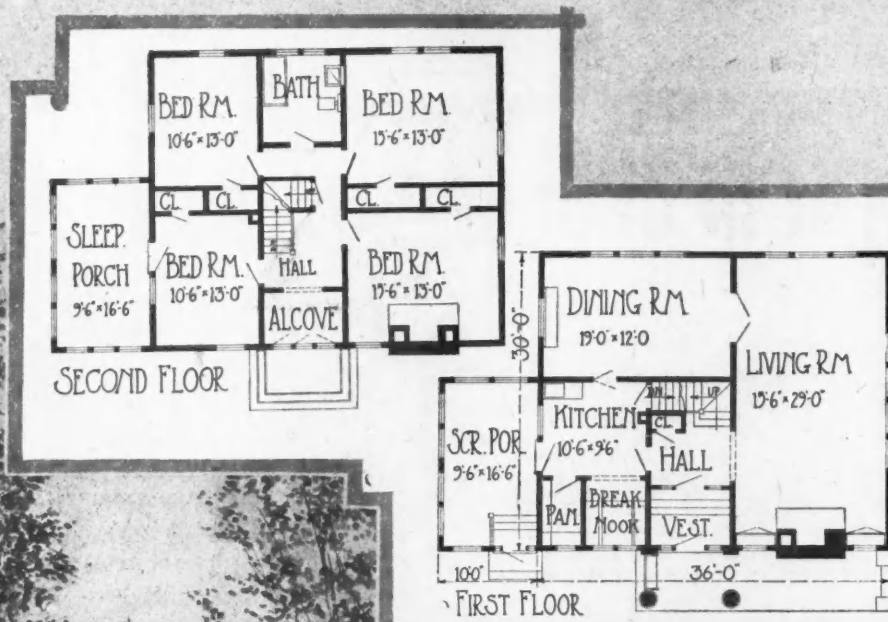
provision for housing its own car and a garage built in the country should offer as great resistance to fire as any built in the city. The fire fighting service in the well organized city is always ready to respond to a call and

may prevent great loss by its ready response. In the country, however, such advantages are less efficient, or entirely lacking. Fire in the country generally means total loss and why anyone should stand in his own light against having a fire-proof garage is inconceivable, since a thoroly fireproof one, large enough for the average car can be built for much less than the property it is supposed to protect.



Front Elevation and Floor Plan of Monolithic Concrete Garage. Builders in County Districts Are Finding This Type of Building Very Attractive.

IN the long run, a "poor" home owner is a better asset to the community than a rich transient tenant.



A MOST SUBSTANTIAL AND ATTRACTIVE HOME. At first glance this building gives an impression of bigness, but a study of the plan reveals the fact that it is not quite as large as it looks, being 36 feet wide, exclusive of sun porch, and 30 feet deep. It presents an attractive appearance in a suburban setting. Well designed and artistically rendered, with its clean, white stucco exterior, it is an excellent type of home for the medium-sized family. Of its seven rooms, four are bedrooms, located on the upper floor, while on the first floor is found the very popular large living room, dining room and kitchen. The porch has been screened in below, and glazed in on the second floor. The entrance is especially attractive and inviting.

Bringing the Country to the City Dweller

VEGETABLE GARDENS ATOP LARGE APARTMENT HOUSES GIVES THE PENNED-UP URBAN FAMILY SOME OF THE JOYS OF THE RURAL SECTIONS

ONLY a small percentage of the residents of the great cities of the United States were born in them, or live there thru choice. Those who were born and reared in the country long for the delights that country life give; those who were born in the city have an inherent desire for a plot of ground where they can prove to themselves the fact that tomatoes do not grow in cans.

When the war garden movement was at its height, many city dwellers sought places where they could grow vegetables. Such places are not frequent, especially in New York City, so apartment house owners called in the builders and constructed garden spots on the roofs of these huge buildings.

The accompanying illustration shows one such garden. It is on top of one of New York's most exclusive and luxurious apartment houses, in the heart of the city. From the conditions of the garden when the photograph was taken this "sky farm" promised a large yield of beans, tomatoes, corn and other garden truck. But what the owners got out of these gardens—each tenant had a space of his own—what was worth most was the joy of caring for the vegetables and flowers.

How well the architect and builder transformed this roof into a "corner of the country" is shown by the

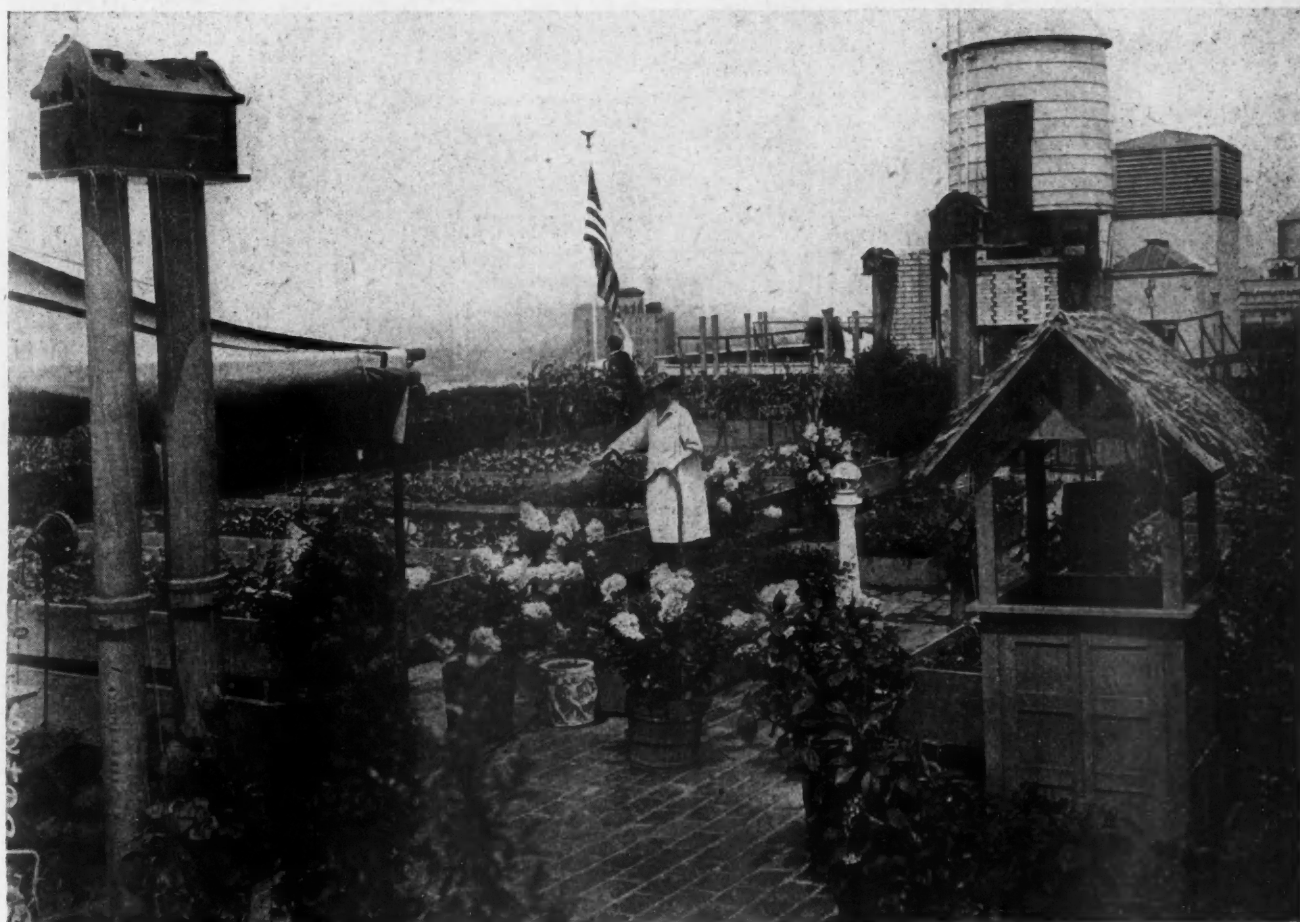
illustration. Bird houses were used to camouflage the soil pipes, which were used also as poles for the climbing beans. Even the "old oaken bucket" is there.

When the war garden period had passed, the gardeners did not forsake their gardens for the simple reason that they found health and delight in caring for them. And each year now sees more and more gardens on the roofs of the larger city buildings.

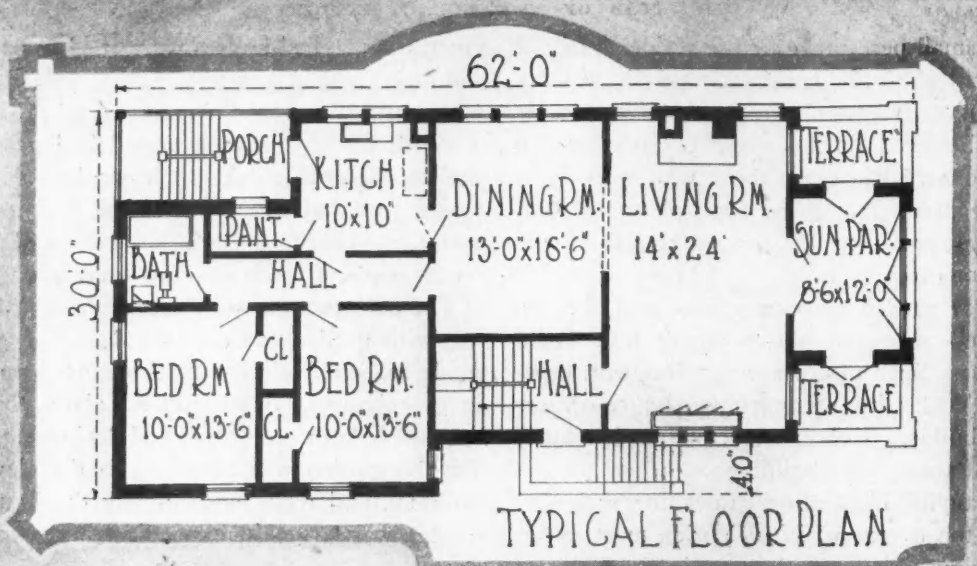
The construction work necessary to provide a building with garden space is simple. The gardens were made in boxes, similar to those used on the benches in greenhouses. These are set above the roof, so as to provide both ventilation and drainage. All the earth for the garden was taken up in the elevators of the building, and while undoubtedly the first cost of this garden was large, the expenditure was worth while.

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WHERE land is subject to overflow or where water from rains would not run off quickly the floor level of cement storage bins should be well above what may be the high water line. This is applicable to either fixed or temporary plants for bare dry prairie is often covered with 2 feet of water from spring rains when culverts became choked. On this land the floors of cement warehouses were set 42 inches above the ground line.



Flower and Vegetable Gardens on Top of a New York Apartment Building. Each Tenant Has or Can Have a Garden of His Own.



AN ATTRACTIVE INVESTMENT PROVIDING HOME AND INCOME. All of the modern features of the popular duplex apartment structure are embodied in this attractive building. In addition to the cheerful sun parlor, the first apartment has two side terraces with attractive balustrades and large flower pots. The side entrance is made distinctive by the stone stairway, landing, and ornamental metal hood. In each apartment there is a large living room, 14 by 24 feet, dining room, two bedrooms, and kitchen. The arrangement of the bedrooms is a particularly happy one. Size, 30 by 62 feet.

Talks with the Building Contractor

SOME SUGGESTIONS THAT MAKE FOR ECONOMY IN BUILDING

By R. Newbecker

ALTHO building contractors have been rushed to capacity during the season many are surprised to find upon figuring their total profits that there has been a leak somewhere. The net profit does not come up to their expectations.

Certain fundamental factors are responsible for this loss. It can be eliminated by insisting on standard trim and stock millwork, close figuring, and elimination of waste due to fads in construction.

The biggest single item entering into the construction of a building, especially a home, aside from the labor, is millwork. I have often wondered why architects, when designing an ordinary home, or contractors who furnish the plans as well as do the actual building, will specify and insist on using special trim, odd-sized doors, windows, and other material not regularly carried in stock. The use of stock sized material in all this work will not detract from the appearance of the home and certainly will result in a saving of hundreds of dollars. By avoiding special designs in millwork, the builder will help his client as well as himself.

Furthermore, when designing and building a home, the contractor should not try to mold the building to fit the furniture. Very often rooms are laid out to fit certain rugs which the prospective owner may have. Little consideration is given the fact that the contractor cannot use a 12-foot joist to make a 12-foot room. The next size of joist is 14 feet. For the sake of fitting this rug he is forced to waste many feet of

good lumber, not to mention time. The house is built to last while the rug will be discarded in a few years at the most. By avoiding these whims in building which the owner may have, and convincing him of the economy of building the home as a distinct unit, the contractor will produce greater satisfaction in the long run and also get a better return. By using material to the greatest economical advantage, much progress will be made in reducing costs.

In the construction of a home the builder can often accomplish a saving by using short pieces of lumber, such as 6 or 8 feet long, instead of specifying all material at 10, 12 or 14 feet lengths and then sawing them to fit his requirements.

Finally there is an important factor often overlooked which should be given consideration by both contractor and owner. It is the contractor's duty to convince his client of the economy involved. The average man builds but once in a lifetime and has very little idea of what goes to make an economical or expensive building. Here is where the contractor has a definite task. He should point out these details and explain them thoroly.

For instance, plans calling for quaint, odd-shaped bay-windows that have never been seen before, all kinds of novelties that are new and untried, mean extra work, material and labor expense. Unless given very special attention, these items will often cause a definite loss to the contractor.

Setting Floor and Wall Tile

RECOMMENDED PRACTICE SHOWN IN DETAIL SHEET (PAGE 102)

BECAUSE of its easy cleaning qualities and range of colors for decorative work, tile has greatly increased in popularity as interior finish, especially in bathrooms and swimming pools. It is frequently used for borders, panels and inserts in exterior stucco and concrete construction. Naturally as a result of this development the progressive architect and contractor are interested in its general treatment and application.

Fundamentally, tile is divided into two classes, floor and wall. In the detail sheet on page 102 the standard methods for laying floor tile and setting wall tile are both shown very clearly. Perhaps a short resume of the methods of each will prove interesting.

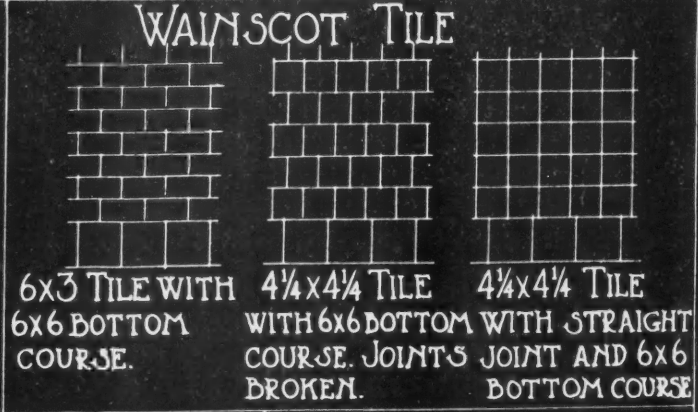
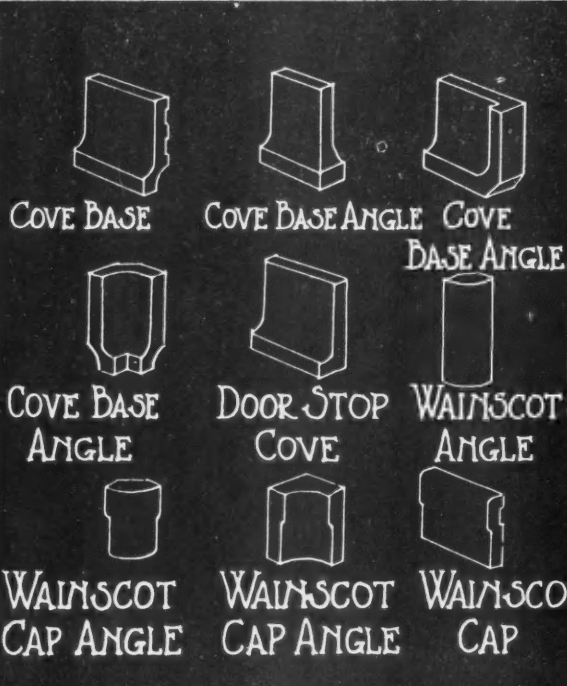
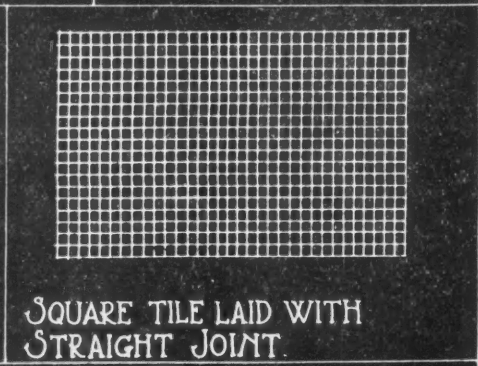
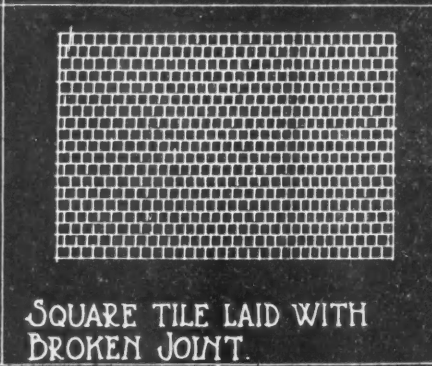
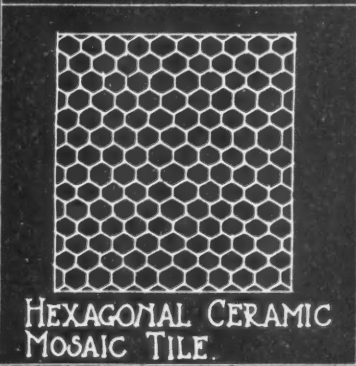
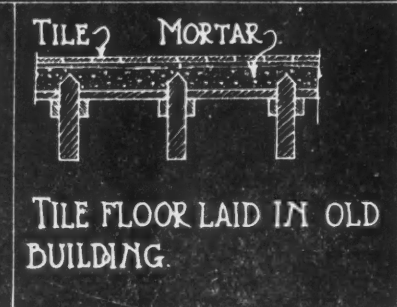
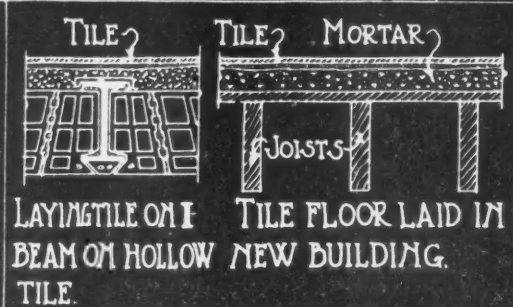
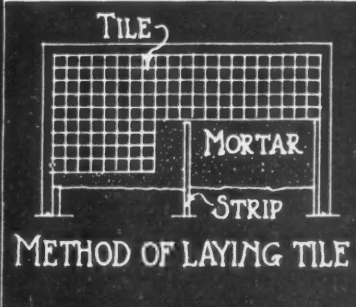
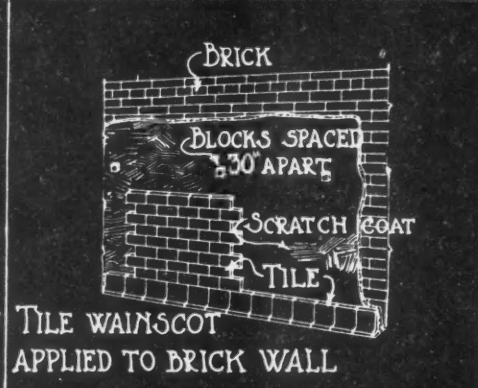
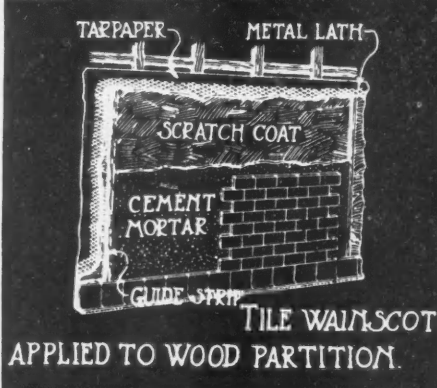
In laying floor tile a perfectly solid and level foundation free from spring or vibration is absolutely necessary. Tile should be laid on a concrete bed of not less than 2½ inch thickness (cinder concrete beds should not be less than 3½ inches), or a concrete bed of 1½ to 3 inches with a leveling coat of a thickness to complete 2½ inches on top, or a concrete bed of not less than 2½ inches laid in successive layers of about 1 inch each.

The surface of this bed should be uniformly rough and brought to within 1 inch of the finished floor line, leaving ½ inch for cement mortar setting bed, or according to the thickness of the tile used.

Screed strips are used as guides for leveling the mortar over as large a section of the floor as possible. The surface of the concrete or leveling coat is first saturated with water and dry cement sprinkled over to a depth of about 1/16 inch. With a trowel spread cement mortar between the strips along one end of the room as evenly as possible. All tile except vitreous, shall be thoroly soaked in clean water before laying, then placed upon and firmly pressed into the cement mortar and tamped with block and hammer about ⅓ inch or until exactly true and even with the finished floor line.

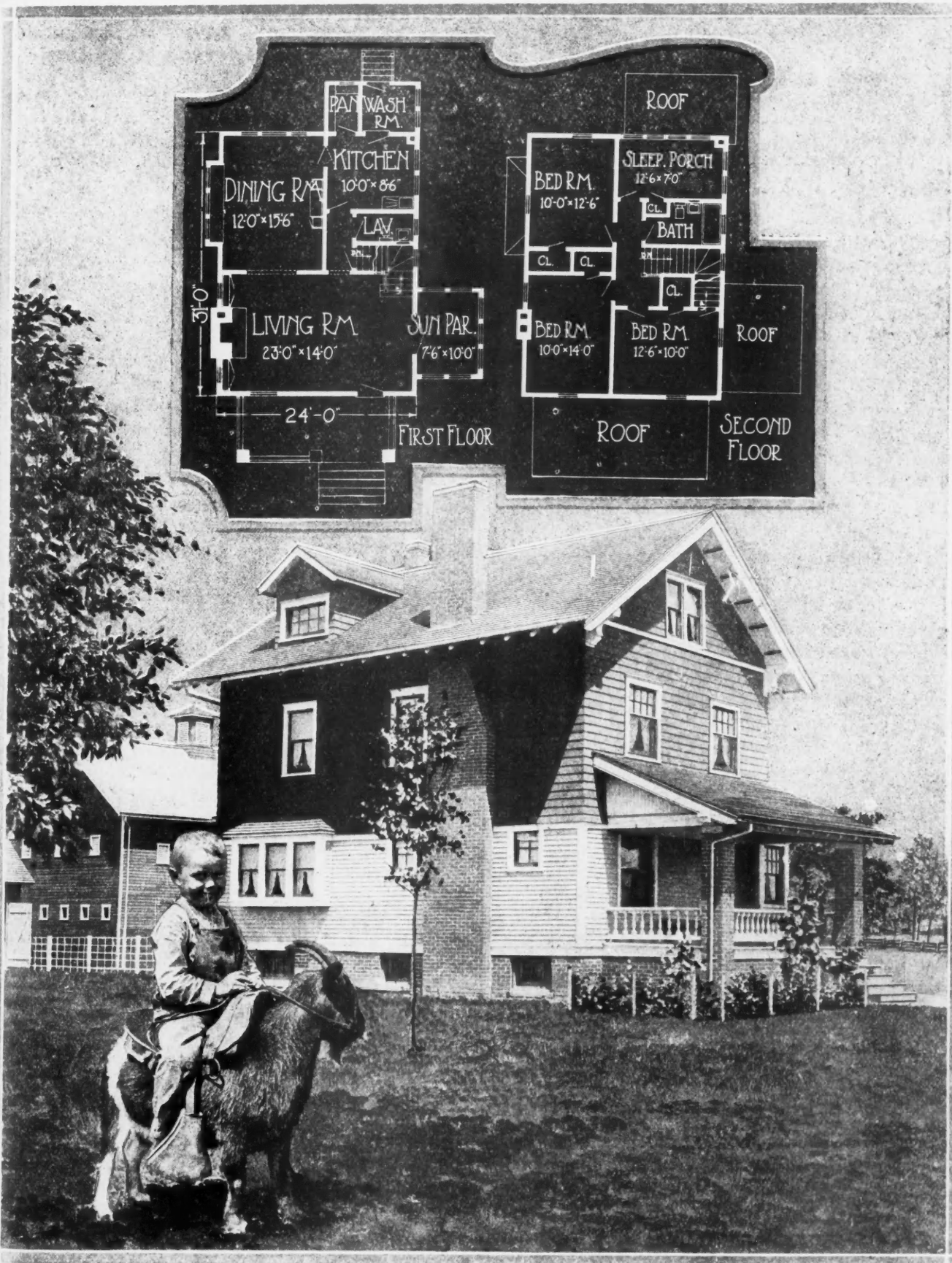
In laying ceramic mosaic tile the border is laid before the center. The inner edge of the border must be kept straight and all cutting for irregularities done along the outer edge. In laying sheets of ceramic tile on the mortar care must be taken to keep the joints between sheets the same general width as those between the mounted tile.

RECOMMENDED CONSTRUCTION



FLOOR & WALL TILE

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NO WONDER THE BOY SMILES. Next to the "Billy goat, which, of course, is the most important thing in his life just now, he lives in the house shown here. He doesn't even mind taking a bath because this house is equipped with a real tile bathroom, like the one shown on the detail sheet opposite. On the first floor are the living room, dining room, kitchen and sun parlor, while upstairs are three bedrooms and a sleeping porch. The extra lavatory on the first floor is a convenience more farm homes should have. That big brick chimney means a large, open fireplace in the living room. The foundation is brick with clapboard up to the second floor and shingles above. The raftered cornice is a feature that adds to the general attractiveness of the setting.

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Cost Plus vs. Lump Sum

ESTIMATING EXPERT EXPLAINS TWO METHODS AND ADVANTAGES

By George M. Petersen

HAVING seen numerous requests in the AMERICAN BUILDER'S pages for information relative to the "percentage" form of contract the writer will endeavor to explain the proper method of figuring this class of work.

The good old days, when contracting was about as safe as playing with nitro glycerine, are almost a thing of the past, especially so where the larger operations are concerned and it seems that at least the contractor is about to be placed on the same plane as that occupied by other merchants instead of being practically a gambler. Most of the larger jobs today are being awarded on either a "cost plus percentage" or a "fixed fee" form of contract instead of the old fashioned "lump sum" contract where the contractor took all of the chances and was lucky if he showed a fair profit.

Some of the larger contracting firms who can afford to have competent and capable estimators, up-to-the-minute plant and efficient organizations are still strongly in favor of the lump sum contract, but comparatively few of the large industrial concerns, who realize that the unsettled condition of the labor and material markets force the contractor to use a high factor of safety when figuring a job on this basis, will award a contract on the lump sum basis.

When contracts are awarded under the old form of contract, however, a unit price is usually given for each item of material and a rate per hour for each class of labor so that any increase in cost will be born by the owner instead of the contractor. In other words, the contractor bids on today's prices and the owner guarantees to pay any advances which may occur during the construction of the work. The owner also receives credit for any decreases which may occur but "decreases" are practically a minus quantity at the present time.

The "cost plus percentage" and the "fixed fee" form of contracts are really the most desirable to the owner for the reason that he is at liberty to make such changes in the building as he may desire without fear of getting an excessive bill of "extras." These forms of contract, especially the former, are also used to a large extent where the building is started weeks ahead of the time when the plans would be finished and ready to go out for bids and also on projects which are builded against time and upon which a contractor would have to figure his labor excessively high in order to cover himself for a great deal of overtime and other rush work which runs higher than ordinary.

It is not the writer's intention to go into the details of the "cost plus" contract as applied to large work



Place a Timekeeper on the Job Payroll so That the Detail Work Will Be Carried on the Job and Office Overhead Reduced. Otherwise the Cost Plus Contract on Average Jobs Will Not Pay.

because each large contractor figures this class of work in his own particular way, but the average small contractor knows little or nothing of this manner of doing work and it is for his information that this article is written.

Ten per cent is the average contractor's compensation on a "cost plus percentage" job; but, and this is the solution of the whole problem, the 10 per cent is NET PROFIT! Many contractors have gone ahead and taken a job at cost plus 10 per cent and then wondered what went wrong when the profit failed to materialize.

No contractor, who has a real organization, can afford to take a small contract for a straight 10 per cent because his overhead expense will take so much of the percentage that there will be nothing left for profit.

The proper system is to place a timekeeper on the job payroll so that the bulk of the detail work will be carried on the job and the office overhead reduced. A fixed sum per hour, usually from 8 to 10 cents, is then added to each man's rate of pay, from laborers to job superintendent, to carry the office overhead, the traveling or general superintendent for whom no direct charge is made, and other incidental expenses. The

owner also pays all premiums for compensation and liability insurance and then the contractor gets his 10 per cent upon the total payroll and material bills, including everything which enters into the construction of the building, whether purchased directly by the owner or not. The contractor must have his percentage upon the sub-contracts or even with the system outlined he will hardly be able to show a profit large enough to warrant his taking the job.

The proposition now resolves itself into this:

Ten cents per hour on labor.

Insurance.

Ten per cent on total completed cost of building.

There are cases where the owner requires the contractor to guarantee the maximum cost of the project and still do the work on the cost plus contract and the only solution to this problem is to get the guarantee high enough to be sure you are safe and then demand 50 per cent of all savings under the guarantee and agree to stand 50 per cent of all expenditures over that sum.

The fixed fee contract is one in which the contractor estimates the job, figures his profit and then agrees to erect the building for a fixed fee of so much money, which fee includes all overhead and profit.

How to Build With Terra Cotta

DETAIL SHEET (PAGE 107) SHOWS SPECIAL FITTING AND MORTAR PRACTICE REQUIRED

TERRA COTTA construction embodies a few principles that make it inherently different from other forms of building work. It is more or less dependent on the manufacturer who has to apply his knowledge of the mechanical processes involved in its makeup. To begin with the architect or builder draws up the plans specifying terra cotta for the facade or interior, as it may be, but the manufacturer, in his turn, draws up a working plan which provides allowances for terra cotta shrinkage.

All of the terra cotta is fitted at the factory. Specifications are sent in plenty of time as the terra cotta manufacturing process requires eight to ten weeks; unless stock terra cotta to suit the requirements can be obtained. If the contractor has little experience with that kind of work it is advisable to have a fitter on the job.

In laying terra cotta certain fundamental practice should be observed, as illustrated in the detail sheet. Common brick backing should be carefully scrutinized, especially the mortar. If the mortar is lumpy, if the cement is poor or contains too much plaster of paris, if the stand is dirty, or not enough cement is used, the mortar will admit moisture thru the joints, resulting in "popping out."

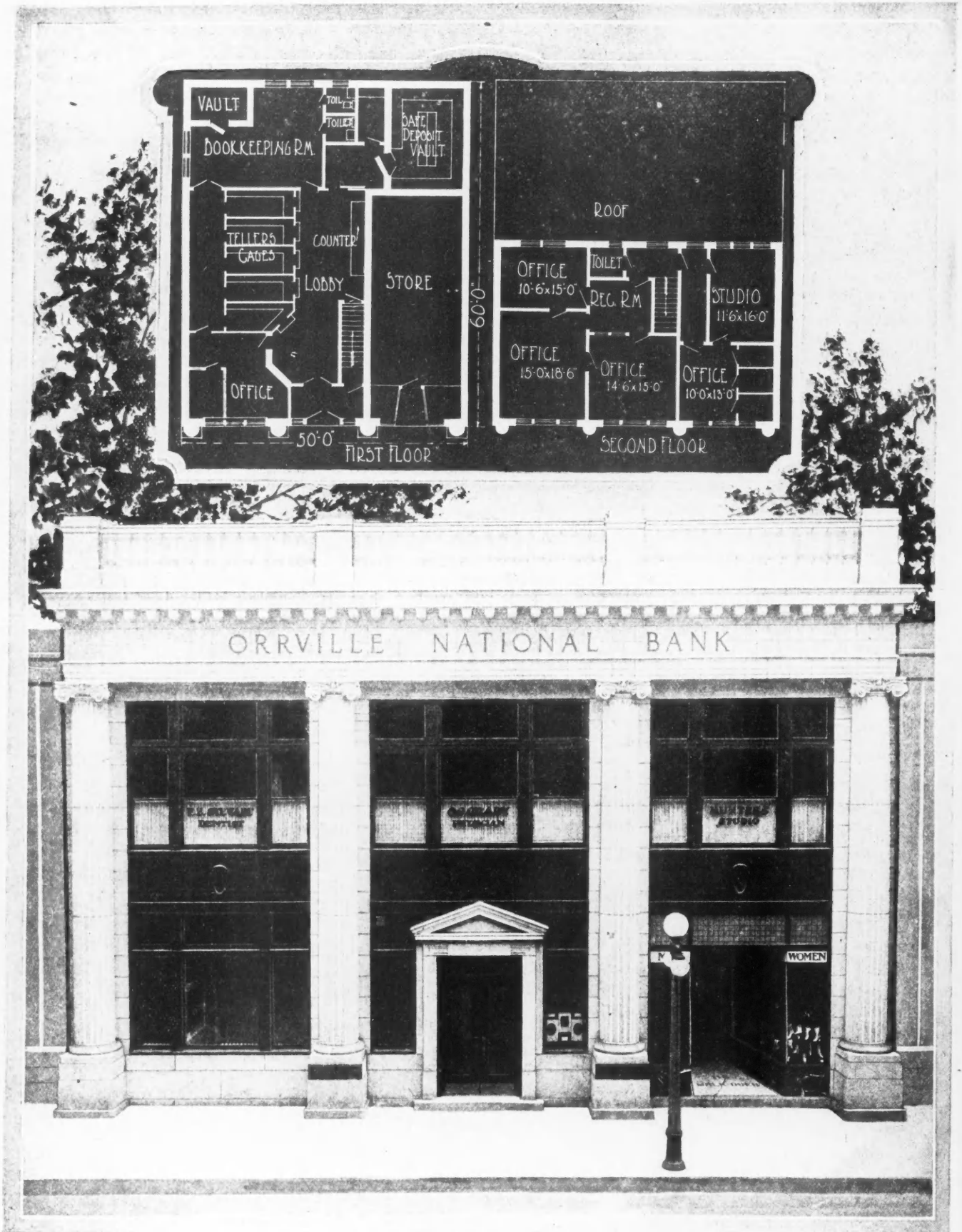
A good terra cotta mortar for common brick backing is made of 1 part lime, well slaked, 2 parts cement, and 8 parts sharp sand. When concrete filling and

backing is used, a good mixture is 1 part cement, 2 parts sand, and 5 parts stone.

All terra cotta, when there is imposed weight, should be filled with masonry at least as far out as the building line. In setting brick masons very often spread a thin bed joint and run the point of the trowel along the center, forcing the mortar to front and back. This method is not advisable in laying terra cotta because frequently the pieces have frogs or rebates on bed and cross joints, and if there is not enough mortar along the center, any imposed strain will have to be borne by the front and back of the piece alone.

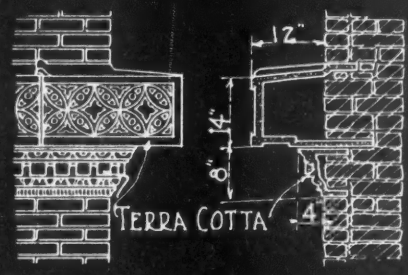
Cross joints should be solidly mortared. With cross joints, also, masons are liable to mortar the edges and neglect the center. All terra cotta joints should be treated the same way as stone joints: they should be amply filled and when the piece is tamped down the excess mortar that oozes out should be removed from the face.

A little care exercised during the construction of the building will make the job of cleaning down much easier than if the excess mortar is allowed to set. A common brush can be used to remove this mortar before it sets and thus cut down labor and time. The best cleaning materials for terra cotta are washing powder and a good abrasive soap, to which is very efficient added "elbow grease."

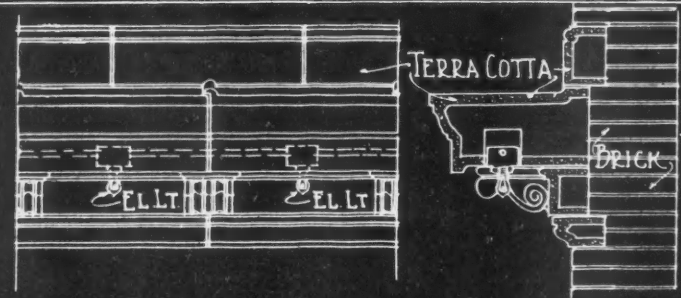


DIGNITY AND CONFIDENCE. These two qualities are reflected in the substantial terra cotta facade of this bank building. The appearance of a bank in large measure indicates its power and character and stimulates confidence in its clients. On the opposite page is a detail showing terra cotta construction. This building is brick with terra cotta finish and has been divided with an eye to efficiency. Extra income is added by the small space-efficient store on the right. On the upper floor which only extends half the length of the building are four offices, receiving room and studio. This half story arrangement allows room for skylights in the rear of the bank and solves the lighting problem by furnishing it from natural and not artificial sources.

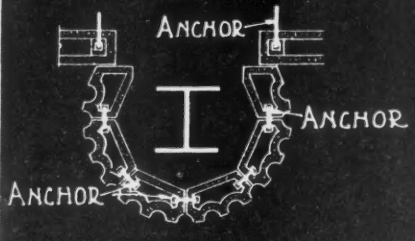
RECOMMENDED CONSTRUCTION



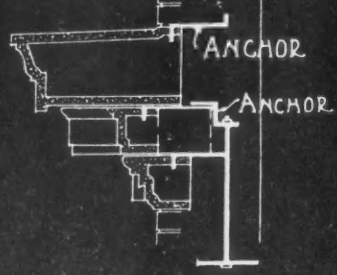
ELEVATION & SECTION OF ORNAMENTAL CORNICE



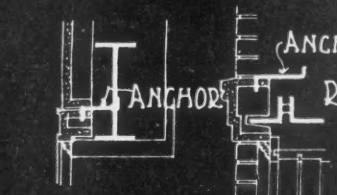
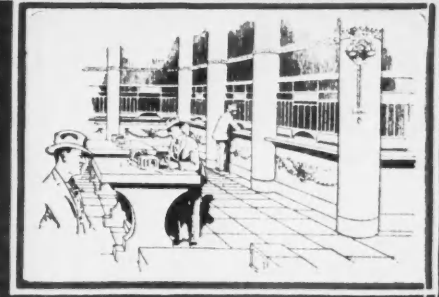
ELEVATION & SECTION OF CORNICE WITH ELECTRIC LIGHT OUTLETS



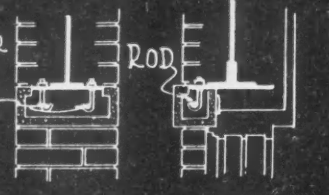
COLUMN



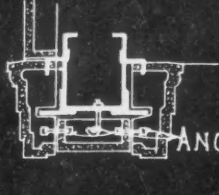
CORNICE



SUPPORTED LINTELS



SUSPENDED LINTELS

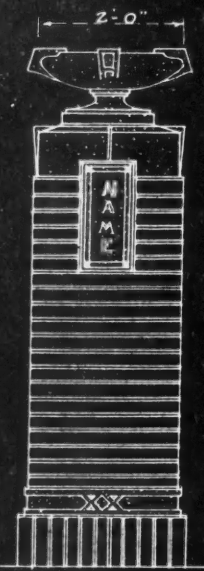


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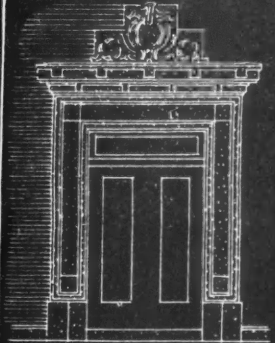


BELT COURSE

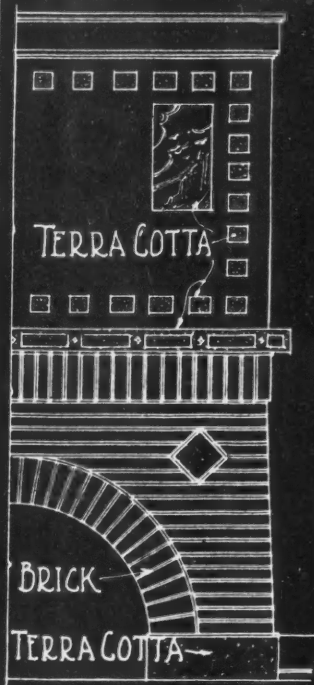
TERRA COTTA ANCHORAGE



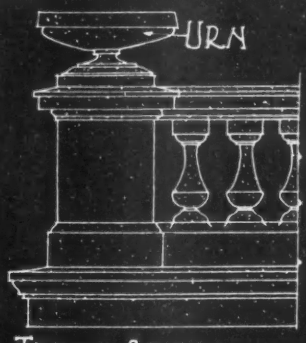
TERRA COTTA & BRICK POST



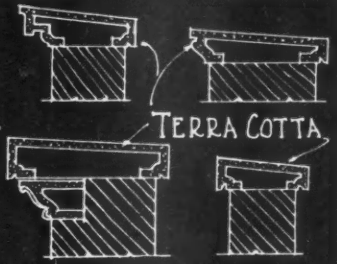
TERRA COTTA ENTRANCES



TERRA COTTA FIRE-PLACE



TERRA COTTA BALCONY RAIL



COPING

TERRA COTTA

Built-In Service Features in Modern Apartments

KITCHENETTE APARTMENTS HAVE MANY SPACE-SAVING DEVICES THAT ADD TO POPULARITY

TRADITION! In the eyes of the European architect and builder that word typifies something sacred, inviolable. But over here it is different. In the April article it was shown how the kitchenette apartment had smashed traditions. It has reduced the bedroom from an institution to an accessory by the use of the disappearing bed.

But the transition from time-worn traditions did not stop here. Up to the time of its conception it was decidedly poor form to eat in the kitchen. But again modern building efficiency has usurped the sacred ideas of good form by making eating in the kitchenette fashionable. By performing a double function this architectural feature has eliminated another room in the floor plan.

In the old arrangement this was not feasible or at least not desirable because the kitchen was a great mess of hot stoves, smelly utensils, and stifling atmosphere. Reducing the room to its logical size and providing attractive receptacles for food utensils and dishes and installing efficient cooking apparatus saves labor and

avoids dirt. Very often electricity is used thruout for cooking. Some kitchenette apartments are equipped entirely with electric ranges which fit in a tiny recess or are fitted to the door.

By eliminating flame, hot vitiated air, sooty utensils, dirt and ashes, some of the objectionable features of a normal kitchen are removed. The simplicity of operation, heat control, labor-saving features and saving in floor space have made them very popular in these servantless apartments.

Only the most efficient arrangement and use of built-in furniture and equipment has made this kitchenette attractive and practicable. In a building of this type the architect and contractor are called upon to design, provide for and install equipment which a few years ago would not have aroused their interest because it was not considered in their field. But every one of these service features and accessories from the electric vacuum cleaner to the space-saving closet are so vitally interwoven and dependent upon the actual construction of the building proper that he has to include them in his range of activity.

One of the most striking innovation of this compact type of apartment is the dressing closet, that mysterious little room where the bed seeks cover. It is shown in one of the illustrations. It is very neatly furnished with dresser and overhanging shelves for storing boxes and can be made even more efficient by the installation of a space-saving closet. The storage of clothes in a condensed apartment of this nature is quite a problem because the supply of clothing does not diminish in proportion to the space. People wear just as much clothes, and just as great a variety when they live in two rooms as in ten. The closet has to be designed to take care of both conditions, an abundance of clothes and scarcity of space. For this reason these space-saving closets have been found very suitable. As a rule, they are about 18 inches deep and 2 feet wide.

Take, for instance, one of the recent innovations in modern apartment buildings—the garbage incinerator. In a compact little apartment of the kind shown in the floor plans here, the problem of



Glengyle Apartments, Chicago. An Example of the Modern Tendency in Apartment Building Construction. It Contains Kitchenette Apartments with Concealed Beds and Other Built-In Features. It Was Designed by E. J. Ohrenstein & Hild, Architects, Chicago.



Typical Living Room in Glengyle Apartments. This Room Is Equipped with a Space-Saving Bed. In Fact, It Is Concealed Behind the Attractive Glass Door Which Opens Into the Dressing Closet, an Innovation of the Condensed Apartment.

crowding is a serious one and certain fundamental factors in healthful housing must be handled efficiently to prevent dangerous consequences. Garbage disposal is one of these.

The removal of garbage by the old can method was never very desirable and in the case of a compact apartment not healthful. Necessity again provided a solution.

Built-in garbage incinerators have been installed in kitchenette apartments with a great degree of success. One system which is used extensively, especially in buildings of this type, consists of hopper doors located in the chimney on the different floors, very often at the end of the service hallway. The garbage, which includes waste, bottles, tin cans, as well as food, is thrown down this chute to an incinerator below, where it is burned. The hopper arrangement prevents soot

and odors from escaping into the building. The same chimney used for the building heating plant and laundry plant is used in this system.

A building of this type is not very successful unless it supplies the wants and gives the service of exacting tenants who are willing to pay high rental. Altho the space has been reduced, the conveniences are by no means lessened; on the contrary they are increased. For that reason the need of built-in service features is obvious.

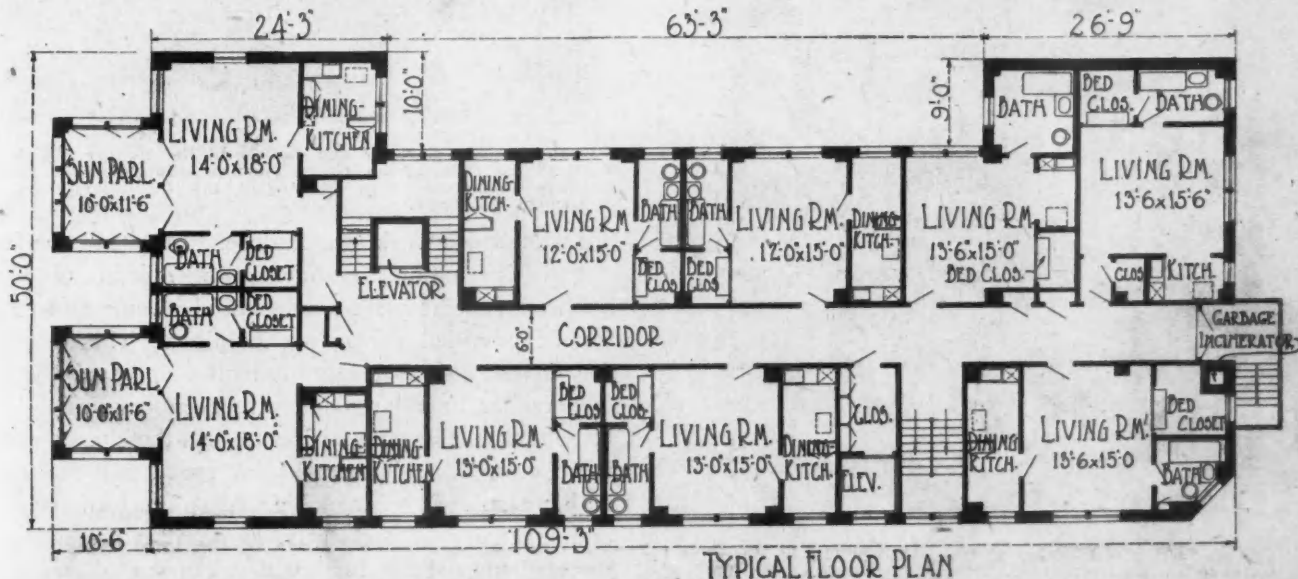
Very often there are no back doors to which delivery men have access. There is but one entrance to a suite and in other cases a long service hallway.

To make up for this package receivers are installed in the hallway wall to take care of the delivery of food-stuffs, parcels, and other commodities without inconvenience to the housekeeper.

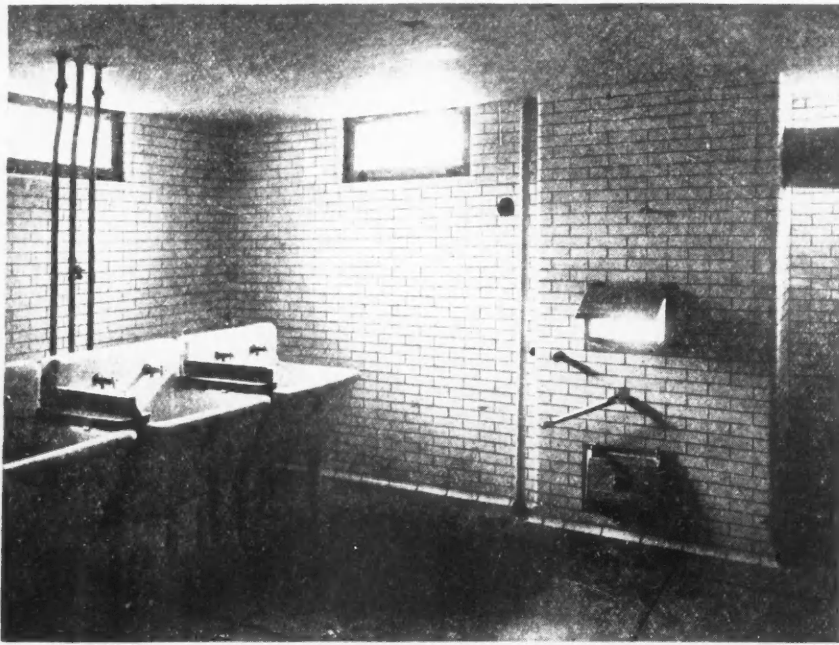
These package receivers have two doors, one opening out into the hallway, the other two into the kitchenette. In some cases they are fitted with automatic interlocking devices. When the delivery man deposits his bundle and turns the latch the outer door is



This Housekeeper Is Not Disturbed by the Delivery of Parcels. This Package Receiver Has Been Built in the Wall Between the Kitchenette and Service Hall.



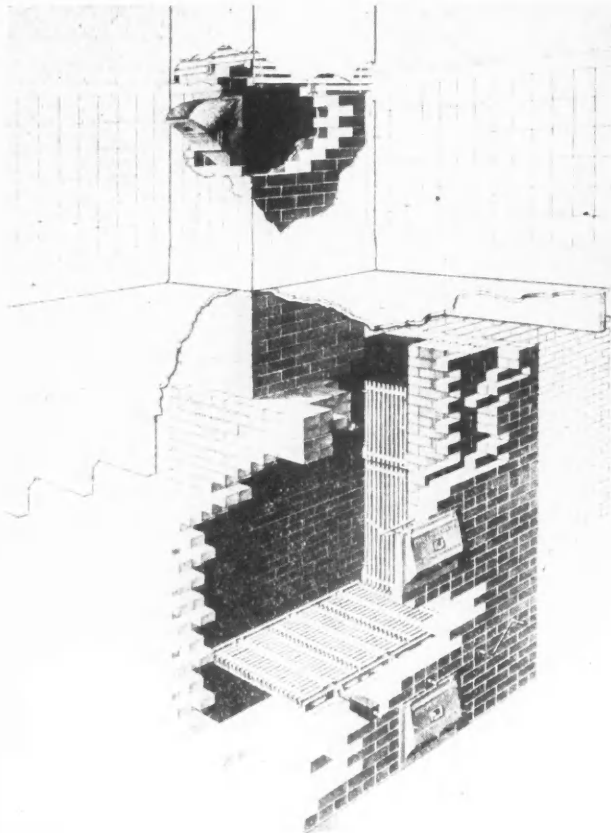
Floor Plan of Glengyle Apartment Building, Showing Arrangement of Apartments.



This Efficient Laundry Gives an Excellent Idea of the Trend in Apartment Building Construction. Note the Built-In Garbage Incinerator at Base of Chimney. The Tenant on the Upper Floor Throws the Bags in the Hopper and Forgets About It.

locked and the inner one automatically unlocked.

Convenience is emphasized in the installation of ice boxes. They are placed against the hall wall with an end door opening into the hall. As in the case of the package receiver, the ice man can place the ice in the box without disturbing the tenants. All of these features require the careful attention of the architect

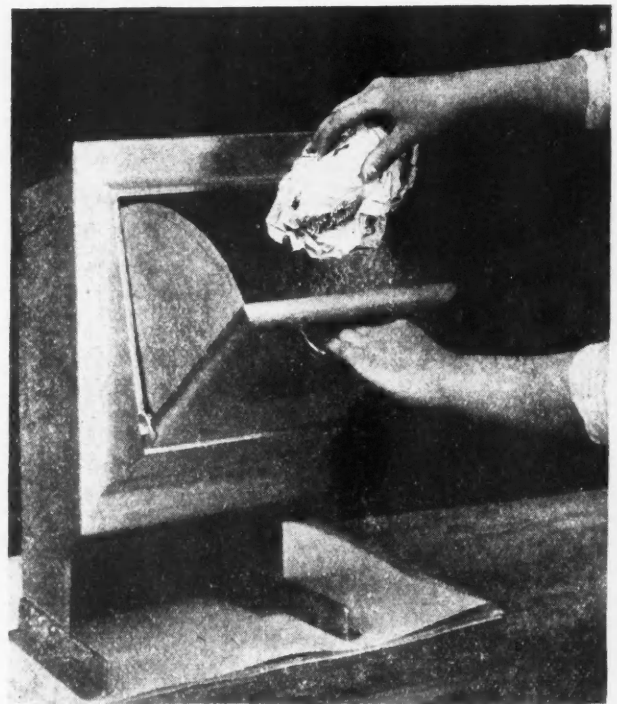


Cross-Section of Chimney at Base, Showing Grates Installed for Garbage Incinerator. The Garbage Falls Down Into This Fire Chamber and Is Consumed Without Smoke Bothering the Apartments Above.

and builder and must be incorporated in the plans with special specifications.

In some apartment buildings the built-in feature is emphasized even more than in the regulation kitchenette type. In these buildings the living room is the only room in the apartment and serves as lounging room, bedroom, kitchen and dining room. This is accomplished by the concealed bed and the steel kitchenette built in one of the side walls. Behind its doors are the kitchen range, sink, ice box and cupboards for food and utensils.

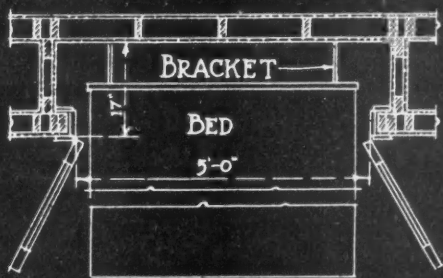
In this one room arrangement, the space-saving idea has been carried to the extreme, but the advantages offered by such a compact arrangement are sufficient to make it attractive to many people who do



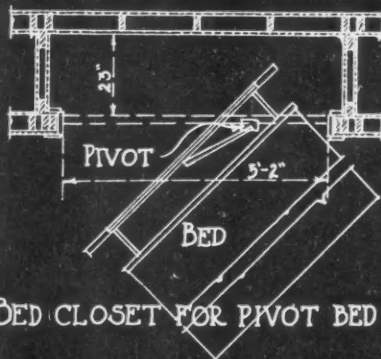
Depositing the Garbage and Refuse in the Hopper Which Is Built in the Chimney on Every Floor and Is Accessible. This Garbage Incinerator Has Eliminated the Unsanitary Can in Apartment Buildings.

not want much work in the house. The attractive features of it from an investment standpoint are obvious. Such apartments yield a substantial income and more can be provided for in one building. This demand for an attractive return on money invested by the owners has in a large measure been responsible for these new small unit apartments. As the cities become more crowded, the demand for space will naturally be increased. It is inevitable that so much of the skill and ingenuity of architects and contractors must be directed toward the further development of the great space-saving idea.

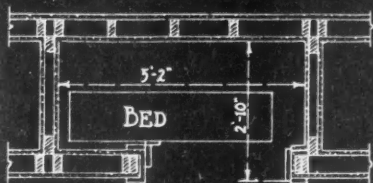
RECOMMENDED CONSTRUCTION



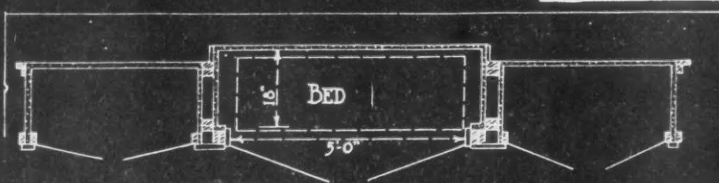
BED CLOSET FOR RECESS BED



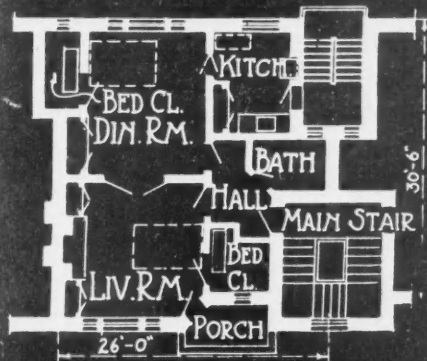
BED CLOSET FOR PIVOT BED



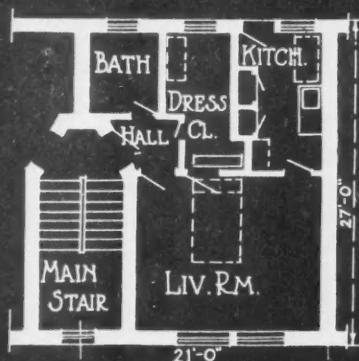
BED CLOSET FOR FULL SIZE BED



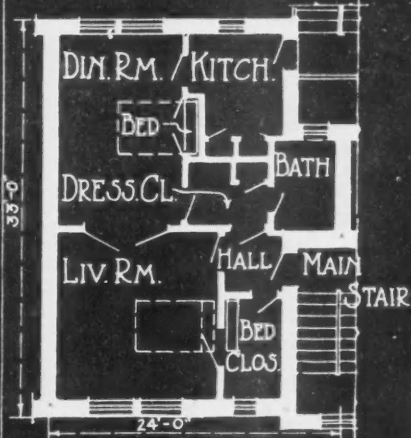
RECESS BED WITH BOOK-CASES OR WARDROBES



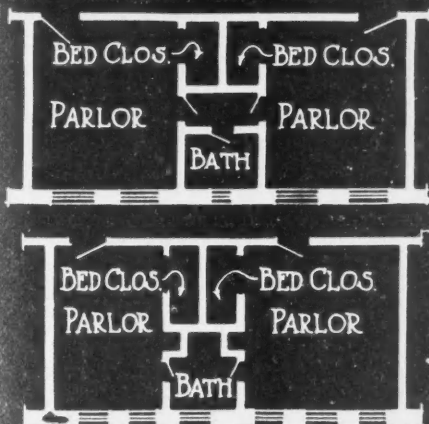
3 ROOM UNIT



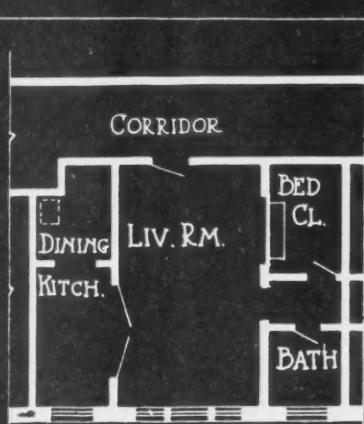
2 ROOM UNIT



3 ROOM UNIT



1 ROOM UNITS WITH CONNECTING BATH



2 ROOM UNIT



1 ROOM UNIT

SPACE SAVING BEDS

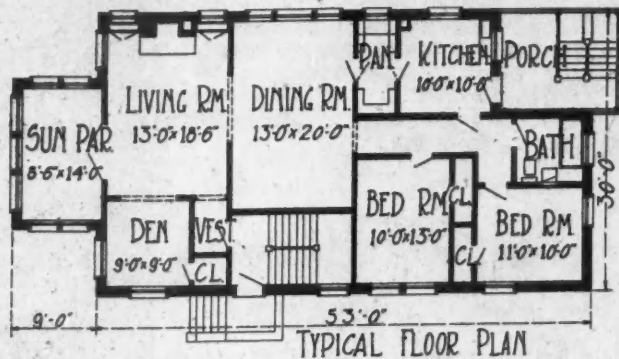
Design for Modern Three-Story Apartment

SUN PARLOR IS IMPORTANT FEATURE IN THIS WIDE LOT STRUCTURE

SUN parlors have become one of the most important features in modern apartment building construction. So insistent is the demand for this innovation on the part of prospective tenants that the builder and owner cannot wisely overlook it when drawing up the plans. By having a variety of types ready for instant application, he can be prepared for the extensive building program which is now on. Based on a simple fundamental principle, these sun parlors can be varied by arrangement of windows, style of roof, shape of floor and in many other ways.

A typical sun parlor is shown in this three-story apartment building. It has a wide window frontage which adds considerably to the light of the apartment.

The building is brick with terra cotta trim, built on a wide lot, being 30 feet wide exclusive of the entrance on the side. Leading up this entrance, which



Floor Plan of Three-Apartment Building.

is several feet above the sidewalk, is a heavy stone stairway surmounted by an equally massive brick balustrade with stone shelf. On the corner of the balustrade around the landing is a stone flower pot.

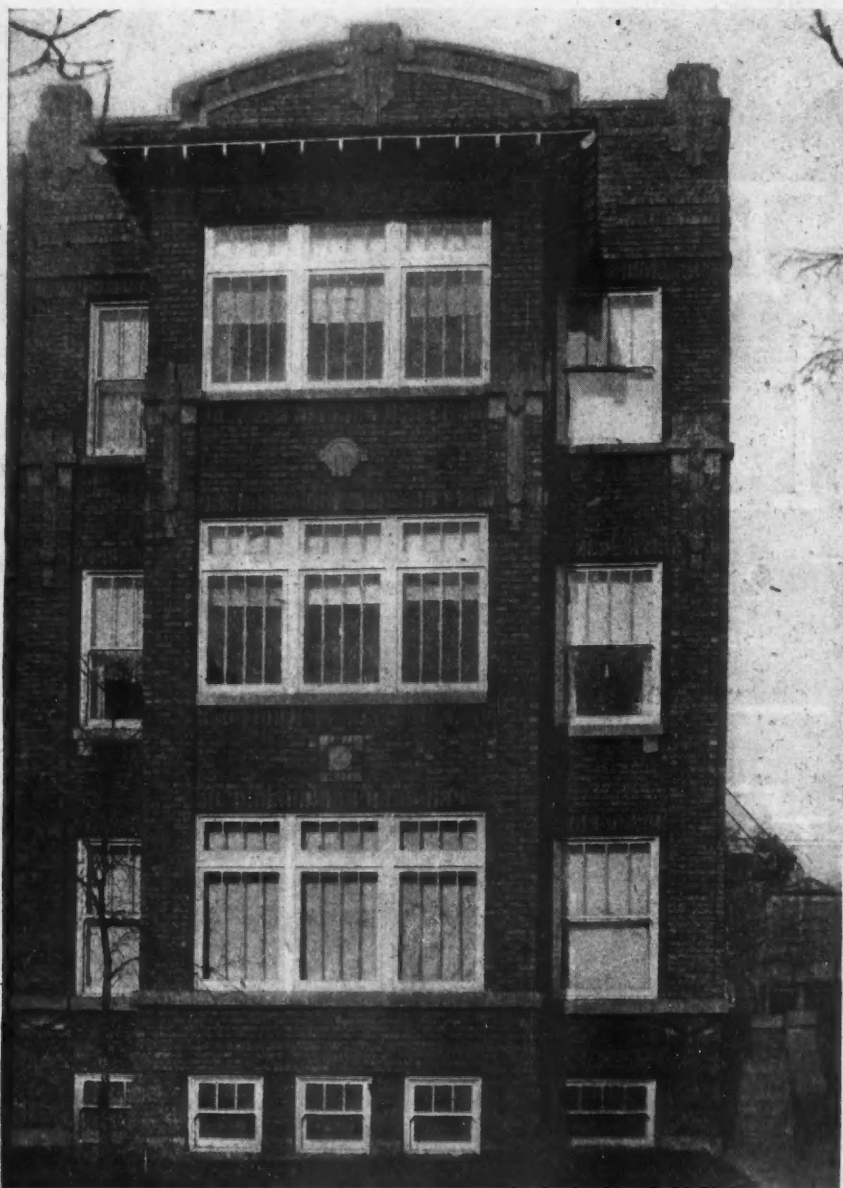
The entrance is covered by an artistic metal hood with electric light.

In the floor plan of the apartments the arrangement of the bedrooms and bath illustrate modern ideas of efficiency and comfort. They are grouped in one end of the house away from the day-time activities and other disturbing influences. By this arrangement part of the family may retire without being disturbed by noise from the other rooms.

The front end of the apartment is divided into a living room and den, which can be used as an emergency bedroom and is equipped with a clothes closet. The living room is 13 by 18 feet 6 inches and has the popular arrangement of fireplace and side wall bookcases. This fireplace can be fitted with artificial gas logs or electric heaters.

The dining room opens directly off the living room. It is 13 by 20 feet. To reach the kitchen it is necessary to pass thru a hall which extends to the rear of the house and gives access to the bedrooms and bath. The housewife will find the location of the pantry opening out on the dining room a handy one. It opens into the kitchen by means of a second door.

With the wide window frontage afforded by the sun parlor and plenty of windows on both sides these apartments are exceptionally well lighted and naturally bright and cheery.



Sun Parlors Are an Essential Feature in This Three-Apartment Building with Attractive Side Entrance. The Facade Has Been Well Executed by the Use of Face Brick and Terra Cotta Trim.

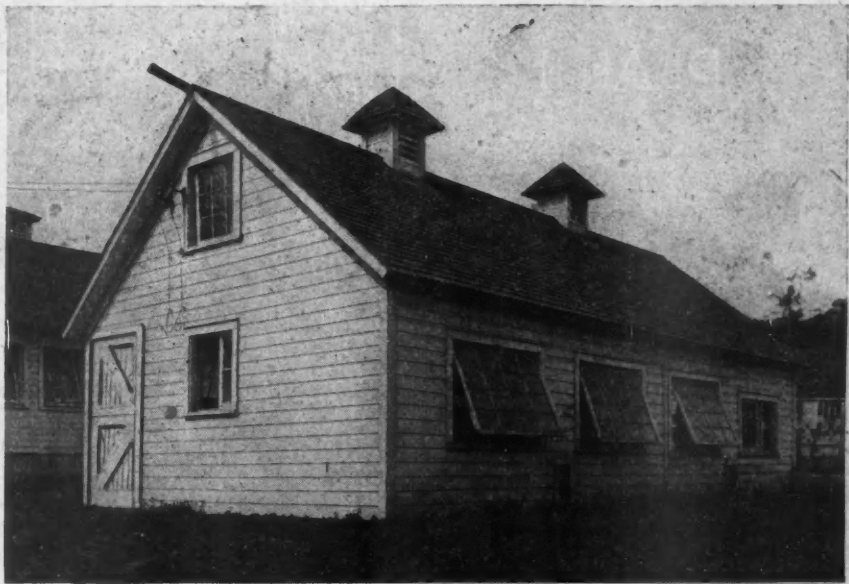
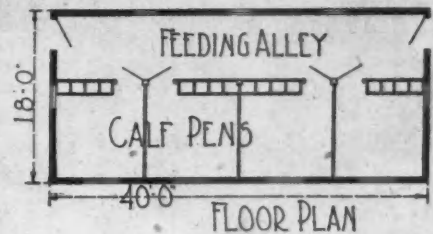
Design for Well-Ventilated Calf Barn

WELL-RAISED, contented calves develop into good producing cows. The care during their youth determines to a large extent the amount of food they will produce when they reach the age when production begins. The building shown here is designed for the primary purpose of helping to raise calves to be real, efficient cows. It is not a surplus building but a necessary one, and moreover, an economical one, as a close study of the construction will reveal.

Forty feet long and 18 feet wide, it is large enough to hold a fairly large number of calves. The four pens are 10 feet wide, well lighted and aired by individual windows. Ventilation cannot be too emphatically emphasized in discussing the building equipment for farm animals. Plenty of fresh air develops active, robust animals, and activity and health naturally mean greater productive qualities. So, in a building of this kind, especially in one for growing calves, this important feature must be provided for.

Each pen opens out on the feeding alley, which extends the length of the barn. The alley is entered at either end and also well ventilated by three windows placed out of line with the windows on the opposite side to pro-

tect against extreme draughts. Further ventilation is provided by two cupolas on the top of the roof.



The Calves in This Barn Get Plenty of Fresh Air and as a Result are Healthy and Active. Well-Ventilated Stock Barns Increase Food Production.

The barn is of frame clapboard construction with a gable shingled roof. It forms a very important and efficient unit in the farm building plan.

Installation of Corn Crib Elevator

DETAIL ON PAGE 114 SHOWS LABOR-SAVING MACHINERY WHICH IS HELPING TO MAKE THE FARM MORE ATTRACTIVE

THE farmer of today is confronted with a serious problem in the shortage of help. He cannot very well afford the time and labor needed for the task of scooping corn by the "hand method" into his corn crib; not when labor is so scarce and expensive. For that reason he is giving contracts for high corn cribs equipped with one of the modern types of cup elevators. The farmer in the corn belt who is still scooping up his harvest into an old fashioned corn crib is certainly an attractive prospect for the contractor who knows the farm building business.

If he is not acquainted with the latest methods of the farm, and the most modern machinery, he is marking time while his progressive brother is getting the business. In constructing a modern corn crib with the elevator, there are several important factors that the contractor must know and be able to tell his farmer client about.

Take the cupola in the first place. Unless it is taken into consideration in the figuring of costs, the farmer may have to pay more than is really necessary. For that reason the contractor who is designing the corn crib must be acquainted with the size and details of

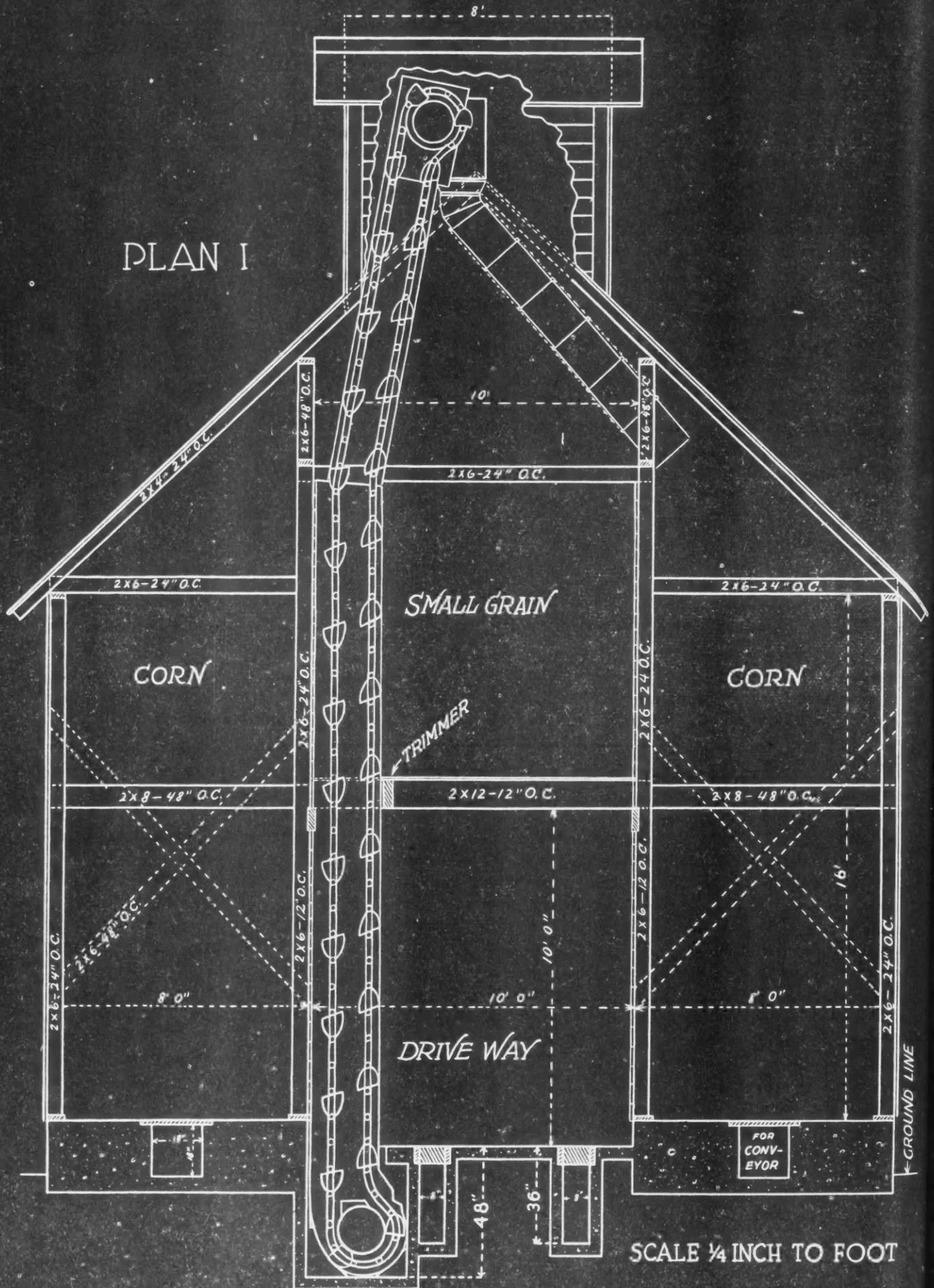
the elevator which is to be installed. He can base his cupola plans according, and provide also for the pit arrangement if there is one. On the next page is a detail sheet showing one of the modern types of corn crib elevators installed.

Furthermore the actual construction of the corn crib is very important. In this modern type the small grain is stored in bins up above the driveway. As a rule these bins must carry a heavy load. Naturally, provision must be made for this condition in the choice of supports, construction of walls, and size of joists. Special attention must be paid to the supports of the grain bin which is located above the side bins and directly above the driveway.

The farmer who is having the corn crib built has a wide variety of elevators to pick from; consequently the contractor, if he is wise, is acquainted with all of the types.

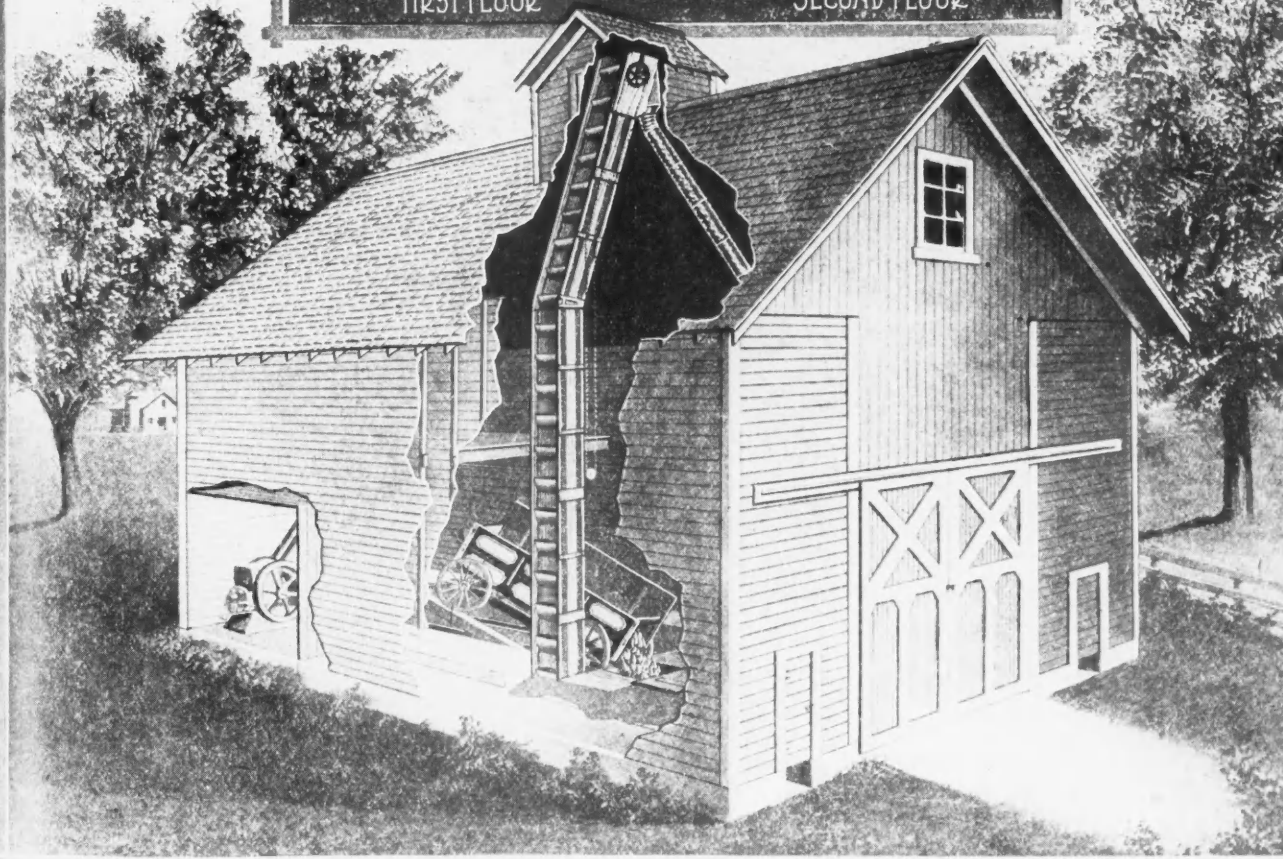
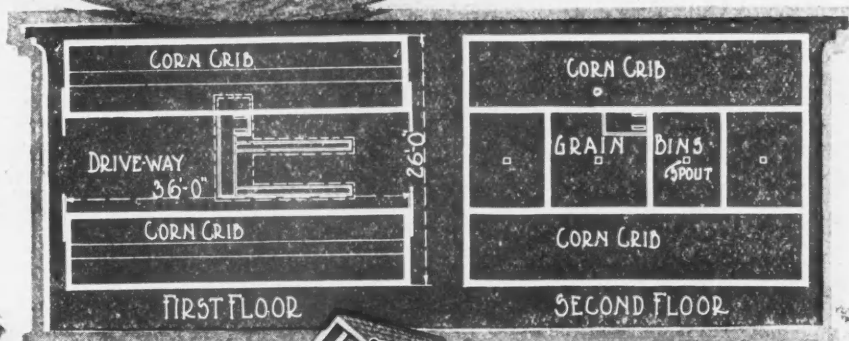
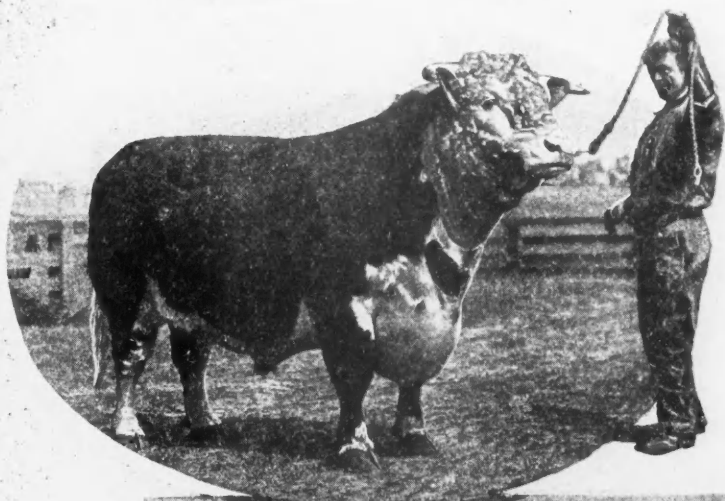
The construction of a corn crib is a job that requires thought and definite technical knowledge on the part of the contractor, even more so than on the part of the farmer; for the bill rendered depends largely on the builder's knowledge.

PLAN I



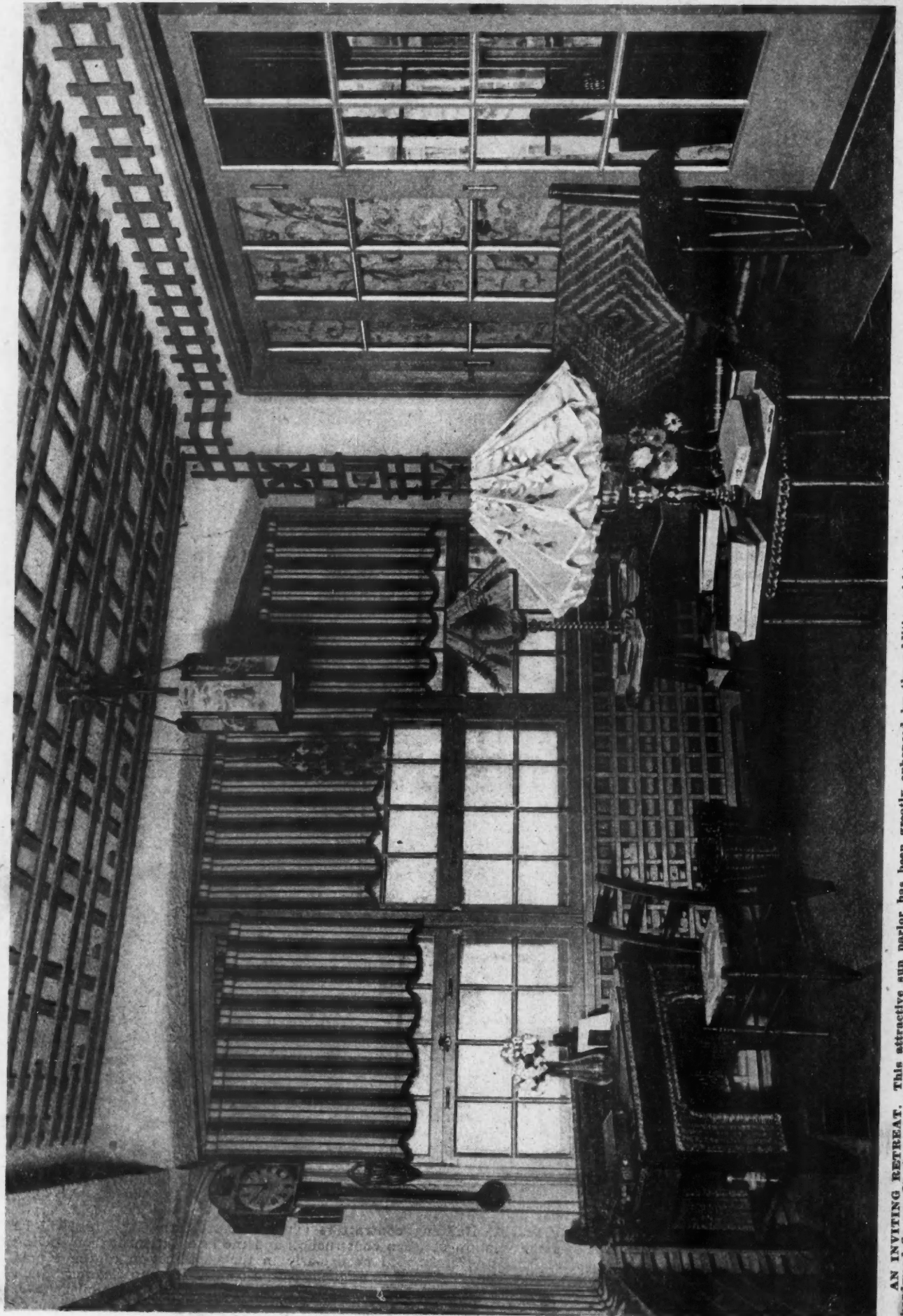
SCALE 1/4 INCH TO FOOT

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MODERN CORN CRIB WITH CUP ELEVATOR. Building contractors who construct farm buildings will be interested in this picture because it shows the relation between construction and the installation of labor-saving machinery which progressive farmers are using. This is demonstrated particularly in the construction of the cupola and the driveway in which the pit has been installed. They have been designed to take care of the cup elevator which carries the grain from the pit to the bins above. The floor plans give a clear idea of the arrangement of the bins above. On the opposite page is a detail sheet showing the installation of the elevator. "Bonnie J.," the bull in the upper part of the picture, was the Grand Champion Hereford in the 1919 International Livestock Show.

GROUND LINE



AN INVITING RETREAT. This attractive sun parlor has been greatly enhanced by the addition of birch lattice work on the stuccoed ceiling and side walls below the window sills and hardwood floors. It gives the effect of a cool, comfortable summer nook. The divided window panes and large French doors all directly contribute to the cheeriness of the parlor by providing plenty of sunlight which is most essential. In the furnishing, careful attention has been paid to harmony between furniture and actual construction details. All in all, it makes a solarium that is special.

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SINCE 190 price of unchange BUILDER was \$ year.

Now, however price to \$3 a year. fair to the many th helped us make the give the reasons why t must be made.

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DESIGN OF SAFE CONSTRUCTION

By Charles W. Leigh

Associate Professor of Mechanics, Armour Institute of Technology

Strength and Stiffness of Beams

ARTICLE 4 OF AN EXTENSIVE SERIES ON STRENGTH OF MATERIALS

IN the two previous articles of this series, methods were given for determining the load that a beam would carry safely. In every case it was shown that the load depended on the way in which the ends of the beam were supported, and also on the manner in which the loads were placed on the beam. The strength of a beam depends on the size of the load that it will carry safely. The greater the load the stronger the beam.

When the beam is a rectangle in cross-section, the formula for bending moment is

$$B. M. = \frac{P \times b \times h^2}{6}$$

If the cross-section is 2 by 8 inches, $b = 2$, $h = 8$ and $p = 1,000$ pounds per square inch. Then

$$B. M. = \frac{1,000 \times 2 \times 8 \times 8}{6} = 21,333 \text{ inch pounds.}$$

But for a beam with a uniformly distributed load such as a floor, the bending moment is $\frac{1}{8}WL$ where W is the total load carried and L is the length in inches. Suppose the beam is 12 feet long (Fig. 1), $L = 12 \times 12 = 144$ inches.

$$\frac{1}{8}W \times 144 = 21,333$$

$$W = \frac{21,333}{18} = 1,185 \text{ pounds}$$

That is, 1,185 pounds indicates the strength of the beam. Now, if the breadth be increased by 2 inches, the section becomes 4 by 8 inches.

$$B. M. = \frac{1,000 \times 4 \times 8 \times 8}{6} = 42,667 \text{ inch pounds.}$$

$$\frac{1}{8}W \times 144 = 42,667$$

$$W = 2,370 \text{ pounds.}$$

By doubling the breadth, the strength was doubled. Suppose the breadth be 2 inches while the depth is increased to 12 inches. The section is 2 by 12 inches.

$$B. M. = \frac{1,000 \times 2 \times 12 \times 12}{6} = 48,000 \text{ inch pounds.}$$

$$\frac{1}{8}W \times 144 = 48,000$$

$$W = 2,667 \text{ pounds.}$$

By increasing the depth 4 inches the load or strength was more than doubled. Now a $4 \times 8 = 32$ square inches, while $2 \times 12 = 24$ square inches.

This problem shows that the strength can be increased much faster by increasing the depth than by increasing the breadth. Consequently it is cheaper to make a stronger beam by increasing the depth, as it takes a smaller timber than would have been required had the breadth been changed to increase the strength

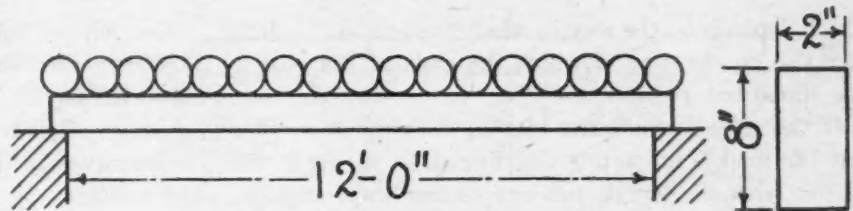


Fig. 1. A Beam with a Uniformly Distributed Load.

by an equal amount.

In the case of I-beams, the strength depends upon the section modulus. From the formula for bending moment, derived in the April article, viz.:

$$B. M. = p \times \text{Section Modulus,}$$

shows that the strength of a beam of given length depends upon the section modulus. Consequently the designer must refer to a hand book and choose a beam of given section modulus for any required strength.

When a beam is loaded it sags or deflects. The stiffness of a beam depends on the amount of sag. The less the deflection the stiffer the beam. In many types of structures the builder does not care about the sag, but in the floor beams of a house, for example, the deflection must be limited or the plastering will be cracked. The usual practice is to limit the sag to $\frac{1}{30}$ of an inch to each foot of length of beam or what amounts to the same thing, $\frac{1}{360}$ of the entire length of the beam in inches.

Now, a beam may be strong enough to carry a given load, but the deflection exceeds the safe amount. In this case a stiffer beam must be used.

The derivation of the formulas for deflection are long and complicated, and no attempt will be made to show how they are obtained. If any reader is interested in the subject, he is referred to works on Strength of Materials or Applied Mechanics.

The formula for deflection is as follows:

$$d = \frac{k WL^3}{EI} \dots \dots \dots I$$

Where d is the deflection in inches, W the total load,

L the length of the beam in inches, I the moment of inertia of the cross-section as previously explained, E the modulus of elasticity, values for which may be gotten from hand books. The value of E depends on the kind of materials as well as the quality, and is expressed in pounds per square inch. The only values used in this article are for structural steel, E = 29,000,000 pounds per square inch, and for wood, E = 1,200,000 pounds per square inch. K is a constant,

and since the beam is not stressed that high, a 2 by 8 is amply strong.

For the deflection $W = 800$, $L = 180$, $E = 1,200,000$ and

$$I = \frac{bh^3}{12} = \frac{2 \times 8 \times 8 \times 8}{12} = 85.3$$

Substituting in Formula II:

$$d = \frac{5 \times 800 \times 180 \times 180 \times 180}{384 \times 1,200,000 \times 85.3}$$

Cancel five zeros from the figures above and below the line, also such other numbers as you can, multiply and divide as indicated, and there results

$$d = .6 \text{ inches (approximately).}$$

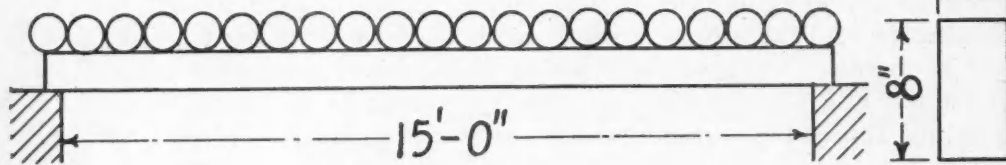


Fig. 2. Uniformly Distributed Load.

which depends on the way in which the beam is loaded, and also on the way in which the ends of the beams are supported.

If the ends of the beam rest on the support freely, and the load is uniformly distributed, as in Fig 1, no matter what the length and size of the beam may be, K is always 5/384. Formula I then becomes

$$d = 5/384 \frac{WL^3}{EI} \dots \dots \dots \text{II}$$

when d is the greatest value of the deflection which occurs at the middle of the beam.

Suppose, for example, that a wooden beam 2 by 8 inches is 15 feet long and carries a uniformly distributed load of 800 pounds (Fig. 2). To find if the timber is strong enough and at the same time stiff enough: Now $\frac{1}{8}WL = \frac{p \times b \times h^2}{6}$

Where $W = 800$, $L = 15 \times 12 = 180$, $b = 2$, $h = 8$ and p is the fibre stress developed. Substituting these values in the formula

$$p = \frac{\frac{1}{8} \times 800 \times 180 \times 6}{2 \times 8 \times 8} = \frac{16,000}{128} = 844 \text{ pounds}$$

But a safe fibre stress for timber is 1,000 pounds

Now, by the rule that the deflection must not exceed 1/360 of the length in inches, it is seen that the allowable sag is

$$1/360 \times 180 = \frac{1}{2} = .5 \text{ inches.}$$

Consequently the beam while strong enough is not stiff enough. If the load did not all come on the floor at once which this beam supports, the 2 by 8-inch might do, but safety would require a larger beam.

Try a 2 by 10-inch of the same length.

$$I = 1/12 bh^3 = 1/12 \times 2 \times 10 \times 10 \times 10 = 166\frac{2}{3}$$

Since every letter has the same value as for the 2 by 8-inch except I, and since 166 2/3 is roughly twice 85 1/2, the deflection for the 2 by 10-inch will be approximately one-half that for the 2 by 8-inch, or d = .3 inch. This is seen to be true because I is below the line in the fraction, and since the divisor in the second case is twice that in the first case, the result in the second will be one-half of the first. Since .3 inch is less than .5 inch, the 2 by 10-inch will be stiff enough. Also if a 2 by 8-inch is strong enough to hold 800 pounds, a 2 by 10-inch will also hold the load safely.

Suppose the problem is to select an I-beam 15 feet long, both strong and stiff enough to carry a section of floor 8 feet wide on which there is a uniform load of 100 pounds per square foot of surface (Fig. 3). The area of the floor is $8 \times 15 = 120$ square feet. Then the uniform load on the beam is $W = 120 \times 100 \text{ pounds} = 12,000 \text{ pounds.}$

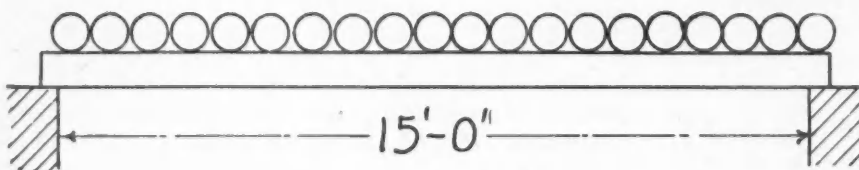


Fig. 3. Side View of Beam and Load.

Now $\frac{1}{8}WL = p \times \text{Section Modulus.}$

Here $L = 15 \times 12 = 180$ inches, and $p = 16,000$ pounds per square inch.

Substituting these values in the formula:

$$\frac{1}{8} \times 12,000 \times 180 = 16,000 \text{ S. M.}$$

$$\therefore \text{S. M.} = 17 \text{ (nearly).}$$

From a hand book or the table of values given in the April number, the I-beam, 9 inches-21 pounds,

8 FT. OF FLOOR

End View.

will have a large enough Section Modulus.

For the deflection of a steel beam, $L = 180$, $W = 12,000$, $E = 29,000,000$ and I from the table, 84.9. Substituting in Formula II:

$$d = \frac{5 \times 12,000 \times 180 \times 180 \times 180}{384 \times 29,000,000 \times 84.9}$$

The six zeros above and below the line cancel and

$$d = \frac{5 \times 12 \times 18 \times 18 \times 18}{384 \times 29 \times 84.9} = .37 \text{ inch (nearly).}$$

The allowable deflection is $1/360 \times 15 \times 12 = .5$ inch. Since the beam sags .37 inch and is less than .5 inch it is both strong and stiff enough.

When the load on a simple beam or a beam freely supported at the end is concentrated at the center of the beam, the K of Formula II becomes $1/48$, or

$$d = \frac{WL^3}{48EI} \dots \dots \dots \text{III}$$

Take a wooden beam 4 by 10 inch of length 12 feet. To find the sag when a concentrated load of 1,000 pounds is placed at the center (Fig. 4)

$$I = 1/12 bh^3 = \frac{4 \times 10 \times 10 \times 10}{12} = 333.3$$

$W = 1,000$, $L = 12 \times 12 = 144$, and $E = 1,200,000$. Substituting in Formula III:

$$d = \frac{1,000 \times 144 \times 144 \times 144}{48 \times 1,200,000 \times 333} = .16 \text{ inch.}$$

Therefore the beam is stiff enough.

To determine the strength of the beam we use

$$\text{Bending moment} = P \times \frac{bh^2}{6}$$

For a simple beam with a concentrated load at the center, bending moment =

$$\frac{1}{4}WL = \frac{1,000 \times 12 \times 12}{4} = 36,000 \text{ inch pounds.}$$

$$\therefore 36,000 = \frac{p \times 4 \times 10 \times 10}{6}$$

$$p = 540 \text{ pounds.}$$

But a safe stress is 1,000 pounds, consequently the beam has sufficient strength.

When a beam has both a concentrated load and a uniformly distributed load, the total deflection is obtained by calculating the deflection, due to each load separately and adding the results. Such a case arises when floor beams support a uniform floor load, and a heavy piece of machinery. The sag due to the machine is greatest when the load is at the center. Then if the beam is stiff enough with the machine on the center of the beam, it will be safe in any position.

Take, for example, wooden floor beams 6 by 12 inches, 15 feet long, spaced 2 feet from center to center, supporting a uniform floor load of 50 pounds per square foot, and a machine weighing 800 pounds. To find the deflection on any beam with this machine at the center of the member:

The floor area carried by a beam is $2 \times 15 = 30$ square feet. Then the load is $30 \times 50 = 1,500$ pounds = W , $L = 12 \times 15 = 180$ inches.

$E = 1,200,000$ and

$$I = 1/12 bh^3 = \frac{6 \times 12 \times 12 \times 12}{12} = 864$$

Substituting in Formula II for distributed load:

$$d = \frac{5 \times 1,500 \times 180 \times 180 \times 180}{384 \times 1,200,000 \times 864}$$

By cancelling the five zeros:

$$d = \frac{5 \times 15 \times 18 \times 18 \times 18}{384 \times 12 \times 864} = .11 \text{ inch.}$$

For the sag due to the load of 800 pounds = W , substitute in Formula III:

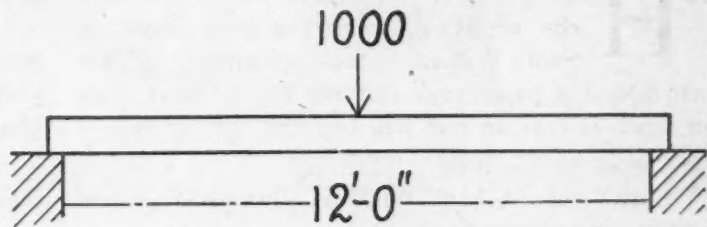


Fig. 4. Simple Beam Concentrated Load.

$$d = \frac{800 \times 180 \times 180 \times 180}{48 \times 1,200,000 \times 864}, \text{ or}$$

$$d = \frac{8 \times 18 \times 18 \times 18}{48 \times 12 \times 864} = .1 \text{ pound inch (nearly).}$$

Then the total deflection $d = .11 \times .1 = .21$ inch.

The safe deflection is $1/360 \times 180 = .5$. The beam is sufficiently stiff to carry the load.

The bending moment for the distributed load is $\frac{1}{8}WL = \frac{1}{8} \times 1,500 \times 180 = 33,750$ inch pounds.

The bending moment for the concentrated load is $\frac{1}{4}WL = \frac{1}{4} \times 800 \times 180 = 36,000$ inch pounds.

The total bending moment is $33,750 + 36,000 = 69,750$ inch pounds, but bending moment = $p \times$ Section Modulus, or

$$69,750 = p \times \frac{bh^2}{6}$$

$$69,750 = p \times \frac{6 \times 12 \times 12}{6} = 144p$$

$$P = 485 \text{ pounds.}$$

But 1,000 pounds is a safe bending stress. Therefore the 6 by 12-inch beams are safe, both in strength and stiffness.

N the storage of cement in bags, pile the packages in such a manner as to prevent the bags from touching the walls or ceilings. In the event of frost forming on these surfaces it will not be communicated to the cement by actual contact.

IT has been pointed out that the United States has been at war on an average of once in 20 years since the Constitution was adopted, and that the object of these wars has been, in the last analysis, to preserve the home.



Fred Beard says:

People Want Quality in Their Homes and Are Ready to Pay for It

"HERE, Sam, is an explanation of the high cost of living," remarked Fred Beard to Sam Williams, the contractor. "This article in the paper says that the reason meat costs so much is that no one will buy the cheaper cuts—everybody wants 'quality' nowadays."

"Sure," replied Sam Williams, "everybody wants quality, and always has wanted it. The only reason everybody hasn't had it is that everybody didn't have money enough to buy it. Things have changed, tho. High wages are introducing a lot of people to food and clothes and automobiles that they never before were acquainted with. You will notice, Fred, that I didn't say they could 'afford' them. That's another thing."

"Are you applying your ideas about food and clothing and automobiles to the homes you are building?" inquired Fred Beard. "I mean, are you recommending quality of materials and quality of equipment to your customers when you are discussing what type of electric fixtures, or what kind of heating plant, or any other features of a home, will be installed?"

"I certainly am, but I am having hard work selling them quality, when all these fellows who sell home equipment are cutting prices, and you know a man gets just about what he pays for."

"Why," continued the contractor, rather heatedly, "only today I had a battle with one of the heating plant salesmen. He got hold of one of the men I am building a home for and all but induced him to take a furnace that isn't large enough to efficiently heat the house. Argues that my man is foolish to spend so

much money on a heating plant. As a matter of fact, half the enjoyment of having a home comes from having it warm and comfortable during the winter. A good plant is a good investment, no matter what it costs."

"These furnace men are rather tough customers," commented the hardware dealer. "I know, because I sell furnaces. Only the other day, too, I read in the paper that a furnace dealer killed himself. He was doing a big business, but the competition was so keen and all of the dealers were cutting prices so heavily no one was making money. He got discouraged and ended his life."

"But that, Sam, was not the point I wanted to make. When a man spends money for silk shirts, or his wife pays a good, round price for a flimsy dress, their money soon is lost to them. They probably are paying for quality, but that quality is not coupled with durability. But when quality is put into the construction of a home, durability always goes with it. Hardwood floors mean quality; a hundred or two more dollars for the heating plant

means a better quality plant, and a plant with longer life, while the owner will get as near perfect satisfaction as it is possible to secure. You know and I know that a poor or insufficient furnace, or hot water, or steam heating system will do more to promoting dissatisfaction over a home building job than any other one thing.

"Not long ago I sold a man a furnace and with it a little draft regulator. I had considerable difficulty selling that regulator because some other furnace man



The Building Contractor—One of the Most Important Constructive Influences in Our National Life Today.

who don't or couldn't supply it said it was a 'waste of money.' But take it from me when a man can spend a few dollars and every morning during the winter have his furnace drafts automatically opened an hour before he tumbles out of bed, his money is well spent. And the funny part of it is that the contrivance costs no more than a first-class silk shirt, and will bring more satisfaction and comfort than a dozen silk shirts.

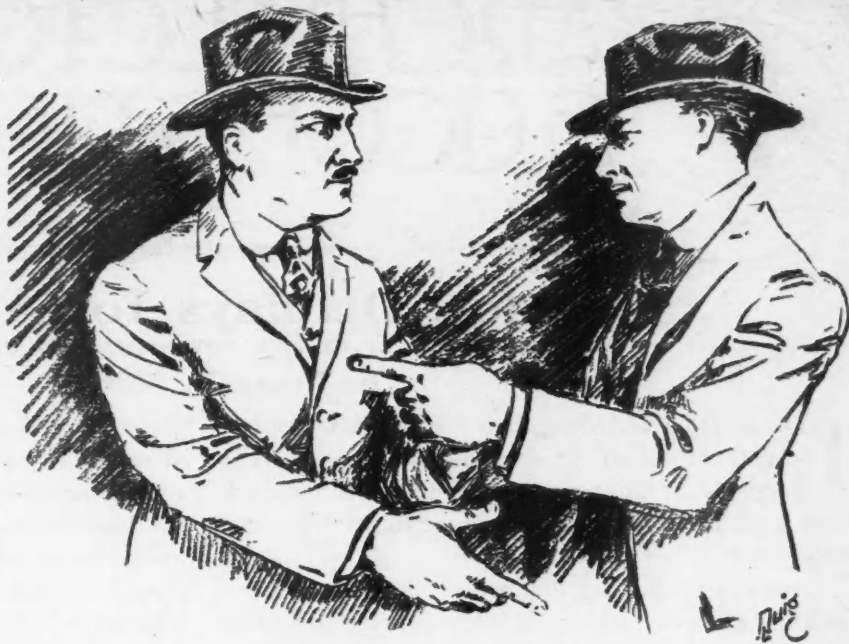
"Yes, sir, Sam, we in the business of building and equipping homes can't make a mistake when we insist on giving our customers 'QUALITY' spelled with capital letters. Not only will our customers be better satisfied, but they will be boosters for us instead of knockers. We started in business in this town and in all probability will continue in business here for the rest of our lives. The work we do is the test by which we will continue to prosper, and enlarge, or otherwise.

"You know, Sam, that builders, especially contractors, had a bad reputation not so many years ago. Everyone thought that after a contract was signed and the work begun, it was necessary to hire detectives to watch the contractor to see that he didn't steal the building site. 'Skinning the job' was what they called it, but I don't believe contractors do that any more. The business of building buildings has become so great and so necessary to the growth and development of this country that there is a good profit for every contractor, and plenty of work for every one. When competition was keen and bidding fierce, many a contractor got a job by bidding so low the owner thought he was getting something for nothing—that he was 'skinning' the contractor, but in desperation to come out of the contract whole the contractor 'skinned' the job. That was when times were different.

"We don't have to cut each other's throats now to get all the business and all the work we can handle. We can give our customers 'quality' materials and 'quality' workmanship. They will be the gainers in the end, and we will profit more than we realize. For we will know that we have given the best we are capable of giving on every job we take."

"That is what some people call 'far-sightedness,'" said the building contractor.

"Yes, and tho there have been many changes in this little old world of ours during our lifetimes, that old saying, 'Foresight is better than hindsight,' is just as true now as ever it was," concluded Fred Beard.



"I Had an Argument with a Heating Plant Salesman Who Insisted That My Man Was Foolish to Pay so Much Money for a Heating Plant. A Good Plant Is a Good Investment, no Matter What It Costs."

Argentina's Building Program

THERE is a large field for the sale of American construction materials in Argentina, according to a report just made public by the Bureau of Foreign and Domestic Commerce, Department of Commerce, and the investment of American capital in Argentine enterprises in an important factor in securing contracts.

Buenos Aires is in great need of first-class office buildings. Several departments of the government are being crowded out of their old quarters for lack of space and modern hotels and apartment houses of the American type are needed. With the return of normal conditions many model homes for workingmen will also be erected in the suburbs of Buenos Aires. Notices appear in the newspapers of the capital from time to time, inviting bids on various public construction enterprises. The time limit for these is usually short, but if American firms were represented in Buenos Aires, they could secure many such contracts.

Argentina has always been an excellent market for iron and steel products for construction purposes. Formerly the imports of cement were considerable, but a large cement plant is now in operation about 200 miles from Buenos Aires, owned by American interests. Lime of unsurpassed quality is found in many parts of Argentina, and the plaster of Paris used is produced chiefly in the country. Clay roofing tiles and roofing slate, and glazed wall and vitrified floor tiles are imported in considerable quantities. Some years ago advertising campaigns were instituted to popularize felt roofing materials, but with only partial success. The chief competitor of this kind of roofing for industrial purposes is galvanized iron sheeting, for which there is good demand. In the past 10 years many skeleton steel structures have been erected.



ARCHITECTURAL SUGGESTIONS



Window Displays for Architects

SUGGESTIONS FOR ATTRACTIVE ADVERTISING TO GET NEW BUSINESS

By Frank H. Williams

IT is a rather odd thing that altho window displays constitute one of the cheapest and most effective methods of advertising, architects so very seldom avail themselves of the opportunities along this line.

Once in a while when an architect designs a big new building a window display is made in some prominent down-town store of his wash drawing of the structure. But outside of this, the architect seldom if ever figures in any display in any show window.

Now there seems no real reason why architects should not go after new business thru window displays in the same alert, progressive way in which retailers and other business men do. Certainly the display that almost any architect could make would attract a lot more attention than does any ordinary display of dry goods or other wearing apparel and, certainly, as the result of such a display, the architect should line up some new business.

But just what could an architect place on display? How could he go about getting a window for his display for the purpose of advertising himself, his place of business and the character of work he does?

It is for the purpose of answering these questions that this article has been written.

The most important question, of course, is regarding the things the architect should display. If there is nothing to exhibit, then a man would be a fool to try and make a good display out of nothing. So it is highly essential that the architect have something definite, specific and worth while to exhibit before he goes about securing a window for his display. What can he exhibit?

Suppose the architect is specializing in residential

properties. Would not photos of some of the homes about the city which he has designed make an attractive exhibit if placed on a rack or placard? What do the blue prints for these homes look like? Has he made any wash drawings of them? All of this material would prove interesting to everyone who is thinking of erecting a new home and to everyone else, for that matter, because everyone is interested in building operations.

Has the architect visualized by

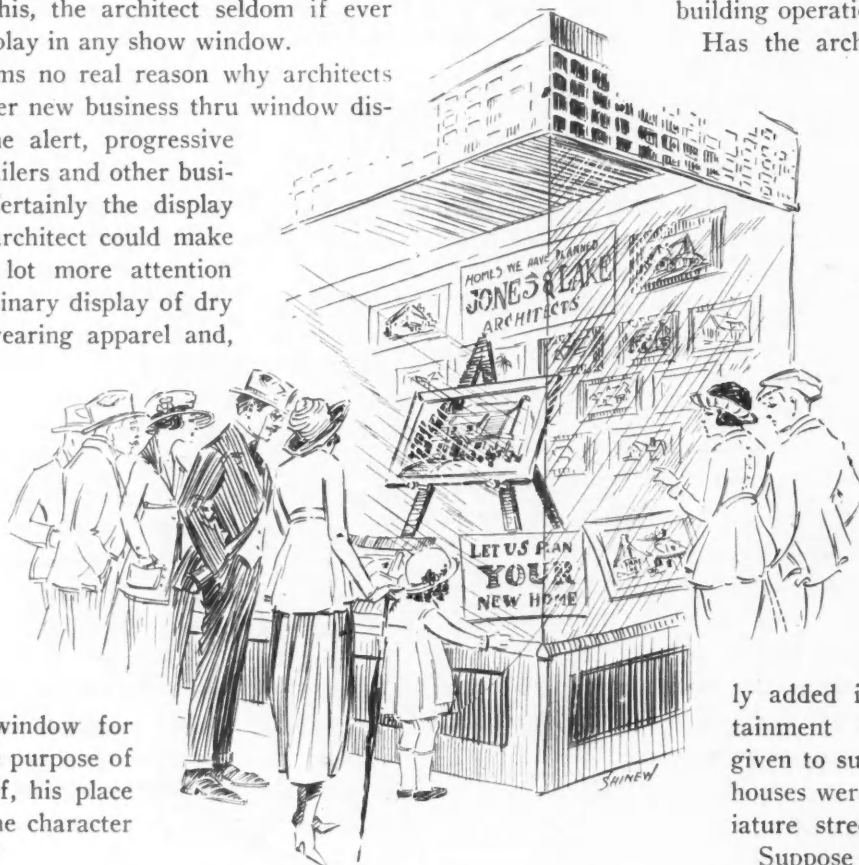
the means of neatly constructed "toy houses" his idea of the building for the benefit of some customer who cannot get a mental image of how the complete job is going to look? Certainly such "toy houses" would be interesting and entertaining if placed in a window display. And greatly

added interest and entertainment value would be given to such a display if the houses were arranged on miniature streets.

Suppose the architect is specializing in business buildings. Photos of such buildings as he has designed would

be interesting. So, too, would everything else which would tend to give the beholder inside information on the way that an architect works.

Everybody is interested in learning about the inside workings of things with which they are familiar. People generally are familiar with the surface workings of the architect—they see blue prints, wash drawings and completed buildings. But how does the architect go about all this? How does he make his



As the Result of Such a Display, the Architect Should Line Up New Business.

computations? What is the first step in preparing the plans for a business block or for a home? What is done next, and so forth. If an architect should make a window display in which he would show step by step just how the plans for a building were evolved the public would take much interest in such a display and comment on it at length because it would be such unusually interesting and entertaining inside information. It would be something entirely different from anything the public was familiar with, and, consequently, the very novelty of the display would attract and hold the attention of the people passing the window where it was on exhibition.

Novelty is one of the biggest factors in getting over an advertisement or a window display. The architect, due to the fact that so little is known by the general public regarding his inside operations, can inject such novelty and difference into the display.

So much for some of the things that could be put into the display. But, once having determined to make a display and having decided upon what he will put in his display, how is the architect to secure a window in which to have his display?

Of course the window display to get the maximum results should be located in the central part of the city where the greatest possible number of people will see it. But how is the architect, whose office is probably several flights up in some office building, to get a display in any prominent show window?

The answer is simple. Every retail establishment is looking for novelties which will give added interest to his own windows. He will gladly welcome any display which will not conflict with the goods he is selling and which will tend to make people take more interest in his windows and comment upon the things they have seen in the windows. Almost any retail establishment would gladly give a leading architect space in their show windows for an exhibit of his work because of the publicity and added interest they would gain for their establishment thru such a display. So the matter of getting a show window for his display need not worry the architect in the least.

Now as to the sort of reading matter that should be used in connection with the display.

This is a very important phase of the proposition. The reading matter will inject the "punch" into the exhibit which will mean more business for the architect. It will give pith and point to the display and tell what it's all about and just how the display demonstrates that the architect is particularly qualified to handle work. In other words, it will be the sales argument.

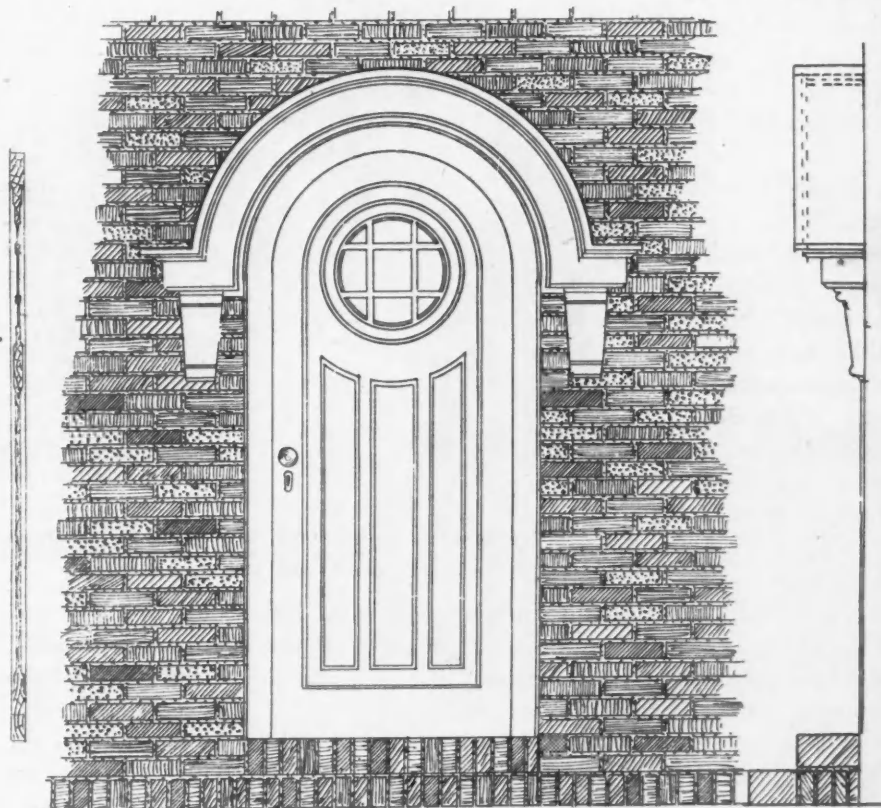
If the architect is specializing in homes some such reading matter as this should be used:

"The way to be sure that your home is going to be RIGHT is to make it RIGHT before even the foundation is dug.

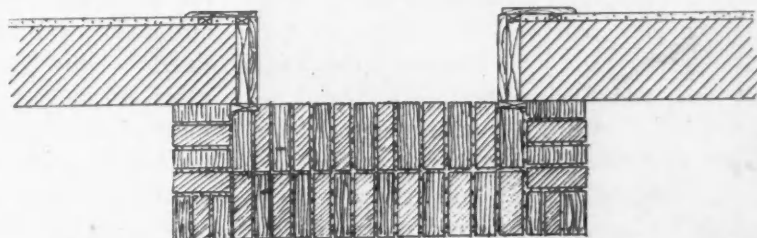
"Properly planned homes give perfect satisfaction after they are erected.

"Have YOUR home planned right by the architect who designed these successful houses. Look at the various processes necessary to the right planning of a home. Notice how thoroly every little detail is worked out.

"Determine NOW to have YOUR home planned RIGHT.



E L E V A T I O N



Architectural Detail of Attractive Doorway Prepared by Geo. M. Petersen, Architect and Estimating Contractor, Cleveland, Ohio. While Shown Here in Connection with a Brick Residence, This Design Would Also be Very Appropriate in a Stucco Home.

Law for the Builder

VALIDITY OF PROMISE OF ADDITIONAL COMPENSATION TO INDUCE CONTRACTOR TO CONTINUE WITH WORK

By Leslie Childs

THERE are a number of cases reported in the law books in which the contractor, after entering upon the contract, has, owing to the development or discovery of some unexpected difficulty, declined to proceed for the price agreed upon. In some of these cases the employer has come forward with an offer of additional compensation, or other inducements, to get the contractor to continue with the work.

In some states these later agreements have been upheld, even tho they have not amounted to a new contract, but in others they have not; and because of this uncertainty the question is one of real interest to every contractor and builder. For if one engaged in the contracting business, finds himself in such a situation, even a slight knowledge of the law on the subject may prove of substantial value. In fact, may prove the difference between a well-earned profit and a ruinous loss.

A case, illustrating the law in those states which hold that such an agreement is invalid, unless it amounts to a new contract, or at least is supported with some new consideration, was that of *Shriner vs. Craft*, 166, Ala. 142. The facts in this case, as they appear in the report, seem to have been substantially as follows:

William A. Shriner entered into a contract with John Craft in which he agreed to furnish the material and build two houses in Mobile, Alabama. After the contract had been made it seems that Shriner became dissatisfied, and, as a special inducement, Craft agreed to advance the money each week for the payment of the laborers at work on the job. It appears that Craft failed to do this, and Shriner thereupon abandoned the contract, refusing to proceed with the work.

Later Craft sued Shriner for damages, and as a defense Shriner pleaded the alleged agreement with Craft in which the latter had agreed to furnish the money to pay the laborers each week; setting up that Craft had failed to do this, and claiming this breach

of the contract on the part of Craft as a justification for his abandonment of the work.

In the lower court it was held that this answer of Shriner constituted no defense to the action, and a judgment for \$1,035.34 was rendered against him for failure to comply with his contract. Shriner then appealed to the Supreme Court, and among other things it was said:

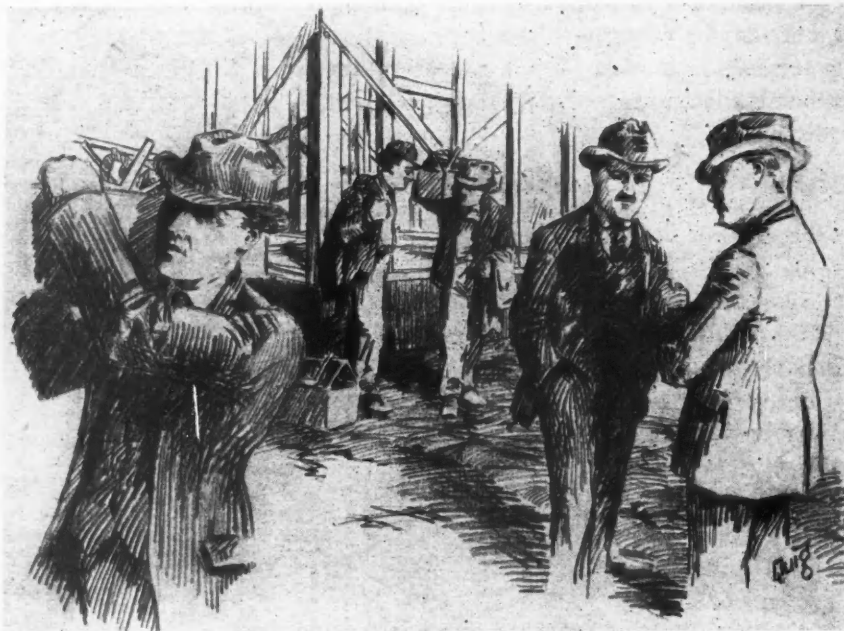
"Where the parties agree to rescind the contract, each one gives up the provisions for his benefit, the mutual assent is complete, and the parties are then competent to make any new contract that may suit them. Where one piece of work is substituted for another, the contractor is released from doing one, in

consideration that he will do the other. But where one party refuses to do the work which his contract requires him to do, or even threatens to abandon the work, unless he is paid more, and the other promises to pay more, the original contract still remaining subsisting, we consider it merely a promise to pay for what he was already obliged to do, and a nu-

dum pactum" (one which cannot be enforced).

The Supreme Court thereupon affirmed the judgment rendered against Shriner the contractor in the lower court, holding that the promise made to him by Craft, after the original contract had been entered into, was not valid, and its breach constituted no excuse for Shriner to break his contract.

As stated above, this rule is not followed in all states, but does hold good in some. In cases of dispute of abandonment of the contract, if there is therefor substituted an entirely new contract, well and good. But in cases, as above, where the contractor, after abandonment of the contract, again takes up the work upon the promise of more pay, to say the least some consideration should appear for the additional pay promised. Otherwise when the contractor completes the work and comes to collect, if he is in a state that follows the Alabama rule he may experience disappointment, and loss.



Craft Agreed to Advance the Money Each Week for the Payment of Laborers at Work on the Job. Craft Failed to Do This and Shriner Thereupon Abandoned the Contract and Refused to Proceed with the Work.

Making Electrical Construction Safe

ARCHITECTS AND CONTRACTORS INTERESTED IN SAFETY PANELS AND SWITCHES TO REDUCE DANGER

By J. W. CORR

FOR a long time the low voltages in constant use in homes, business places and industrial plants, even including voltages as high as 500 in some cases, were considered not dangerous. About 1909 so many cases of serious accidents from contact with these voltages were made public, that the necessity of safety apparatus became more generally recognized along with the movement of the insurance companies, to require protection against wheels, gears, belts, etc. It was pointed out that while wiring was covered by insulation and enclosed in steel conduit, the switch, and other devices, with which the operators came directly in contact, were less protected, altho operated chiefly by persons unfamiliar with electrical apparatus especially

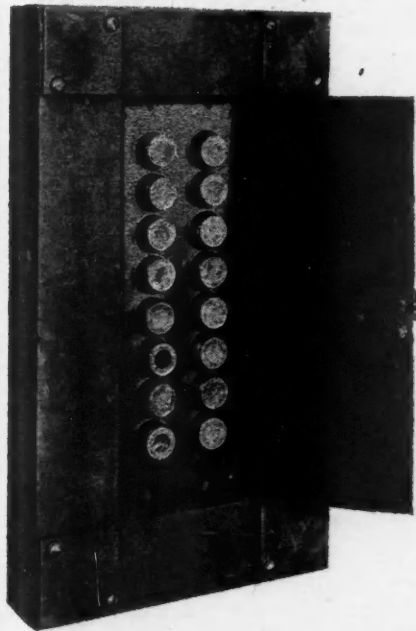
able features which this safety apparatus provides.

Safety Panels and Switchboards

In large buildings, such as hotels and industrial buildings, where metering panels are not required, it is found desirable to use panels having all parts dead that are necessary for operating, and these dead operating parts under a door of the cabinet trim, separate from the fuse compartment door. The fuse compartment door should be locked, and the keys held only by the electrical maintenance men.

Panels are now available, having this combination worked out with unique simplicity. This combination provides absolute safety for the operator and prevents unauthorized persons from getting at the fuses. By virtue of the fuse compartment being thus inaccessible to unauthorized persons, fuse chips should less often have to be replaced, because maintenance men, protected by having fuses under a locked door, will more often use the right size and style of fuses. This will also prevent the practice of winding fuse wire around fuse clips by unauthorized employes, which practice is often responsible for the complete destruction of an open faced panel.

For lighter service, such as apartment buildings, houses, small stores, small isolated offices and railway depots, where the operator is also the maintenance man, plug fuses are very desirable. By using plug fuses with push switches, a double branch, dead front safety panel with a safety main switch is possible. This type of panel is 100 per cent safe, yet another



Plug Fuse Type of Safety Panel Commonly Used in Homes and Apartments for Circuit Distribution. Builders and Architects Are Interested in Safe Appliances.

in private homes. The very fact that the voltage was low, and not fatal, or dangerous to everybody, tended to make the average person more careless.

The Department of Commerce, Bureau of Standards and the National Safety Council took up the question, and showed the dangers of open installations of electrical apparatus, and at the present time the Bureau of Standards favors the use of safety apparatus, wherever suitable apparatus is available. The recent tendency of cities and states has been to adopt this proposed code as a standard requirement. The necessity of safety apparatus is further emphasized by the accident liability clause of various states, making the employer responsible for accidents to industrial employes. Architects and builders are giving the matter their close attention.

It has remained, therefore, for the manufacturer to provide electrical apparatus, to include adequate safety features.

The details of safety apparatus to which I wish to confine my article come under the headings of "Safety Panels," "Safety Switchboards" and "Safety Switches." These subjects are of interest to architects, engineers and contractors particularly at the present time, because of the increasing recognition of the desir-



Making Electrical Construction Safe for the Children. The Safety Panel Installed in This Home Reduces the Risk Connected with Switches.



This Fuse Compartment Cannot Be Opened Unless Switch Is in the Off Position Because of the Safety Arrangement in the Switch. Safe Electrical Construction of This Type Is Being Installed in Shops and Factories to Protect Employees.

feature is its economy of space, particularly in width. Double branch panels of this style are now available as narrow as 10 inches. This narrow width is a valuable feature in mounting panels flush in concrete columns.

When safety panels are supplied with a main switch, it is often desirable to have main switch of a safety type operated from a dead front. In other words, if a panel is to be known to the operator as a safety panel, it should be 100 per cent safe, as otherwise the operator would be more or less thrown off his guard.

In the foregoing discussion I have referred to lighting panels with two or three wire mains and two-wire 30-ampere branches. The popular voltages used on these panels are 110 and 220. With the use of power panels where 440 volts, 3 phase, 3 to 3 wire is popular, the question of safety becomes more and more important. These panels should be 100 per cent safe, that is, arranged so that the fused compartment cannot be opened without the switch being in the "off" position. This type of panel is now available and is fast superseding the open face type.

Safety switchboards are fast being designed for the market. They are available at present to some extent, and are not only dead front, but also dead rear. With the dead rear arrangement, the board can be placed much closer to the wall, thereby economizing a great deal of space. Each switch section is removable from the front and is 100 per cent safe.

Safety Switches

The use of safety switches has already become a very popular practice, and open knife switches are fast becoming a thing of the past. Several cities have a ruling to the effect that all new switch installations must be of the safety type.

The degree of safety is classified by the Board of Fire Underwriters under the classifications "A" and "B.". Class "A" means "accomplished safety" or 100 per cent safe, while Class "B" covers switches in strong steel boxes, externally operated. A switch coming under Class "A" must not only be in a strong box, but must be arranged so that fuses are not accessible while the switch is on; in other words, while the fuses are alive.

House entrance switches that are 100 per cent safe not only protect anyone who replaces fuses, but with a meter seal and a padlock attachment to lock the switch in the "off" position, the public service company's current is protected from theft, while the service is temporarily discontinued.

Industrial safety switches should be installed in every factory for humanitarian reasons, yet by so doing the liability insurance premiums are materially lowered and 100 per cent safety switches, having less depreciation, make it only a matter of a few years when the excessive cost would be thereby saved.



Practical Novelties in Electrical Switches

UNTIL very recently all the time and energy spent in the development of electric lighting has been centered on the light itself, with the result that the light is practically perfect. Only in the past few years has the subject of switches and other necessary appliances been studied as the importance of the subject warranted.

While several manufacturers have been working along this line with excellent results, the results are only beginning to be realized and the improved appliances put into use. To a large part of the general public a switch is a switch—usually in the form of a key on the bulb socket, tho sometimes it may be a push button in the wall.

Of course, the switch principle of making and breaking the circuit is the same in all switches; the difference lies in the way the principle is applied, and in convenience, durability and appearance.

One of the modern forms of door switches is being used very widely in homes of the better class for

lighting closets. The idea of an electric light in a closet is not new, but the door jamb switch does away with the necessity of fumbling around in the dark for a suspended bulb. The mere act of opening the door

mantel, side and center lights are controlled from one switch.

A ceiling snap switch is popular, especially in offices and factories. It is inconvenient to have a heavy, hanging switch within reach, for it is apt to be very much in the way. The ceiling snap switch is kept up out of the way and operated by a light cord. One pull turns on the light—another pull turns it off.



When to Heat Wood Before Gluing

WHETHER a hide glue joint will be strengthened or weakened by heating the wood before gluing depends on the size of the joint. It is assumed, of course, that the work is being done in a glue room that is warm and not draughty, and that the wood itself is at room temperature. Under these conditions, if the joint be made is of small area, heating the wood is unnecessary. In fact, it may be detrimental, for the warmth of the wood will keep the glue thin; and, when pressure is applied, too much glue may squeeze out, leaving a starved joint. It is very easy to apply too much pressure to a small area.

In making glue joints of large size (several inches each way), heating the wood before gluing is of distinct advantage. Many experiments at the Forest Products Laboratory, Madison, Wis., have proved that when the wood in large joint work is not heated, the joints develop full strength only in spots. Weak spots and even open joints are too frequently discovered.

Uniform high strength in joints of large size may be secured by heating the wood in a hot-box for 10 or 15 minutes at 120 to 130 degrees Fahrenheit just before gluing. The heat from the wood prevents the glue from chilling and keeps it liquid until pressure is applied.

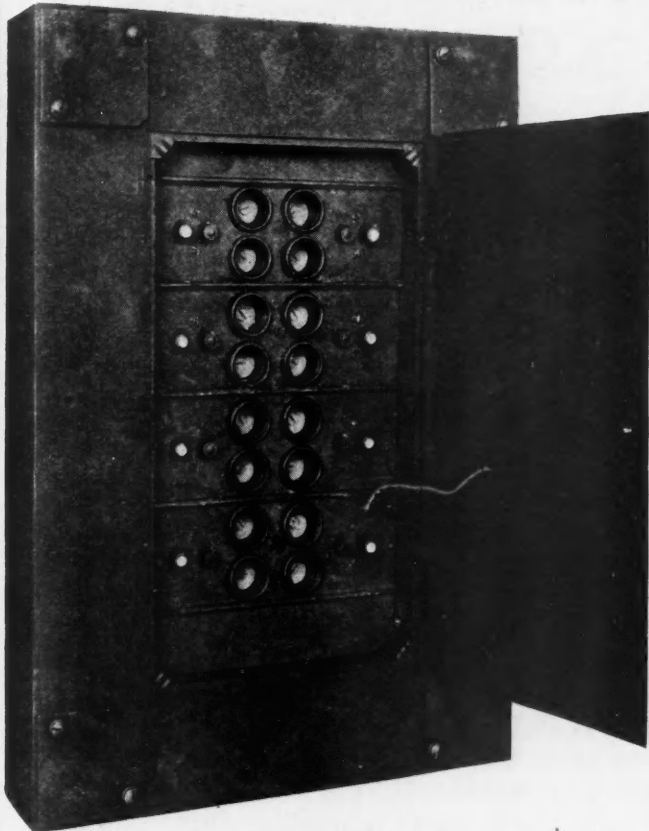
It should be remembered that heating the wood retards the setting of the glue to some extent. In heavy woods, from which the heat escapes slowly, this retarding effect is more marked than in lighter woods. In all species glued cold at the laboratory the time under pressure required to develop full joint strength was less than eight hours. When heated wood was used, at least 10 hours were required to develop full joint strength in mahogany, and more than 12 hours in red oak and maple.



STORAGE bins or rooms for cement should be tight so that moisture may not enter thru leaks in roofs, walls or floors. Floors should be raised above the ground and a free passage of air should circulate under the floors of bins or rooms. It is advisable, especially in cold climates, to prevent the circulation of air thru the storage bins, for any moisture in the air is likely to condense on the walls and ceilings of the storage rooms, causing what is commonly termed "sweating."



THE purchase of a home is the first step toward independence and success.



Narrow Push Button Type of Safety Panel with Plug Fuses Commonly Used in Small Stores and Offices for Circuit Distribution and Control. Progressive Architects and Builders Make Provision for Safety Electrical Devices in Their Plans.

releases a spring button in a socket placed in the jamb, and turns on the current. Closing the door presses back the button and breaks the circuit. It is impossible to "forget" to turn out the light, and leave it burning for hours—perhaps for days—until the closet door is opened again.

This form of switch has been widely applied to refrigerating rooms as well as to closets.

In some cases a reverse acting switch is desired, where closing the door turns on the light and opening the door turns it off. A switch for this purpose is also made.

The door jamb switches are so made that the probable swelling of a door in damp weather, and contraction of the wood in dry weather does not operate the switch. The switch has a special adjusting feature, a roller bearing tip on the plunger, which relieves sidewise strain and prevents sticking and grinding. Otherwise the utility of the switch would be comparatively short lived.

The switch is built in a rolled steel case so that the ordinary trouble of broken porcelain is obviated.

Another push button switch presents a solution of group control. Alternate, consecutive or simultaneous control of service groups of lights may be obtained with one switch. For example, in a large living room,

Building Contracts Break All Records

INDUSTRIAL BUILDINGS HEAD LIST—RESIDENTIAL CONTRACTS FORM SMALLER PART OF TOTAL

ALTHO there has been much talk of construction being held up on account of high prices, high wages, and shortage of material, the total amount of contracts awarded during March in the territory east of the Missouri and north of the Ohio rivers, according to statistics compiled by the F. W. Dodge Company, showed a great increase over the figures for January and February, and was, in fact, greater than the figures for any month in 1919. The total amount for March was \$327,897,000, as against \$235,848,000 for January, and \$216,663,000 for February.

These figures give \$780,408,000 as the total for the first quarter of 1920. Normally the first three months of the year account for about 20 per cent of the year's total of work started. In the first quarter of 1919 contracts awarded amounted to \$275,555,000. Of the total for the first three months of the year, \$267,193,000, or 34 per cent, was for industrial buildings; \$150,651,000, or 19 per cent, was for residential buildings; and \$146,973,000, or 19 per cent, for public works and utilities. This shows that the work which has been held up is in the residential group; that is, the smaller building operations. Normally, this group accounts for about 30 per cent of the total, and at the present time, in view of existing needs, it should be about 40 per cent of the total.

Altho contracts have been awarded to the amount of 780 millions of dollars there is still a vast amount of work being held up for more favorable conditions. In the first quarter of 1920, contemplated and projected work of all kinds was reported by the F. W. Dodge Company to the amount of \$1,700,000,000. Of the contemplated work, public works and utilities amount to \$363,802,000 or 21 per cent of the total; industrial buildings amount to \$355,073,000, or 21 per cent of the total; and residential building amount to \$343,173,000, or 20 per cent of the total.

The Central West

Building contracts in the Central West (comprising Illinois, Indiana, Iowa, Wisconsin, Michigan, and portions of Missouri, Nebraska, and Kansas) in March amounted to \$89,727,000. There has been a steady increase in this district since the beginning of the year, January having shown a total of \$61,423,000, and February, \$78,082,000. The total for the quarter was \$229,233,000, about double the amount for the same period last year, which was \$110,164,000.

The quarterly total contained the following important items: \$72,545,000, or 32 per cent, of the whole, for industrial buildings; \$49,018,000, or 21 per cent, for public works and utilities; \$44,611,100, or 19 per cent, for business buildings; and \$40,352,000, or 18 per cent, for residential buildings.

Contemplated work reported in the first quarter amounted to \$681,032,000, including \$155,002,000 for

public works and utilities, \$138,241,000 for social and recreational projects (the hundred million dollar Chicago lake front parkway project is included in this group), \$137,622,000 for industrial plants, and \$107,937,000 for residential buildings.

The Northwest

March building contracts in Minnesota and North and South Dakota, amounted to \$11,038,000, as compared with \$7,246,000 for January and \$6,017,000 for February. The combined total for the three months was \$24,302,000, or more than five times the figure for the first quarter of 1919, which was \$4,772,000.

Included in the total figure for the first quarter were the following items: \$7,008,000, or 29 per cent, for residential buildings; \$4,714,000, or 19 per cent, for educational buildings; and \$4,064,000, or 18 per cent, for public works and utilities.

Contemplated work to the amount of \$44,244,000 was reported in the three months, including \$12,021,000 for public works and utilities, \$8,964,000 for business buildings, and \$8,042,000 for residential buildings.

Pittsburgh District

Building contracts let during March in western Pennsylvania, West Virginia, and Ohio amounted to \$67,888,000, as compared with \$43,556,000 in January, and \$42,520,000 in February. The total for the three months was \$163,965,000, or more than three times the figure for the first quarter of 1919, which was \$40,567,000.

Of the first quarter of 1920 total, \$56,394,000, or 38 per cent, was for industrial buildings, \$33,160,000, or 22 per cent, for public works and utilities; and \$28,733,000, or 19 per cent, for residential buildings.

Contemplated work was reported in the first quarter to the amount of \$180,514,000. This figure included \$53,765,000 for industrial buildings, \$47,781,000 for residential buildings, and \$26,762,000 for business buildings.

New York State and Northern New Jersey

In New York State and northern New Jersey contract awards in March amounted to \$66,623,000, compared with \$79,570,000 in January, and \$36,375,000 in February. The temporary slump in February doubtless reflected the unfavorable conditions of the weather and in the labor and material markets.

The total of contracts awarded for the first quarter amounted to \$182,568,000, as against \$50,208,000 for the first quarter of 1919. In the figures for the first three months of 1920 were included \$62,308,000, or 34%, for industrial buildings; \$39,513,000, or 22%, for public works and utilities; \$33,286,000, or 18%, for business buildings, and \$25,174,000, or 14%, for residential buildings. The low figure for the residential group is a matter of serious concern, as it is probable that the housing shortage is more acute in this territory than anywhere else.

Contemplated projects amounting to \$303,270,000 were reported in the first three months, the total including \$77,264,000 for public works and utilities, \$74,153,000 for residential buildings, \$62,075,000 for business buildings, and \$56,142,000 for industrial buildings.

CORRESPONDENCE

Questions answered—ideas exchanged



You Are Requested and Urged to Make Free Use of These Columns for the Discussion of All Questions of Interest to the Building Industry

Undertaker Builds Own Garage

To the Editor: Metropolis, Ill.
I observe in your last number you showed a design of a modern undertaking establishment with garage. I recently built a garage adjoining my undertaking plant and used the mausoleum style, suggestive of the business, while not violating the ethics of the profession, which does not approve of ordinary advertising. It is built of concrete block and trim.

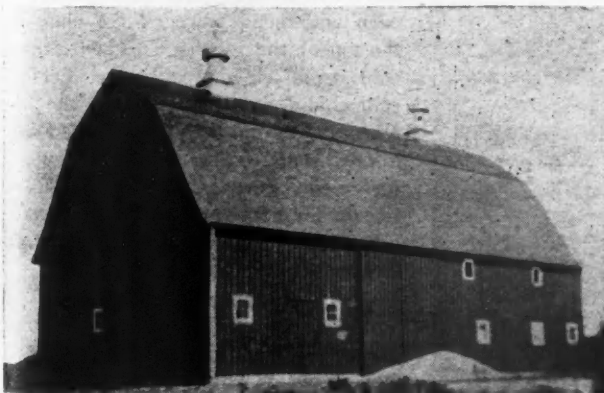
All of the cast stone and blocks were made in my plant under my supervision, and I supervised the construction from plan and elevation. The garage is 20x27 and houses our auto and a hearse. The temperature in the interior in freezing weather with prevailing winds is 15 to 20 degrees higher than on the outside, and I rarely have trouble about water freezing in the radiator.

I consider it almost fire-proof and carry no insurance on building or contents. The doors are hung on Lowden hangers, and I installed a Willis Mfg. Co. ventilator. Atlas cement was used in mixing the block, and the roofing is slate-covered, made by Bird & Sons. All of this material was ordered from advertisements in the AMERICAN BUILDER. A. J. GIBBONS.

Builder Has Busy Year

To the Editor: Addison, Ill.
I certainly want to thank you for all the good pointers and ideas the AMERICAN BUILDER contains. Every carpenter who is interested in building should not be without it, as it keeps him right up to date.

I enclose a little photo of a barn I built last summer for Fred Meier. It is 40 by 72 feet, 16 feet of which are studded, and is framed with heavy fir-timber, 8 by 8 and 6 by 8. There are stalls for thirty cows and six horses, and also a granary.



\$4,000 Barn Built by E. H. Gavie, Contractor, in Addison, Ill. It is 40 by 72 Feet and Is Equipped with Stalls for Thirty Cows and Six Horses and a Granary. Mr. Gavie Reports Unusual Building Activity in His Section.

The height from gable to barn floor is 38 feet. It cost about \$4,000.

I built another barn last summer 30 by 80 feet with the same shape roof, so it kept me very busy during that season.

This spring I have to remodel a house. The outlook for the coming year is very bright. E. H. GAVIE.

Solution for Prosser's Problem

To the Editor: High River, Alberta.
I am much interested in the questions and answers that appear in your correspondence column, but it is only one of the many features that go to make up a useful and instructive whole.

The plan department, particularly the last year, has been excellent, the articles on stresses and strains are especially useful to the builder who wishes to enlarge his scope of knowledge, and, last but not least, the advertising matter keeps the up-to-date contractor in touch with what is to be had to suit his special needs.

I am taking the liberty of submitting an answer to R. L. Prosser's problem to determine the area of the curved surface of the segment of a sphere.

Rule: Multiply the circumference of the sphere of which the segment is a part, by the height of the segment. The formula for circumference of the whole sphere is:

$$\text{Circumference} = \frac{h}{R^2} + h \times 3.1416$$

R = radius of base of segment, h = height of segment; or, in other words, the circumference equals the radius of base of segment squared, divided by height of segment, plus height, multiplied by 3.1416.

In the example, the radius is 8 feet; then 8 squared is 64; 64 divided by height (4) equals 16; 16 plus height (4) equals 20, equals diameter of whole sphere; 20x3.1416 equals circumference of sphere.

Circumference (62,832) times height (4) equals 249,328. Therefore the area of the given spherical segment is 249,328 sq. ft.

PERCY TAYLOR,
Building Contractor.

How to Mark Tools with Acid

To the Editor: Manganese, Minn.
While looking over the correspondence department in the March number of the AMERICAN BUILDER, I noticed a question asked by J. A. Polke, of De Soto, Iowa, how to mark tools with acid.

I think if he will follow this method that he will get satisfactory results:

Cover the iron or steel surface on which name is to be written with tallow, then write with a scratch awl, cutting clear to the surface, then fill in lies of letters with nitric acid

(HNO₃), let it stand ten minutes, and then clean. The name will be etched in the iron or steel written on.

I have been a subscriber to the *AMERICAN BUILDER* for the past two years and find it very helpful in my line as contractor and carpenter.

L. L. FOOTE.



Another Method for Renewing Oilstones

To the Editor:

Columbus, O.

I am a new member of your large family and appreciate the *AMERICAN BUILDER* very much. In reply to Mr. Stahl, of Shamokin, Pa., to take the oil and "hardness" out of an oilstone, if he will use coal oil and turpentine instead of oil a few times, I think he will find the stones almost as good as new. If they are still "hard," resurface them on an emery wheel and then use the kerosene and turpentine. Hoping this method may be successful and the information useful, not only to Mr. Stahl, but to others.

CHAS. N. GRIGSBY.



Advertisers—Take This Name

To the Editor:

Ferron, Utah.

I am in the contracting game and would appreciate it very much if you would kindly refer my name to your advertisers.

I have been a reader of the *AMERICAN BUILDER* for almost a year, and would not be without it for anything. Each copy is a bundle of useful information to the builder.

LLOYD NELSON.



Formula for Area of Dome

To the Editor:

Seattle, Wash.

I am submitting herewith a formula in answer to R. L. Prosser's problem. Mr. Prosser in a letter asks how to compute the area of a dome less or greater than a hemisphere. The algebraic formula for that problem is: $\pi (a^2 + r^2)$. The altitude is here denoted by a , the radius of the base circle by r , and π is 3.145927.

In Mr. Prosser's example the altitude of the dome was given as 4; the span 16', or radius—half the span=8'. The area therefore equals $3.1416 \times (4 \times 4 \text{ plus } 8 \times 8)$ equals $251\frac{1}{2}$ feet.

The altitude a , and radius r , are sides including the right angle in a right triangle. Denoting the hypotenuse by h , we have $h^2 = (a^2 + r^2)$ and above formula is resolved to $\pi \times h^2$, a very simple but correct form.

KNUTE A. WESTHOLM.



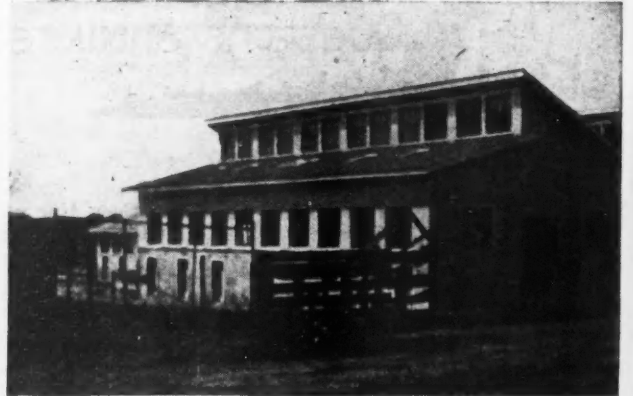
Builds \$4,000 Hog House

To the Editor:

Topeka, Kans.

I am sending two views of a \$4,000 hog house that I built for one of the big breeders of the state. It is said to be one of the best, if not the best hog house in Kansas, and 44 by 100 feet in size. It has cement floors thruout, laid on hollow

tile, water and heat in the building and cement troughs. The building up to the belt line is of hollow tile stuccoed, and from belt up is frame. It has fir siding and a roof of slate surface asphalt shingles. The interior walls are painted a bluish gray. It is equipped with electric lights and knock-



Prize Hog House Built by A. C. McCray of Topeka, Kans., for Famous Hog Breeder. It Is 44 by 100 Feet and Is Hollow Tile with Stucco Finish Up to Belt Line, Frame Above.

down portable pens. Overhead track and conveyors take care of the feeding and cleaning.

The first sale in this house amounted to \$18,345 for 47 head of Poland Chinas, ranging from \$1,200 down to \$150 apiece.

A. C. McCRAY.



Favors Sheathing on Outside

To the Editor:

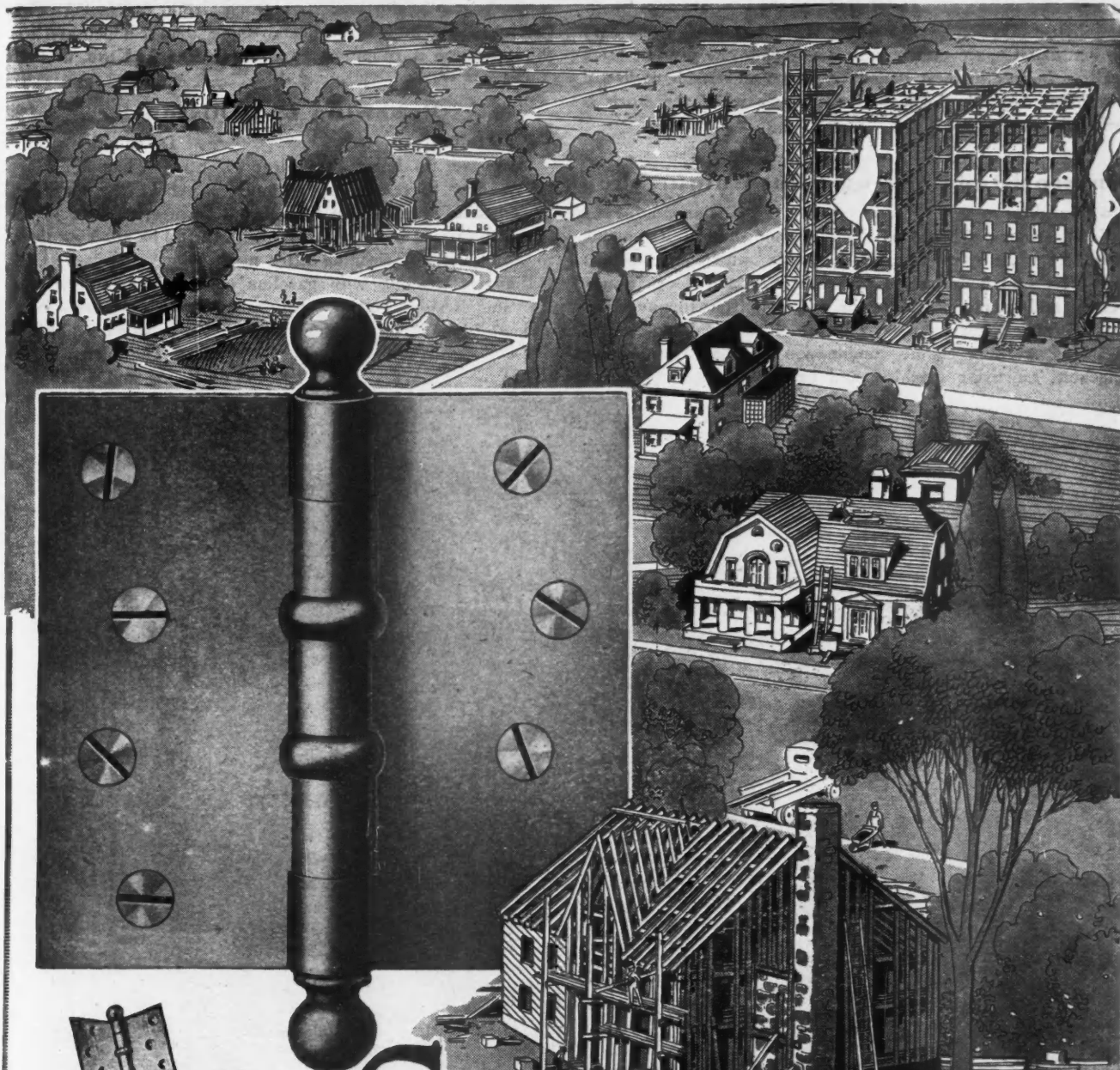
Watertown, N. Y.

Mr. Linn Elvins asks which is the better way to apply sheathing, inside or out. I think it is very much better placed outside, for the good reason that all surfaces are covered solidly from foundation to plate. If the sheathing is on the inside there will be a space entirely around the house at the second story where the joists rest on the plate that will have no covering, nor any place to put on building paper. In the cold winter days cold winds and frost will enter and make the house very cold and uncomfortable. I see no more difficulty in sheathing outside than inside, in fact not so much, as there are no joints to contend with in putting up the top boards. Another reason why all sheathing should be put on outside of a building is that the building paper may have a solid and smooth backing, and the clapboards or whatever kind of siding may be used, will lie firm and snug. To put paper on studding is very poor practice as it will be torn and sag between the studding, in such cases making holes for wind and cold to get thru. All spaces between second story joists should be boxed in with scrap sheathing, even with inside face of the plate and the top of the joists. This will prevent cold from blowing thru between the ceiling and the first floor and the floor above. No plumber will be needed when a cold snap comes along and tries to freeze your water pipes. There is no reason for housewives to drive nails all over a house when so many hooks and hangers are available.

If Mr. H. Schopmann, of Jersey City, will fur out the outside of his house with 1 by 2 furrings and then use metal lath on which stucco can be placed, he will have a dry house. The other way would be more expensive and would require all outside walls to be furred out over the present plastering then



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lathed and plastered again. This method would also make the house dry on the inside. It is absolutely necessary to get an air space either outside or inside the present brick wall. I believe his best remedy is stucco on outside as it will not interfere with the use of the house while the work is being done.

J. M. KANE.



Enterprising Carpenter Has Unique Shop

To the Editor:

Richmond, Tex.

I am sending a photo of my carpenter shop at Richmond, Tex. It is 20 by 64 feet, 10 feet wide, with room upstairs for office and bedroom. I make window and door frames, screen and cabinet work, repair and upholster furniture, ice boxes, refrigerators, and do a lot of other odd jobs. I have a 5 H. P. gasoline engine, combination saw, band saw, boring machine, mortising machine, and get all I can do. So can

comfort and healthfulness resulting from dispensing with this excessive moisture will far more than compensate for this reduction in room size.

JAMES A. KING, C. E.



Renewing Old Oilstones

To the Editor:

Downington, Pa.

In answer to letter of George D. Stahl, Shamokin, Pa., asking how to renew old oilstones, I believe the glaze on his oilstones is not from the oil, but from steel dust, which has been carried into the surface with the oil by allowing them to stand without cleaning after use.

I advise cleaning with gasoline or ammonia, and if this does not restore cutting qualities, scour with loose emery and steel blocks, or sandpaper fastened to a wooden block.

WARREN H. JOHNSON,
Contractor and Builder.



M. Meehan, Carpenter and General Contractor in Richmond, Tex., Has Incorporated Some Unique Ideas in the Shop Shown Here. He Has Built Up a Successful Business Repairing Furniture and Making Windows, Etc. Note the Revamped Touring Car. It Proves an Efficient Aid in His Business.

any other man who has a good shop and a little energy and experience.

I call your attention to my handy wagon. It was an Overland roadster and I conceived the idea of making a light truck of it for my own convenience in hauling and delivering goods. The small cab in the center and the platform extending both sides of it enables me to haul long lumber. The platform is as high as the fenders so I can haul lumber 24 feet long. Maybe some of my old carpenter friends have an old car they could do the same thing with it.

M. MEEHAN.



How to Prevent Dripping Walls

To the Editor:

Mason City, Iowa.

The best method I know for solving this difficulty of dripping walls is to line the exterior walls of this house with 3-inch hollow clay tile, then plaster over this tile wall. This will slightly reduce the net interior dimensions of the rooms having exterior walls, but the greatly increased

How to Repair Cracks in Stucco

To the Editor:

Buffalo, N. Y.

There is a little expert information that I would like to get personally.

During the winter and spring of 1918-1919, I had a house built that is stucco half way up. Wooden lath was used on this house and this spring several cracks have appeared in the stucco and not large ones, but especially at the corners it has opened up slightly, say about one-eighth inch, the cracks running up and down. There are also between corners a few finer cracks.

I would like to find out what can be done, if anything, to fill these up and if cement should be used or if it would be satisfactory to fill up the larger cracks with a preparation on the market which is used for the repairing of roofs, gutters, etc., that is guaranteed not to dry out or to soften under heat, and then wash this over with a thin coat of portland cement.

What paint do you recommend for Asbestos Roofing?

Answer—NONE!

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A ROCK doesn't need paint to make it last. Neither does Asbestos Roofing. Because Asbestos Roofing is made of rock.

The Asbestos in Asbestos Roofing is the same unchanged fibrous mineral that has endured through countless centuries of terrific heat and pressure.

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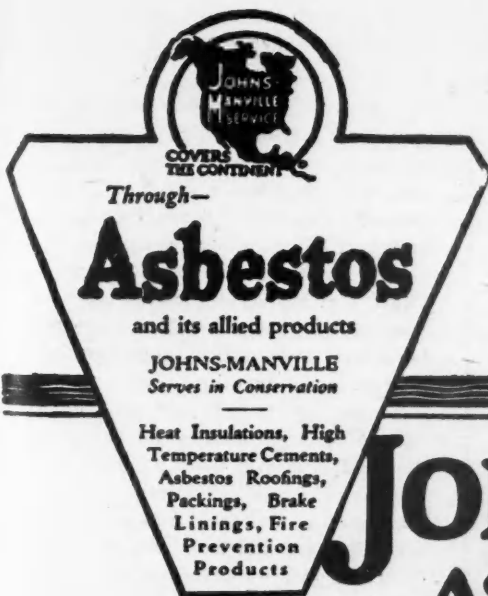
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JOHNS-MANVILLE ASBESTOS ROOFING

If you are able to get this information for me without a great deal of trouble I would certainly appreciate it, and perhaps it would be of some interest to others as well as myself.
 RAY R. THOMPSON.

Answer. If the stucco clings solidly to its base and cracking is not general, existent cracks may be satisfactorily closed by one or a combination of the methods described below:

1. If the crack occurs in some unexposed portion of the wall where surface appearance is no object, it may be thoroly moistened and then filled with a 1:1 mixture of cement and sand or stone screenings, usually making use of the same kind of sand or stone used in the finish stucco coat. This mixture should contain only quite small particles, however, and should be of about the consistency of putty so that it may be easily forced into small cracks with a trowel.
2. If the cracks to be repaired are in exposed surfaces where it is desired to conceal the repairs as much as possible, it may be preferable, after moistening the crack, to apply dry cement with a dry powder spray, then gently spraying on water.
3. There is on the market a white elastic putty suitable for repairing cracks in stucco merely by troweling or forcing the material into the cracks.
4. Where stucco wall has been blemished by cracks and made more unsightly by repairs, it may be found desirable to refinish the surface. After drenching the surface with water, a mixture of cement and water of the consistency of rich cream may be stippled on. This work may be done best in damp and cloudy weather. Each straight wall surface or wall panel must be done at one continuous operation, else surface may show where work was discontinued, if even for an hour or two.
5. A flat tone material for tinting stucco surfaces, which has been quite widely used in resurfacing after stucco repairs, is made by several well-known concerns.

EDITOR.

Roof Framing Easily Memorized

To the Editor:

Whitehall, Mont.

The many inquires that are sent to the **AMERICAN BUILDER** from time to time, seeking information relative to roof framing problem, have induced me to write this article showing a method of hip-roof framing at once simple, easily understood and readily memorized.

To those seriously seeking knowledge of roof framing I would say, provide yourself with a drawing board about 18 by 24 inches, a tee square and set squares, and draw and re-draw the figures that are here shown. Get some 1 by 2 inch pine and build a model of the roof which may be hipped on both ends. For this purpose make a drawing of the roof to a scale of 3 inches to the foot, and build the model 2 feet wide by 4 feet long. Nail the wall plates to the top of the bench or kitchen table, and cut all the hips, jacks and common rafters to measurements obtained from the drawing. If you make a miss, try again as you can soon confidently expect to gain a correct understanding of this problem and almost all roof problems are a variation of this one, and may be solved by applying the same principles.

Figure 1 is the plan of one end of a building roofed with a hip roof of equal pitch, that is to say, the slope of the roof is the same on the end as on the sides. This figure also gives the development of the roof, showing the true lengths of all the members—hip-rafters, jack-rafters and common rafters, with all the necessary bevels for cuts. The development of a roof means that the roof is laid out flat on the drawing. Bearing this flattening process in mind, look at Fig. 1 (the wall plates are shown by two lines, but only the outside ones are of first importance as they give the width of building), the full lines, a, b, c, d, are the plan lines of the common, jack, and hip rafters and wall plates respectively. To begin

the development process, let us imagine that the pair of common rafters seen in elevation have been erected over their plan lines a', and then laid over on their sides as shown. We see that the rise of roof, or, in other words, the height to ridge, is 9 feet, or from p to p₁. From these rafters the true length and the vertical and horizontal cuts are obtained.

The elevation of the hip rafter is now found by erecting a line perpendicular to plan c of hip, at point p. With the compasses at p, and a distance p₁, draw the arc p₁p₁₁, which determines the rise or height of hip, which, as may be seen, is the same as for common rafters. Draw the hip as shown in elevation, from which you get the true length and horizontal and vertical cuts just as it appears in the drawing.

To get the lengths and cuts of jack rafters it is necessary to flatten out the roof, and you may, mentally, erect a pair of common rafters over their plan lines a', and press on the top point until they are laid out flat and straight. This will push the plates out to d'. You may set the compasses at p₁ and draw the arc a'' a'', and the line drawn tangent to this arc—d'—is the developed position of the wall plate d.

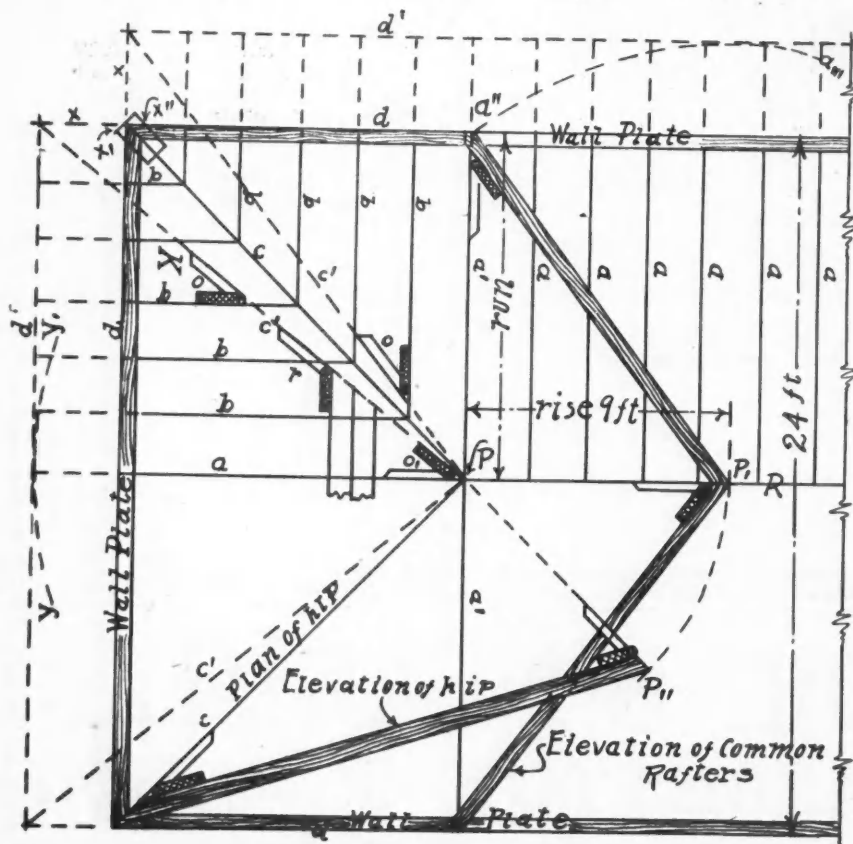


Fig. 1. Plan of End of Building Roofed with a Hip Roof of Uniform Pitch, Showing Development Process Used in Framing Roofs.

MICHIGAN

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MICHIGAN

If the roof should be erected with all the members nailed in position, and then flattened out, the hips would part up the center line—if so provided for experiment—and each half travel to end and side with the plates d, and assume their developed positions over lines c', the jacks and common rafters moving over the dotted lines to d'.

The roof is now fully developed or laid out flat, and the true lengths of jacks are found by measuring along their plan lines from d' to c', using the same scale as the one used

to make the drawing, and remembering that length found from the drawing is to be applied along the center line on the back of jacks. The horizontal and vertical cuts are the same as for common rafters, the cheek cut is as shown at o, o, face cut of sheathing is at r, and miter cut of hips as at o', which is the same as the cheek cut of jacks.

The rafters are represented on plan only by their center lines, which leaves the drawing clearer to the beginner and reduces the labor of drawing considerably, but the student is reminded that the jacks must be now shortened an amount equal to half the thickness of the hip, and in a direction parallel to the hip.

The common rafters must also be shortened a distance equal to half the thickness of the ridge, as shown at k, Fig. 3.

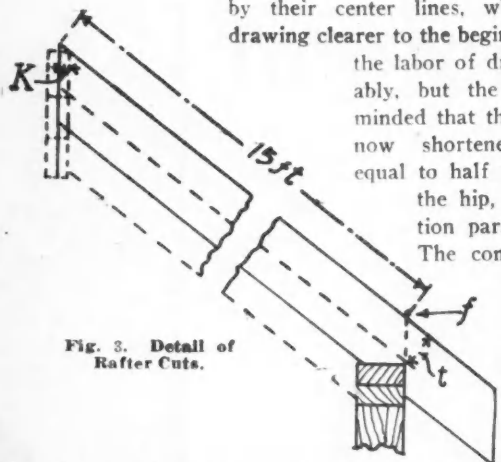


Fig. 2. Cross-Section Showing Rafters in Place, Carpenters Often Overlook That Space, J, the Joker.

center lines of all members except the wall plates, allowances must be made for whatever thickness of materials is used as already explained, but the hips are still to be considered.

Hips in carpentry are never backed, that is, cut down on both sides to bring them into the plane of end and side respectively, but are shortened to allow the corners as at x' to line up with plates as at x'' (Fig. 1).

After the foot cut of the hip is marked as in Fig. 4 to length scaled from drawing, measure along this

mark from the toe, a distance equal to half the thickness of hip, apply square to back of rafter and mark as shown, then cut off parallel to foot cut. "DIOGENES."

Wants Pointers on Making Library Lamp

To the Editor: Fort Johnson, N. Y.
Can you give me information on how to build a Mission library table lamp?
RICHARD S. DOUGLAS.

Professor Leigh Answers Stress Problems

To the Editor: Minneapolis, Minn.
I would be much obliged if you could help me solve the following problems and also indicate sections required in following cases:

- (a) I-beam, span 12 feet 6 inches. Uniformly distributed load of 18 tons. Fibre stress, 16,000 lbs. per square inch.
- (b) Same case as (a). Fibre stress, 12,000 lbs. per square inch.
- (c) Same case as (a). Fibre stress, 10,000 lbs. per square inch.
- (d) Channel. Span, 15 feet 9 inches. Uniformly distributed load, 13½ tons. Fibre stress, 12,000 lbs. per square inch.

Carnegie Handbook is to be used.
Please show every step in calculation and give page number, when referring to the handbook.

C. KRAGH.

Answer: In reply to your request, will say that the formula for determining section modulus of a beam carrying a uniformly distributed load, as given in the March number of the AMERICAN BUILDER, is:

$$\frac{WL}{8} = P \text{ (section modulus), or section modulus} = \frac{WL}{8P}$$

where W is the total load in pounds, L is the length of the beam in inches, and P is a safe fibre stress, in pounds per square inch. The formula may be stated in the following words:

Divide one-eighth of the total load in pounds by the fibre stress and multiply this quotient by the length of the beam in inches. The result is the section modulus.

(a) Find the proper sized I-beam 12 feet 6 inches long to safely carry a uniformly distributed load of 36,000 pounds. Fibre stress, 16,000 pounds per square inch.

$$\text{One-eighth of the load} = \frac{36,000}{8} = 4,500.$$

$$\text{Dividing by fibre stress} = \frac{4,500}{16,000} = .281.$$

Multiply by the length, 12 feet 6 inches, in inches gives 150 × .281 = 42.5 = section modulus.

Fig. 3. Detail of Rafter Cuts.

If the rafters over-run the wall as frequently happens, care must be taken to get at the proper point from which the run and rise start. Figs. 2 and 3 will make this clear. In Fig. 2 the pair of rafters shown in elevation in Fig. 1 are shown by dotted lines, but if it is desired to let the rafters run over to form eaves, the whole roof will be raised a distance j, but the rise or pitch remains the same. I call this distance j, because it is the little joker that 99 out of every 100 carpenters fail to find, and are thus unable to account for the slight misfit that results in spite of most careful marking and cutting.

The safest way to get the rafter marked right is to first mark the plumb cut at head, then measure down the back of rafter, the length found on the drawing—or steel square—and mark another plumb cut as at f, Fig. 3, next mark the bird's mouth foot cut, leaving sufficient material at t, to carry the eaves.

It also requires that an amount k, Fig. 3, which is half the thickness of the ridge, be marked off and deducted from the length of the rafter. Referring now to Fig. 2, it is seen that from f across the center line is the run, and from point f upwards is the rise.

Owing to the fact that we are working from

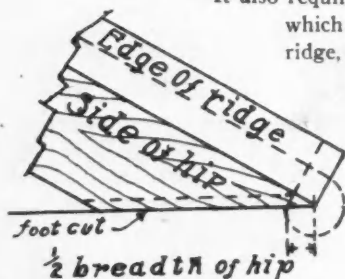


Fig. 4. Detail Showing Foot Cut.

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ATLAS CEMENT

My edition of Cambria Hand Book is 1903. On page 156 is found Properties of Standard I-Beams. Column No. 8 contains the section modulus corresponding to the depth of beam in column 2, with corresponding weight per foot in column 3. Running down column 8, 42.5 is found between the values 41 and 58.9. The value larger than the computed one must be used. But 58.9 is the section modulus for a 15-foot 42-pound I-beam. If you do not possess this edition of Cambria, look through the table of contents of your edition for "Properties of Standard I-Beams." This will direct you to the desired tables.

(b) Same condition as (a), when fibre stress is 12,000 pounds per square inch. Proceed as directed in the rule.

$$\text{One-eighth of the load} = \frac{36,000}{8} = 4,500.$$

$$\text{Dividing by fibre stress} = \frac{4,500}{12,000} = .375.$$

Multiplying by length in inches gives $150 \times .375 = 56.25 =$ section modulus.

Referring to the same table in Cambria, column 8, we find 56.25 between 41 and 58.9 as in case (a).

∴ A 15-foot 42-pound I-beam, if used, will be stressed less than 12,000 pounds, and is safe.

(c) Same as (a), with fibre stress equal to 10,000 pounds per square inch.

$$\text{One-eighth of the load} = \frac{36,000}{8} = 4,500.$$

$$\text{Dividing by fibre stress} = \frac{4,500}{10,000} = .45.$$

Multiplying by the length in inches gives $150 \times .45 = 67.5 =$ section modulus.

Referring again to the same table and column, we find 67.5 between 64.5 and 68.1. Use the larger, viz, 68.1, which corresponds to a 15-foot 55-pound I-beam.

(d) Find the proper sized channel 15 feet 9 inches span to carry a uniformly distributed load of $13\frac{1}{2}$ tons or 27,000

pounds. Fibre stress, 12,000 pounds per square inch. Here $W = 27,000$ pounds and the length is 189 inches. We use the same rule as before.

$$\text{One-eighth of the load} = \frac{27,000}{8} = 3,375.$$

$$\text{Dividing by fibre stress} = \frac{3,375}{12,000} = .281.$$

Multiplying by the length, there results $189 \times 2.81 = 53.1$.

In Cambria, 1903, is found "Properties of Standard Channels" on pages 160, 161, 162 and 163. Column 8 contains the section modulus corresponding to depths in column 2 and weight per foot in column 3. Looking down the column it is found that 53.1 lies between 50 and 53.7. Therefore, use the channel with section modulus 53.7. The size of channel is 15 inches—50 pounds.

The preceding method is the one to use for any uniformly distributed load.

CHAS. W. LEIGH,
Assoc. Professor of Mechanics,
Armour Institute of Technology,
Chicago, Ill.



Contractor Designs Time Card

To the Editor: Milton, Iowa.

I am enclosing the layout of a weekly time card which I designed and intend to use in my work. I believe it eliminates much of the trouble which contractors have in figuring out payrolls for their men and it does not require much clerical work.

J. E. DONAHO.



FLOORS on which cement is piled can be made of two layers of tongue and grooved flooring with one or more layers of tarred and rosin building papers between. This will make an air tight floor which will be fairly well insulated. Portland cement has been stored in such buildings for a period of one year without any damage to the cement.

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WORKMAN'S WEEKLY TIME CARD

DAY OF WEEK	MONTH OF <i>April</i> 1920														NAME OF WORKMAN <i>Miller</i>														TOTAL TIME	RATE PER DAY	AMT				
	NATURE OF WORK <i>Garage</i>														WORK DONE FOR <i>W. Wilson</i>																	HRS.	\$	C	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
MON												4																					4		
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THR															10																		10		
FRI																7																	7		
SAT																	9																9		
SUN																																			
																	TOTAL TIME IN HRS.														48	7.00	33	60	

Time Card Designed by J. E. Donaho, Milton, Iowa, to Keep Records of His Men. He Finds It Eliminates Much of the Trouble Which Carpenter Contractors Have on Pay Day and Also Helps Them Keep in Close Touch with Activity on Several Jobs.

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Johnson's Perfectone Undercoat works easily under the brush and can be flowed on and brushed out free from brush marks. Dries hard with a smooth, velvety sheen—requires very little sanding.

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Johnson's Perfectone Enamel is made in Satine and High Gloss. We recommend the use of the Satine everywhere except in kitchens and bath rooms where a High Gloss may be desired. Johnson's Perfectone Enamel Satine has just enough gloss and not a bit too much. It gives a beautiful, artistic, hand-rubbed effect without the expense of rubbing, but it may be rubbed if desired. Johnson's Perfectone Enamel is elastic and durable. It stands repeated washing with soap and water.

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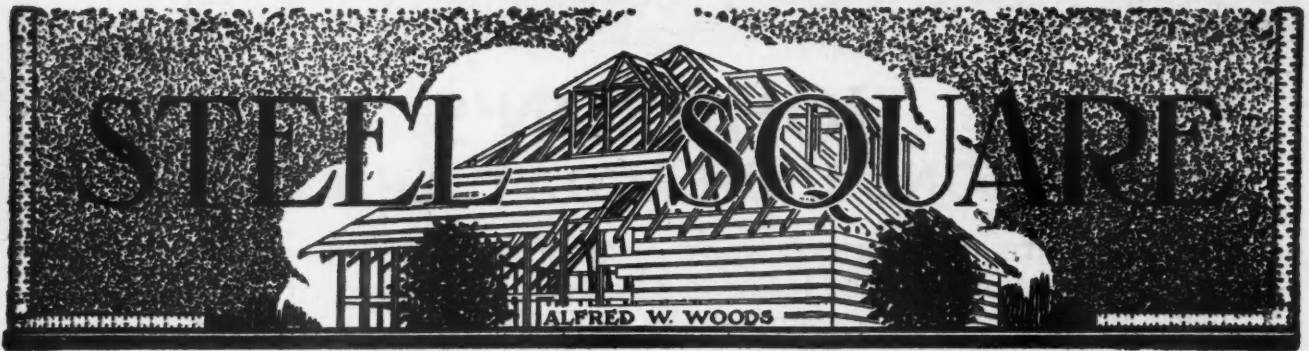
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Possibilities of the Steel Square

HOW TO APPLY FOR UNUSUAL OR STEEP PITCHES—FACTS AND FIGURES ABOUT PITCHES

IN THE lengths of rafters taken from 12, 13, and 17 on the tongue to the figures designating the rise on the blade, only three are absolutely without fractions and they are for the common rafters as follows:

Twelve to 5 = 13 inches; 12 to 9 = 15 inches, and 12 to 16 = 20 inches. However, the length of the hip in several cases is so nearly without fractions that we have given them as such.

The rule 6, 8, and 10, so generally used for squaring up buildings, is the same as the angle taken on the steel square from 12 to 16 = 20. Of course, any of the other angles could be used for this purpose, but the above being without fractions are easy numbers to remember. The length of the common rafter doubles its run, when it has a rise of 60 degrees, which taken on the steel square is at a little over 20¾ inches rise to the foot. The same occurs of the octagon hip when it has a rise of a little less than 22¾ inches and that for the common hip at nearly 29½ inches rise to the foot.

In the illustration in Fig. 1 we show the pitch lines up to the full pitch, also the reversed pitch—that is, by letting the blade represent the run and the tongue the rise. The length of the pitch lines in that case become the length of the rafter for a one-foot rise to the inches in run taken on the blade. The reader will notice that several of the reversed pitches are to be

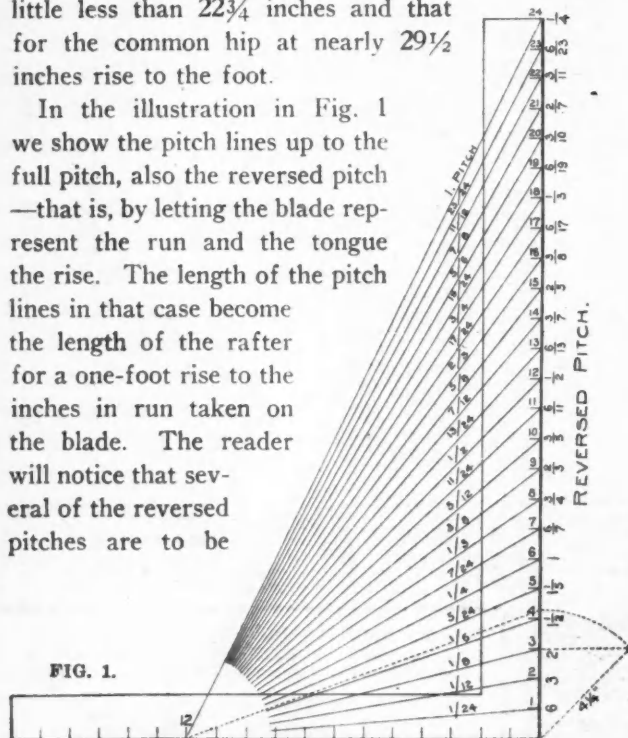


Diagram Showing Pitch Lines Up to Full Pitch, Also Reversed Pitch on Steel Square.

found in the first column, tho representing some other pitch, that is, the full pitch becomes the ¼ pitch when reversed. The ¾, same as ⅓. The ⅔ as ⅜. The ½ being at the halfway point between horizontal and perpendicular remains unchanged.

From this it will be seen that the low pitches become very steep when reversed. Thus, 1/24 pitch becomes 6 pitches or has a rise of 12 feet to a one-foot run. The 1/12 pitch has a rise equal to 3 feet to a one-foot run, etc.

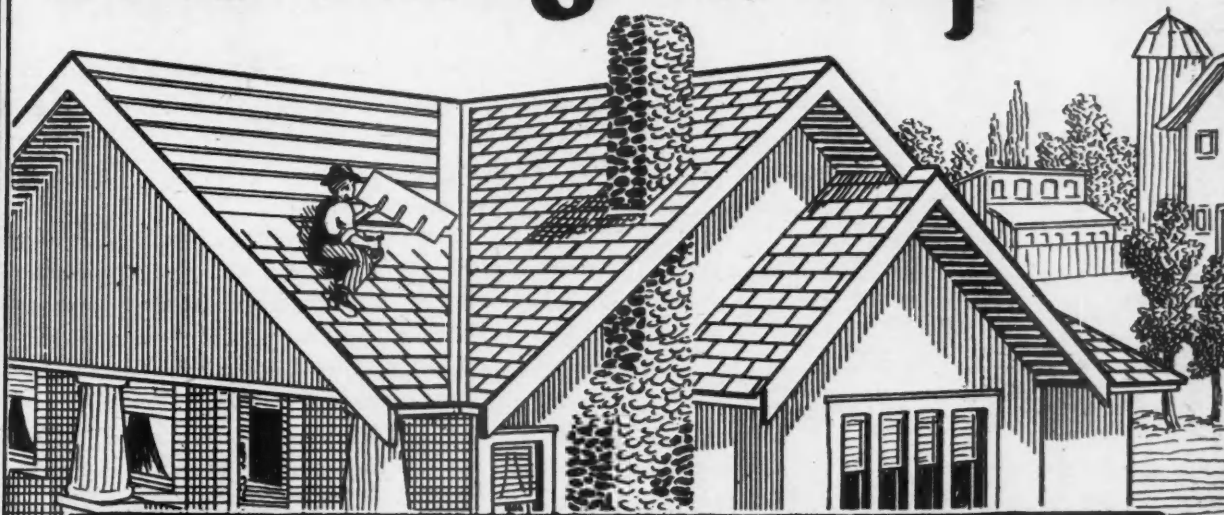
For the corresponding length of the hip or valley for these pitch lines, add 5/12 to the run of the common rafter which is the same as taking the diagonal of a square, whose sides equal the run as shown by the dotted lines for a 3-inch run, which in this case is equal to 4¼ inches and measure diagonally across to 12 on the tongue will give the length per scale for the hip for each foot in rise of the common rafter. This, of course, reverses the seat and plumb cuts, on the square, and also causes a calculation that can be simplified by always reckoning the run on the tongue regardless of the pitch given the common rafter.

In Fig. 2 is shown how to apply the steel square for steep pitches. In this illustration we show all of the pitch lines up to 96-inch rise to one foot in run, or full pitches. The pitch lines shown in connection with the steel square, represent the same up to the full pitch. Now leaving the pitch lines as they are and just imagine that we slide the square to the left until the 6-inch mark on the tongue rests at the starting point A and it will be seen that the scale has been reduced one-half; in other words, the pitch lines would intersect the blade at the ½-inch marks, thereby permitting of a 48-inch rise to a one-foot run. The 48 being double 24 (the span) is therefore equal to full pitches. If it is necessary for a still further reduction, just slide the square again to the left until the 3-inch mark on the tongue rests at the starting point. The pitch lines will then intersect the ¼-inch marks on the blade and permit 96 inches rise to one foot in run or four full pitches. These are of course unusual, but the rule that applies to the common pitches, that is, those most generally used, necessarily applies to these.

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In every community the housing situation is acute. Relief will be gained only by the erection of many homes. This Spring and Summer a great many new buildings will be erected and old ones remodeled and re-roofed. You should *cash in* on this building boom.

Vulcanite Slab Shingles, Style "L" find a ready sale—are popular with the trade because of their moderate price, beauty, durability, fire-resisting qualities and the ease and quickness with which they are laid. Surfaced with Red or Green crushed slate.

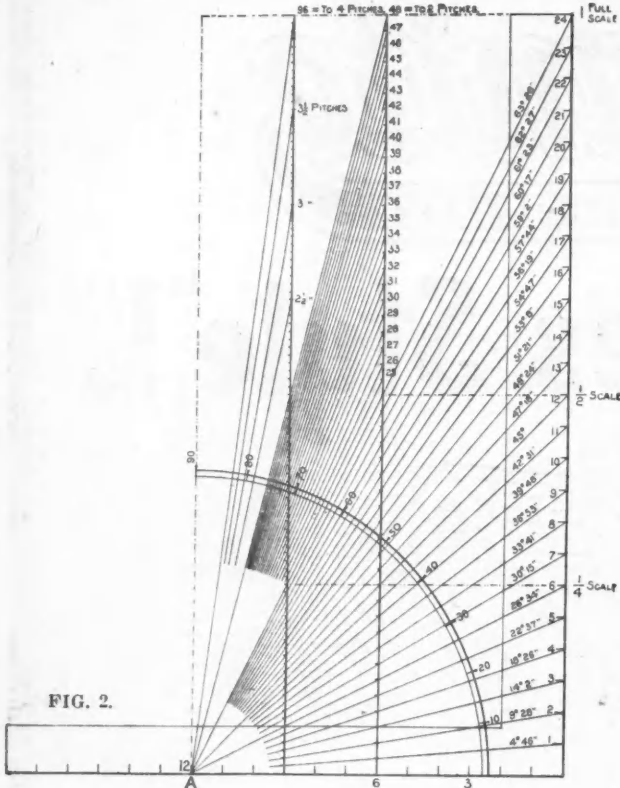
Write our nearest branch office for samples, prices and other information.

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Vulcanite Roofing Company
FAMOUS for QUALITY
ROOFING DIVISION OF THE BEAVER BOARD COMPANIES

Anderson, Ind.
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San Francisco, Cal.

For the corresponding hip or valley for the pitch lines above the full pitch, use $8\frac{1}{2}$ on the tongue for the $\frac{1}{2}$ scale and $4\frac{1}{4}$ for the $\frac{1}{4}$ scale. It will be seen that by the reduction in the scale, taken on the tongue of the square, permits of many pitch lines on the blade, thereby increasing the rise to any desired height.



How to Apply Steel Square for Steep Pitches. Degrees and Minutes Are Shown.

In this illustration we give the degree and minutes of pitch for the common rafter up to the full pitch. To find the same for the reversed pitch lines, it is only necessary to subtract the degrees here given from 90 degrees. Thus—to find the degrees for the full pitch when reversed, subtract $63^{\circ} 26'$ from 90° . To do this it must be remembered that it is necessary to borrow one degree from ninety and that one degree is equal to 60' and should be expressed thus: $89^{\circ} 60' - 63^{\circ} 26' = 26^{\circ} 34'$, which will be seen is the same as that for a six-inch rise or the $\frac{1}{4}$ pitch. By referring to the degree scale in Fig. 2, the degree of the other pitch lines can be very neatly arrived at by scale as shown in the quadrant.

We trust we have made it clear that by using the tongue of the square to represent the run, instead of the blade, as is the custom of most other writers, permits of the pitch lines up to the full pitch. Then again the blade being longer than the tongue gives a greater range of angles without reduction from the full scale to obtain the

side cuts of the jacks and hips, which with this system are always on the blade, thereby helping to fix more readily on the mind the different cuts and where they belong on the steel square.

Wood Needs Protection

WOOD must be protected. Standing in the forest, in the form of a tree, the bark serves as the protection. Knock off a patch of the bark and the tree begins to decay where the protector is gone.

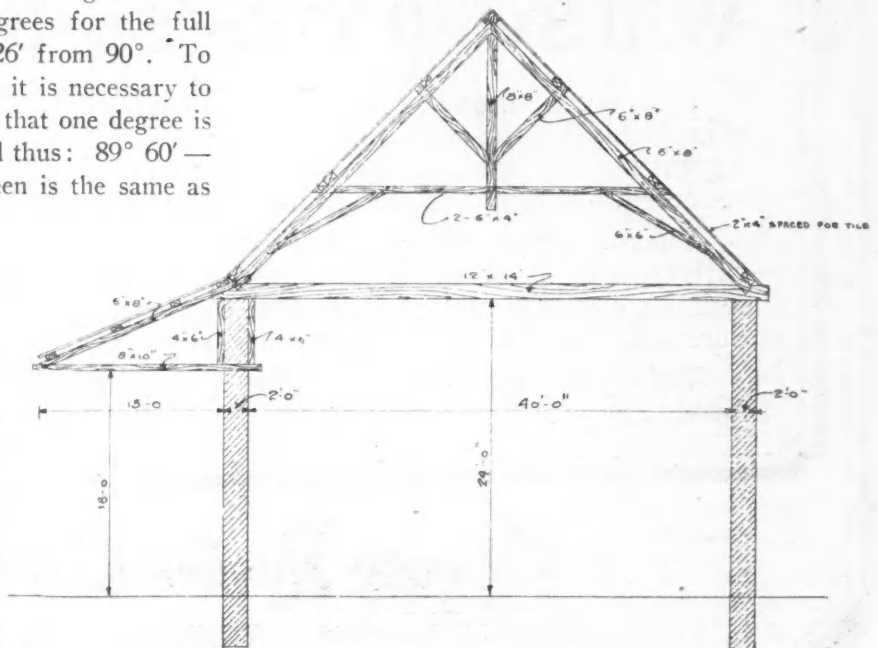
When manufactured into lumber, and the lumber is used in building, paint becomes the natural protector of wood. Let the paint wear off and the decay sets in at the bare spot.

Paint prevents decay of wood even in the tree. Oftentimes when a patch of bark is knocked off, a coat of heavy tar or creosote paint is applied and no decay takes place.

A Roof Truss in Rural France

MANY readers will be interested in how the French farmers, who use practically no nails and hew their structural members from the log right on the job, frame their roofs. The sketch herewith is a typical truss which is used thruout that country and is decidedly interesting, especially so the manner in which the cantilever action of the overhanging shelter is transmitted directly to the truss so that the whole roof would have to be lifted up, or the 8x10 break, to cause failure.

These roofs are almost invariably covered with tile, in which case the roof surface is strapped vertically with 2 by 4's on which the tile is laid. The stone walls are laid without mortar, being merely embedded in sand or very fine gravel. G. M. PETERSEN.

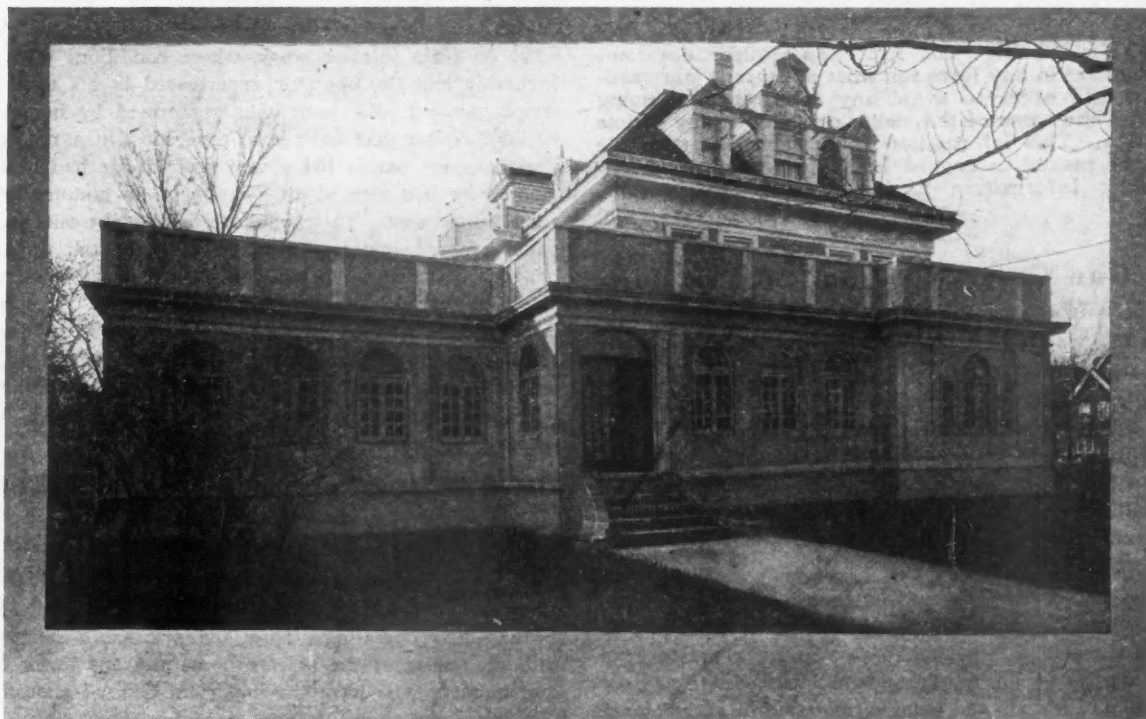


TYPICAL ROOF TRUSS IN RURAL FRANCE

French Farmers Use Very Few Nails in Barn Construction. These Roofs Are Usually Covered with Tile and Are Very Strong.

Vitri-Flux

For Concrete and Cement Products



Stucco for Home Building Vitri-Flux for Waterproof Stucco

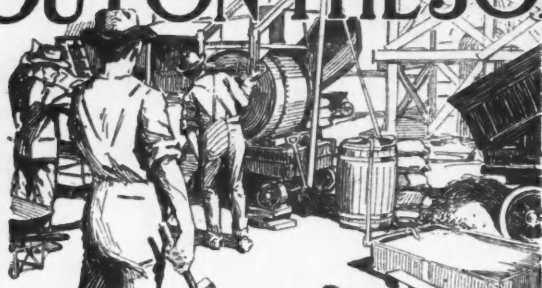
STUCCO is deservedly the most popular finish for the surface of homes. No other material is capable of more varied and artistic treatment.

But stucco should be waterproof. Freezing and thawing has a powerful disintegrating effect on a moisture-absorbent surface. A Stucco that will absorb every raindrop that falls against it will remain mottled and blotched for hours after each shower.

Vitri-Flux added to the water with which the stucco is mixed will effectively waterproof it.

The **GRANITEX COMPANY** 171 MADISON AVE.
NEW YORK CITY

OUT ON THE JOB



What Builders Are Finding Good

EDITOR'S NOTE: The American Builder does not accept payment in any form for what appears in our reading pages. In order to avoid any appearance of doing so, we omit the name of the maker or seller of any article we describe. This information is, however, kept on file and will be mailed to anyone interested; address American Builder Information Exchange, 1827 Prairie Ave., Chicago.

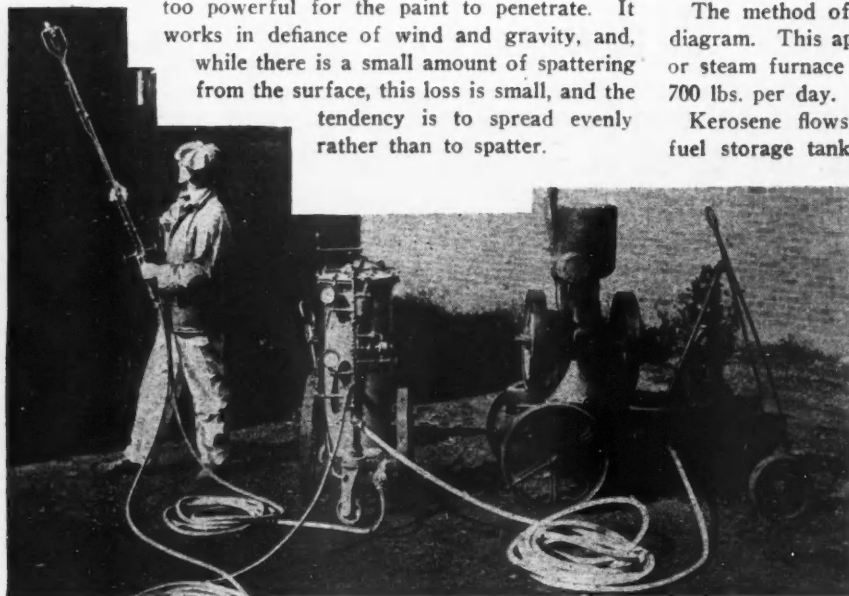
Paint Gun Covers 2000 Sq. Ft. Per Hour

PAINTING with mechanical appliances for industrial buildings, tanks and other large projects has been gaining in popularity with contractors.

There were many small difficulties to be overcome in the operation, but one of the main problems was to confine the paint jet to a definite radius while in transit from the nozzle to the surface to be painted; to reduce splashing and prevent volatilization. A gun that is being used extensively has demonstrated that a hollow conical air jet within which paint is liberated helps considerably.

This nozzle has two openings—a central opening for paint and an annular opening around the center from which the air is discharged as a veritable blast under a pressure approximating 60 pounds to the square inch. There are separate conduits for air and paint terminating in a right angle on each side, which operates at any desired angle.

The paint is driven from the central outlet under low velocity and is immediately picked up by the surrounding air jet and carried to the painted surface. The air jet is too powerful for the paint to penetrate. It works in defiance of wind and gravity, and, while there is a small amount of spattering from the surface, this loss is small, and the tendency is to spread evenly rather than to spatter.



Paint Gun Equipment. The Compressor is shown at the right and the Storage Tank in the center. Both air and paint are forced out of the funnel-shaped gun at high pressure.

A powerful air-jet at the painter's command for cleaning of dirty surfaces has been found efficient in reaching crevices and out-of-the-way corners, a difficult task with the hand painter's cleaning implements—the wire brush, putty knife and cloth.

An efficient jet system compares favorably with brushing in the treatment of rough surfaces, such as rock-faced masonry, rough lumber, etc., because perpendicular application of the paint enables it to penetrate voids better than brushing across the surface. In the instance of a nail head or bolt head protruding a small fraction of an inch from the surface, a single sweep of the paint gun fills it, front, back and all around, while a hand painter must make several passes with his brush if some part of the metal or adjoining wall is not left unpainted.

The paint gun has covered 2,000 square feet per hour or more on plain interior work, where conditions were wholly favorable and the operator experienced in his task. In interior painting jobs sometimes performed by novices, 1,000 to 1,600 square feet have been covered. On a recent job at a gymnasium, panels 104 square feet in size had been hand-painted by two men at an average of 35 minutes per panel for a single coat. This appliance handled by one man did a panel every 5 minutes. A huge storage tank on the roof of the new Overland building in Cleveland was given a single protective coating of red in 3½ hours. The tank had 3,500 square feet of surface. It was about 18 feet from the top of the tower on which it was located, and no ladders or scaffolding were required. One painter, with the aid of a helper in handling and arranging the hose, did the whole job.



Oil-Burning Apparatus for Coal-Burning Heating Plants

WITHIN the last few years the use of oil for heating purposes has greatly increased. Locomotives, battleships and large plants are using it quite extensively for both heating and operating. Now the practice is being carried into the realm of the private home and apartment building, and builders who have the important task of choosing heating plants are giving it some careful study.

An automatic oil-burning apparatus which is being installed in many private residences and buildings is intended primarily for use in connection with the heating plants which now operate on coal.

The method of installation is shown in the accompanying diagram. This apparatus is installed in hot water, warm air, or steam furnace which has a coal consumption of less than 700 lbs. per day.

Kerosene flows by gravity thru a supply line from the fuel storage tank to the float-chamber, where the oil level is maintained by the needle valve.

The thermostat is located in an upper room. When the temperature of the room drops below the point at which the thermostat is set, contact is made with the motor of the heat regulator setting the regulator shaft in motion. Contact is made by means of the regulator motor-switch connected with the city electric circuit, which furnishes current to the motor mounted on the blower housing.

The contact starts the blower which furnishes a forced draft of air thru a tube leading to the combustion chamber, and thru an atomizing fuel nozzle located in the air-tube close to the combustion chamber.

THE MAGIC OF KELLASTONE

IMPERISHABLE STUCCO

IN YOUR TOWN are hundreds of frame, brick or stone structures—homes, churches, schools, public buildings, etc., which give the contractor or builder an unusual opportunity to remodel with

KELLASTONE

IMPERISHABLE STUCCO

At a very small cost, these unattractive structures can be transformed into beautiful modern homes of distinctive architectural designs.

It may be put on over wood siding, brick, tile or stone, without disturbing occupants. Is the original all-mineral magnesite stucco, never cracks like ordinary stucco and possesses the dense strength of granite. Is a perfect insulator against heat, cold, fire or weather. Wonderful effects produced by the use of various colored dashes.

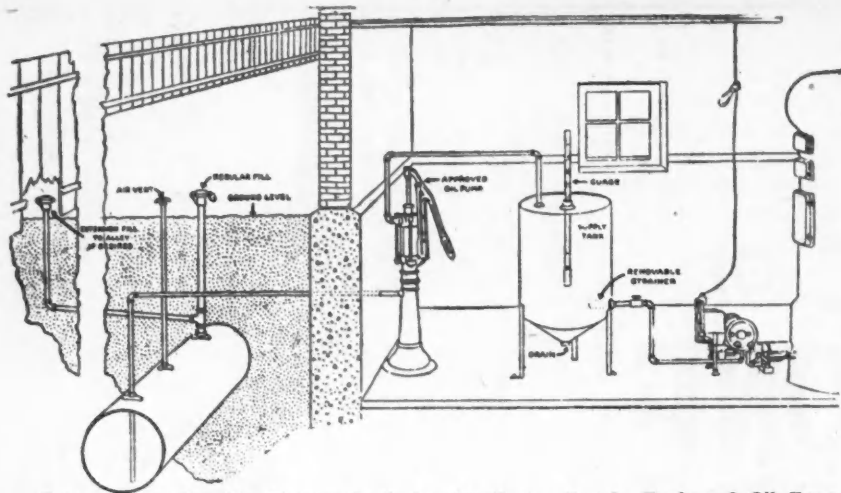
Write for full information

NATIONAL KELLASTONE CO.

Room 515—155 East Superior Street

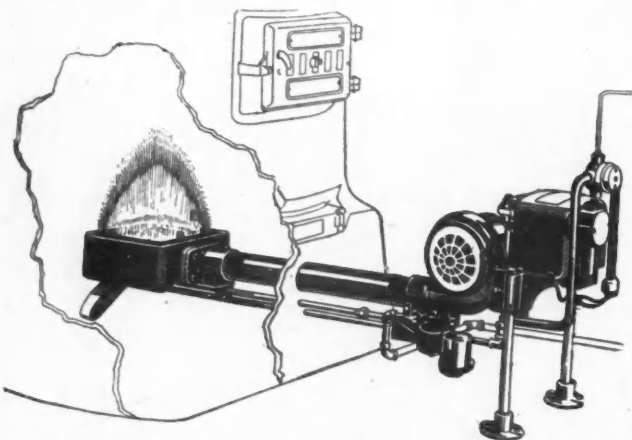
CHICAGO, ILL.





Cross-Section Showing Storage Tank for Oil, Pump, Supply Tank and Oil Burner with Connecting Pipes. This System Has Been Installed in Many Private Residences and Buildings.

The suction of the air passing thru the fuel nozzle draws the kerosene from the float-chamber and feeds a finely atomized spray of fuel into the combustion chamber.



Phantom Drawing, Showing Oil Burning Apparatus Installed in Modern Heating Plant and in Operation.

The nozzle is so designed that air in correct proportion is mixed with the oil; hence the fuel is burned with complete combustion in the combustion chamber.

A pilot-light, supplied from the city gas line, is located in the combustion chamber, directly in front and beneath the point at which the fuel is fed into the chamber.

This pilot-light burns continuously in a low flame when the blower is not in operation. At the same time that the heat regulator acts and sets the blower in motion, the shaft of the heat regulator opens a gas-valve located directly behind the regulator and engages with the shaft of the regulator by means of a self-adjusting coupling. With the one-half revolution of the regulator, the pilot flame is turned from low to full opening and back to low again.

During the expansion of the pilot-light's flame, the sprayed kerosene is ignited; when it has been ignited, the pilot has again been reduced to the low flame.

The fire continues to burn in the combustion chamber until the temperature

at the thermostat in the upper room is brought to a point at which the thermostat is set to operate.

With the action of the thermostat the current to the motor is shut off by means of the heat regulator, so that no air is fed thru the tube and no fuel is being supplied to the combustion chamber.

The action of the fire going on and off in this manner is governed by the temperature at the thermostat.



Making the Ford Work in the Shop

MANY contractors and carpenters who own a Ford car or truck will be mighty interested to learn about the new accessory which recently

made its appearance. It is designed to make the Ford work when it is not out hauling the material to the job or the family to town.

Recently when confronted by a shortage of power due to the fuel strike one firm used this apparatus to operate several lathes, emery wheels and other machinery.

The appliance is adapted to quick changes for the task of fitting on the belt or taking it off only requires a few minutes.

When this appliance has been attached to the crank shaft of the Ford it can be used to operate a saw rig, concrete mixer, power woodworker, mortar mixer, hoist trench pump or other machinery the contractor uses that requires power. It is especially interesting in view of the present shortage in gasoline engines. Contractors are finding themselves somewhat handicapped for this reason.

The appliance consists of a pulley attachable to the cranking end of the engine shaft. By hitching it to an ordinary belt, as shown in the accompanying illustration, this pulley will drive a wide variety of machinery and develops 8 to 12 horsepower.



Ford Fitted Up with Power Device Operating a Large Shop and Keeping the Machinery Going During a Power Shortage. This Appliance Can Be Used Handily by Carpenters in Their Shops to Operate Saw Rigs.

ARE YOU WASTING LUMBER, NAILS AND LABOR?

Do You Realize What You Lose on Each Job by Still Using the Old Wood Scaffolding?

First, think of the lumber and nails it takes; and at the present high cost of these items you can easily see that a great many dollars are being thrown away; these dollars belong in your pocket.

Then see how much time you lose in staging a job with wood; while you are putting up this scaffolding you could just as well be busy on the real construction work which means that you would finish the job much sooner; **LABOR SAVING IS DOLLAR SAVING NOWADAYS.**

Do Away With Wood Scaffolding

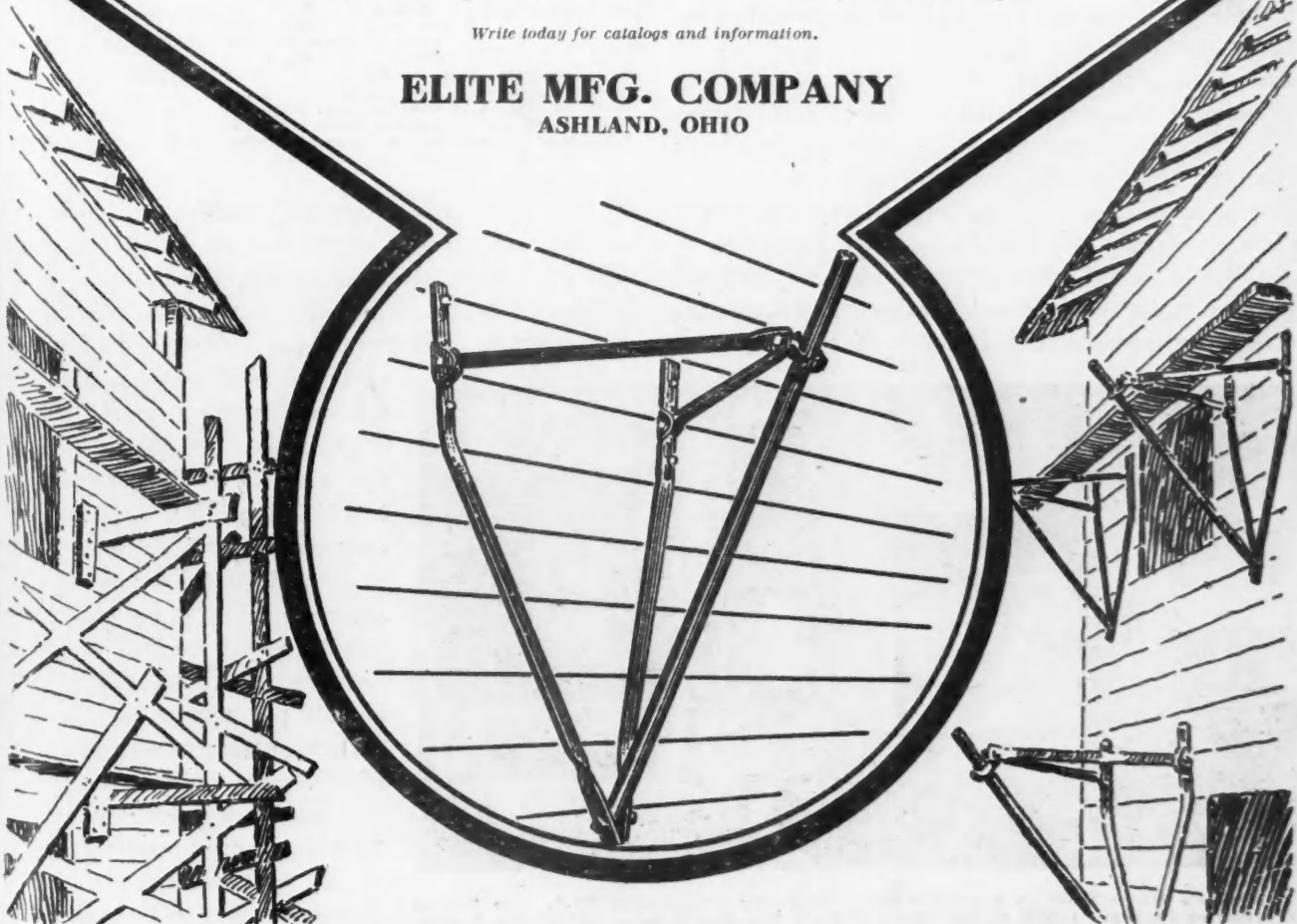
Reliable Scaffold Brackets will save you all this waste as each bracket requires only four nails; then to remove the bracket simply lift it off and drive the nails in; your bracket then folds up and is ready for the next job.

The "RELIABLE" is strong and steady—no side movement—they are quickly installed and removed, and then, too, they can be used equally well on brick, stucco, brick-veneer as well as frame buildings.

You can save the price of Reliable Brackets on your second job.

Write today for catalogs and information.

ELITE MFG. COMPANY
ASHLAND, OHIO



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

Recommended Concrete Tile and Block Practice

ARTICLE I OF A SERIES OF ARTICLES BASED ON REPORTS OF THE VARIOUS SUB-COMMITTEES OF THE COMMITTEE ON CONCRETE BLOCK HOUSES, NATIONAL CONFERENCE ON CONCRETE HOUSE CONSTRUCTION

By A. J. R. Curtis

PERHAPS never before has there been prepared such a complete, concise and authentic code for the manufacture and use of concrete structural block in residential and general construction work as was presented at the National Conference on Concrete House Construction, thru the report of the committee on concrete block houses and the discussion of the latter in the various sessions. It is for that reason that the AMERICAN BUILDER has arranged to publish several articles, with explanations and pertinent comment, the substance of the following sub-committee reports which make up the report of the committee on concrete block houses.

- I. Recommended Practice for Concrete Block and Tile Construction.
- II. Standard Block Sizes, with Building Calculations.
- III. Surface Finish and Cement Stucco on Block.
- IV. Concrete Trimstone and Ornamental Work.

These articles have been prepared for the AMERICAN BUILDER with the co-operation of members of the committee and officers of the conference.

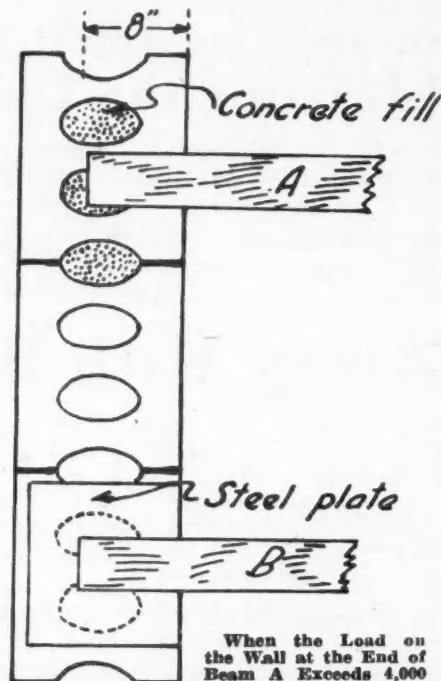
Block and Tile Practice

The sub-committee on recommended practice for concrete block and tile construction recognized in its report the following eight points as deserving of particular attention: (1) Specifications and building regulations for concrete block and tile; (2) Composition, preparation and use of cement mortars; (3) Approved types and thicknesses of mortar joints; (4) Making foundation walls watertight against pressure; (5) Use of split sills and lintels; (6) Protection of sills, lintels and other projecting or unusually exposed portions of the wall against breakage and spattering during construction; (7) Methods of cleaning down

concrete block walls; (8) Applying of plaster with and without furring and lath.

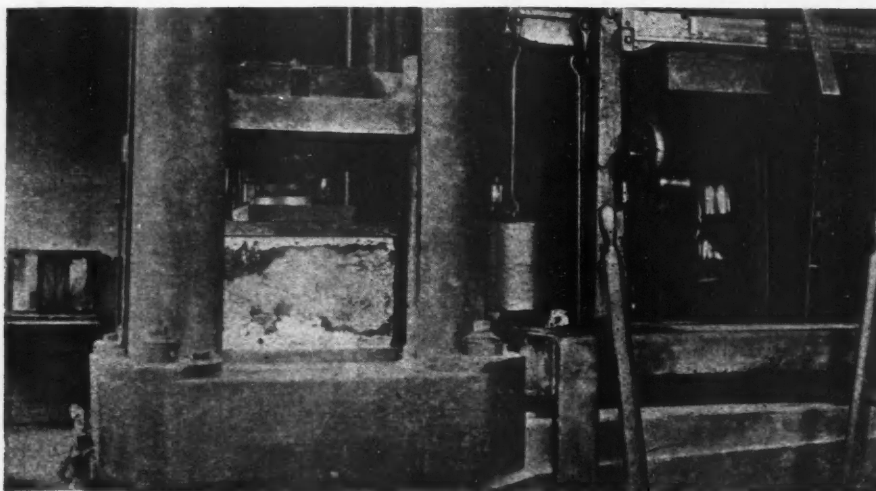
Specifications for Concrete Block and Structural Tile

Concrete block and concrete structural tile used in house construction must be of highest quality as regards load-bearing ability and resistance to moisture. The committee on concrete block houses endorsed and recommended the standard specifications and building regulations for concrete architectural stone, building block, and brick, adopted by the American Concrete Institute, April 10, 1917.



When the Load on the Wall at the End of Beam A Exceeds 4,000 Pounds, the Block on Which It Rests Must Be Made Solid for at Least 8 Inches from the Inside Face of the Wall, as Shown, Unless a Steel Plate Is Used (as Shown Supporting Beam B). This Plate Must Be Sufficiently Large to Reduce the Bearing Load to 167 Pounds Per Square Inch.

These specifications provide for tests of the product to be made in a testing laboratory of recognized standing, as follows: Ultimate compressive strength—(a) In the case of solid cast stone, block and brick, the ultimate compressive strength at 28 days (after manufacture) must average 1,500 pounds per square inch of gross cross-sectional area as used in the wall, and must not fall below 1,000 pounds per square inch in any test; (b) In the case of hollow building block and tile, the compressive strength at 28 days must average 1,000 pounds per square inch of gross cross-sectional area as used in the wall and must not fall below 700 pounds per square inch in any particular test; (c) In the case of two-piece building block, if only one block is tested at a time, the ultimate compressive strength at 28 days must equal 1,000 pounds per square inch of gross cross-sectional area, computing



Concrete Stucco Block in Testing Machine Ready for Compression Test. The Uneven Coloring on the Block Is Due to the Plaster of Paris Base and Capping, Which Are Applied to the Block to Insure a Uniform Bearing When the Load Is Applied. This Block Withstood a Load of 1,756 Pounds Per Square Inch.

Build Comfort into the homes of your Clients



STANDARDS of living in America have reached the highest stage in history. The people of this country insist on comfort in every appointment of their homes. Nothing yet devised contributes more comfort to the home than

The Little Draft-Man Furnace *Regulator*



It sets a new standard of heating comfort and convenience.

Builders are known and advertised by the completeness and class of the homes they erect for their clients. When they recommend the "Little Draft-Man" they display their alertness as to the things that are right. By including it they help sell the homes they build. Nine times out of ten the home builder will quickly O. K. installation of the "Little Draft-Man" as a part of the heating plant when they are shown what it adds in the way of convenience, comfort and economy.

With the "Little Draft-Man" attached to the heating plant it will no longer be necessary for someone, half-awake to stumble below stairs in the cold to open up the furnace draft. The "Little Draft-Man" does this chore while the family nestles in comfort beneath the bed-clothes. It is only necessary to set the regulator at night. There are no electrical connections or contacts—nothing to get out of order.



People dress mornings in comfort where the "Little Draft-Man" warms the house before "get up time." Set the regulator at night. It mechanically opens the furnace draft at the hour set.

Builders Will Be Interested

in this remarkable device. It is now supplied on new or old installations by the leading furnace manufacturers.

The Price is Only \$18.00

East of the Rocky Mountains

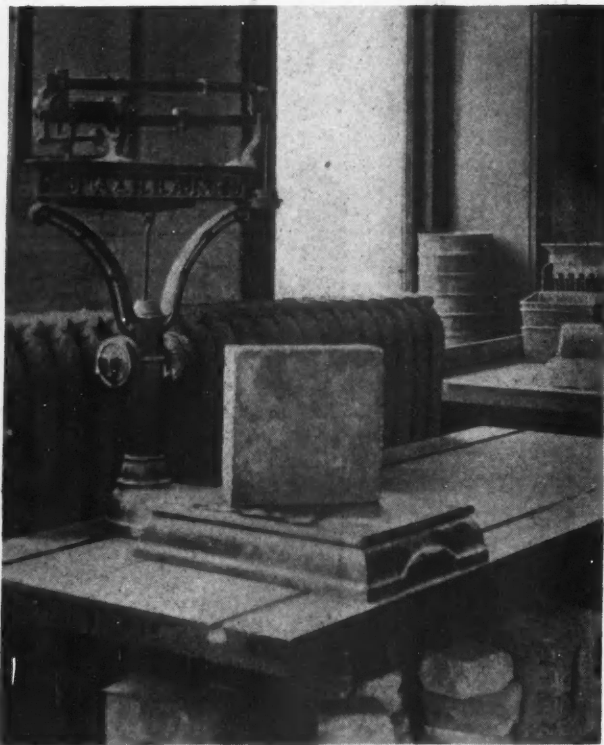
No device giving equal comfort and convenience can be offered your clients at anywhere near this price. Works equally well with old or new heating plants of any make—warm air, hot water, steam furnaces or boilers. Installation is easy.

*On sale by all heating equipment dealers,
hardware stores, etc. Sent direct if your
dealer will not get it for you.*

Sahlin Manufacturing Co.

31 Ottawa Ave., N.W. Grand Rapids, Mich.

CANADIAN DISTRIBUTORS, McCLARY'S, LONDON, ONT.



The Test for Absorption Consists of Weighing the Block Absolutely Dry, Immersing It in Clean Water for 48 Hours, Carefully Wiping the Surface and Reweighing, on an Accurate Scale, as Shown. The Wet Block Must Not Weigh Over 10 Per Cent More Than When Dry.

this area as the product of the length of the block by one-half the width of the wall for which the block is intended. If pairs of two-piece block are tested together, the gross cross-sectional area shall be regarded as the product of the length of the block by the full width of the wall for which the block is intended. No single test on above two-piece block shall fall below 700 pounds per square inch of cross-sectional area as computed above.

How Blocks Are Tested

The block to be tested are first carefully measured, then bedded in plaster of paris or similar material, in order to secure uniform bearing in the testing machine. The load is then applied until failure on each individual specimen. The load applied, divided by the cross-sectional area in square inches, as described above, gives the load per square inch. When testing other than rectangular block, great care must be taken to apply the load at the center of gravity of the specimen. At least six specimens of block should be presented for testing.

American Concrete Institute specifications provide that

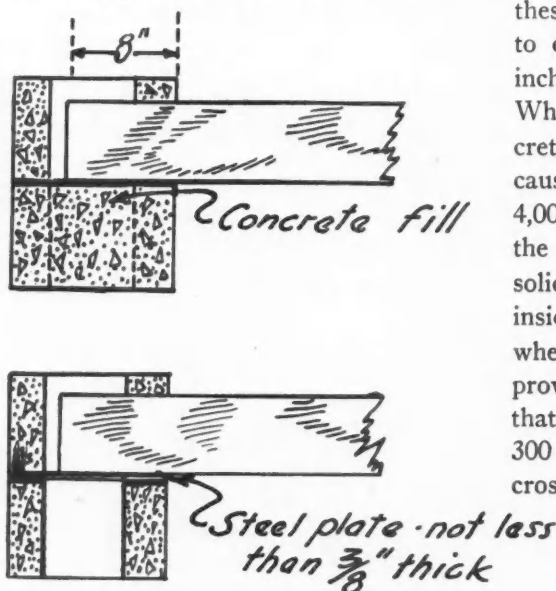
no block or tile 28 days old, for use in building construction, shall absorb more than 10 per cent of its weight in water, when the entire block is immersed in water for a period of 48 hours. This absorption test is of relatively very great importance. The degree of watertightness of a block indicates its density, and density is proportional to strength, other factors such as quality of the materials and proportions of the mixture being equal. The fact that a block may in 48 hours absorb a quantity of water equal to 10 per cents of its weight does not mean that the block would pass water thru it. While the entire block, immersed, may absorb as much as 10 per cent water, the face of any good block will have an absorption so low as to be insignificant. While few blocks appear on the city markets today so poorly made as to pass water directly thru them, difficulty will be experienced with the block whose exposed surface is just porous enough to absorb dirt-laden water, retaining the dirt in the pores of the concrete, producing in due time dirty and dead appearances, particularly displeasing after rains.

For the absorption test, the specimen is first thoroly dried to a constant weight at a temperature not to exceed 212° F. and the weight recorded. The specimen is then immersed in clear water for 48 hours, after which it is removed, the surface water wiped off, and the sample re-weighed.

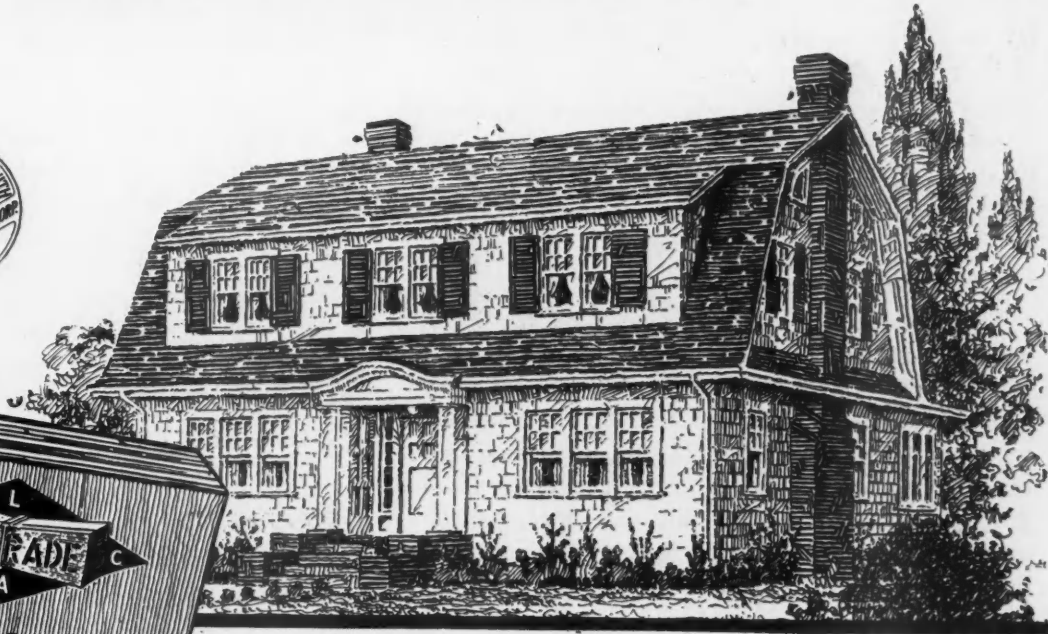
The load allowed on solid walls of concrete block, laid in portland cement mortar, or hollow walls filled with concrete, is not to exceed 300 pounds per square inch of gross cross-sectional area. Load allowed on hollow walls of concrete block or tile is not to exceed 167 pounds per square inch of cross-sectional area.

If the floor loads are carried on girders or joists resting on concrete pilasters filled in place, of a mixture not leaner than one part portland cement, two parts sand and four parts pebbles or crushed stone, these pilasters may be loaded not to exceed 300 pounds per square inch of gross cross-sectional area. Where girders or joists rest on concrete blocks in such a manner as to cause concentrated loads of over 4,000 pounds, the block supporting the girders or joists must be made solid for at least 8 inches from the inside face of the wall, except where a suitable bearing plate is provided to distribute the load so that it will not average more than 300 pounds per square inch of gross cross-sectional area, if of solid block, or 167 pounds per square inch if of hollow or two-piece blocks.

When the combined live and dead floor loads exceed



Vertical Sections, Upper Illustration Showing Beam Resting on Solid Concrete Block or Concrete Filled Hollow Block. Lower Illustration Showing Beam Resting on $\frac{3}{8}$ -Inch Steel Plate.



The All-Shingled Home Is Decidedly the Vogue

THE quaint charm of the cedar shingled exterior has set a new fashion in home building. Indeed, many of the newest colonial and bungalow types owe their attractiveness to their red cedar shingled exterior.

Greatest value is obtained if you specify "Rite-Grade Inspected" Shingles—this means every shingle

is strictly serviceable and up-to-the grade under which sold.

There are three grades of Rite-Grades and all are up-to-grade. Ask your dealer what grade you need.

Book of Plans—We will mail you a copy of our Distinctive Homes Booklet. Send two-cent stamp]to defray mailing cost.

**SHINGLE BRANCH, WEST COAST LUMBERMEN'S ASSOCIATION
426 Henry Bldg., Seattle, Wash.**

and

**THE SHINGLE AGENCY OF BRITISH COLUMBIA
911 Metropolitan Bldg., Vancouver, B. C.**

RITE-GRADE INSPECTED RED CEDAR SHINGLES

60 pounds per square foot, floor joists shall rest on $\frac{3}{8}$ -inch steel plates of a width $\frac{1}{2}$ inch to 1 inch less than the wall thickness; or in place of these steel plates the joists may rest on solid block, three inches to four inches less in thickness than the width of the building wall, but such bearing block must be at least eight inches in thickness.

Thickness of Concrete Block Walls

The thickness of concrete block and tile bearing walls should properly be governed by the limits of loading, 300 pounds per square inch for solid walls and 167 pounds per square inch for hollow walls. The minimum wall thickness is usually, altho not necessarily, considered 8 inches. The above calculations are approximated in the following table, which is incorporated in the American Concrete Institute specifications and now used in a number of city building codes.

THICKNESS OF WALLS IN INCHES OF RESIDENCES AND APARTMENT BUILDINGS WHERE DEAD FLOOR LOAD DOES NOT EXCEED 60 POUNDS PER SQUARE FOOT

No. of Stories	Basement Inches	First Story Inches	Second Story Inches	Third Story Inches	Fourth Story Inches
1	8	8
2	10	8	8
3	12	12	10	8	..
4	16	12	12	10	8

Where walls are decreased in thickness, the top course of the thicker wall must afford a solid bearing for the webs or walls of the course of block above.

Mortar and Mortar Joints

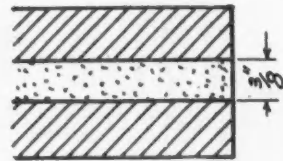
The essentials for good mortar joints are:

1. Density and low absorption of moisture.
2. Ample compressive strength.
3. Ability to attain strength rapidly.
4. Good working qualities.
5. Pleasing appearance.
6. Ability to resist exposure to the elements permanently.

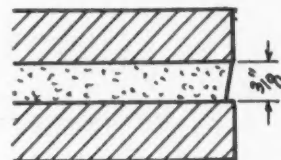


Protection of Concrete Architectural Stone, and in Fact All Protruding and Exposed Part of the Surface While Construction Is in Progress, Is Very Important. Rough Box Protection, Like That Shown, Is Inexpensive.

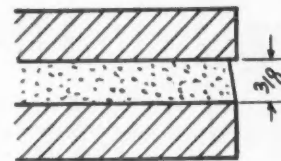
The mortar used in laying up concrete block and tile should, for a number of reasons, be of first quality. The units laid in it are heavier than brick or clay tile, forcing the mortar to sustain a greater weight than is the case with other materials, excepting natural stone. The mortar must be comparatively strong in



FLUSH JOINT



STRUCK JOINT No. 1



STRUCK JOINT No. 2

Some Types of Mortar Joints Used in Laying Up Concrete Block.

order to make the joints equally as strong as the block. Portland cement mortar is recommended, therefore, and it has, in addition to the necessary strength, the ability to make practically a monolithic bond with the block, because of the similarity of material in the block and mortar.

Portland cement mortar should be made with washed sand, proportioned from fine to coarse. The water used should be clean. A small amount of well-slaked or commercially hydrated lime may be used to impart better working qualities—to make the mortar “fat.” The quantity of lime used should not exceed 25 per cent by volume of the cement in the mixture.

Rich, impervious mortar obtained by a mixture of one part portland cement to two parts sand is recommended. The mortar should be mixed thoroly and with just sufficient water to give maximum plasticity. Only such mortar as can be used within 30 minutes should be mixed at a time. Retempered mortar should not be used. Mortar joints $\frac{1}{4}$ inch or $\frac{3}{8}$ inch in thickness are preferred.

None but finely ground mineral colors should be used for making colored mortars. The amount of mineral colors should not exceed 10 per cent by weight of the cement in the mixture. Extreme care must be taken that successive batches of mortar contain exactly the same proportions of cement, sand, coloring matter and water; otherwise the mortar will not be uniform in color.

A good bond between mortar and block is essential. Therefore mortar should be applied with force. For best results both ends of the block should be buttered. The horizontal or supporting section of the block should be entirely covered with mortar. Quite a number of styles of

MIDLAND TERRA COTTA

The Most Attractive Building Material

The value of any property is increased by the use of this material. Apartments rent easier and for more money and store fronts win more attention by its use.

Tell us your building problem and we will gladly quote our price and give all help possible.

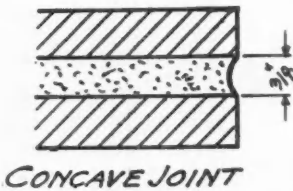
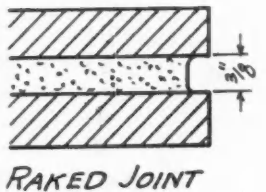
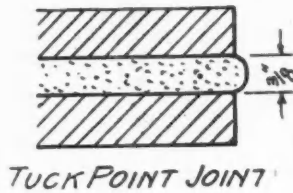
MIDLAND
TERRA COTTA
COMPANY
Lumber Exchange
CHICAGO



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joints are in common use. Among these are the flush joint, struck joint No. 1, struck joint No. 2, concave joint and tuck point joint.

The flush joint as its name implies, is made by striking the mortar off flush with the wall surface. Except where the blocks are to be covered with stucco, the flush joint is not recommended because of its porousness and openness.



Illustrating Types of Mortar Joints Used in Laying Up Concrete Block. The Tuck Joint Shown Above Is Not Recommended.

Struck joint No. 1 is made by drawing the trowel along the joint with the blade resting on the edge of the block below the joint. In making struck joint No. 2, the operation is the same as for No. 1, except that the blade of the trowel glides on the edge of the block above the joint. The later is preferable because it provides a more weatherproof joint. It is often called a weather joint.

The concave joint is made by drawing a pointing tool along the joint, producing a concave surface. This operation compacts the mortar, producing a dense, watertight joint. It is the type of joint recommended as most practical for concrete block houses which are not intended to receive a stucco finish.

The tuck point joint is seldom used and is not recommended. This joint is formed by a special tool producing a joint which projects beyond the wall surface.

Making Foundation Walls Watertight

An absolutely dry basement is one of the requirements of good construction. When the site on which the house is to be located does not have good natural drainage, special precautions should be taken to make the concrete block walls watertight below grade. This treatment should be calculated to seal the mortar joints securely.

The simplest and most commonly recommended precautionary measure is to plaster the rough exterior of the basement wall, while wet, with cement mortar; then after the

wall has become thoroly dry, paint the surface with hot pitch or asphalt. Where practical, lines of drain tile should be laid around the outside of the wall footings and at least six inches below them, to carry off excess water.

Sills and Lintels

Special precautions should be taken to forestall the penetration of moisture at the sills, lintels and special courses and likewise to prevent condensation on the inside walls at these points. Split (two-piece) sills, lintels and trimstone are recommended for use in residence construction, as they provide an air space which acts as an insulator and arrests the direct passage of moisture. Space between inner and outer sections need not be greater than 1/4 inch. In two-piece lintel construction each division of the lintel should be reinforced according to standard methods to carry superimposed loads. In some cases, where it may be inconvenient to use two-piece sills, the penetration of moisture is prevented by casting a suitable metallic strip on the top of the solid sill.

Adequate protection against damage during construction must be provided for exposed portions of the surfaces, such as sills, lintels, trimstone and corner construction. Where exposed to unusual danger, the work should be covered with building paper and boxed in. Workmen should be cautioned to be reasonably careful not to spatter the walls during erection.

Plastering on Block with or without Furring

Some concrete block enthusiasts have recommended that plaster be applied directly to the block surface. These recommendations have been made despite the fact that it is customary to fur out the plaster for all kinds of masonry houses. Furring and lathing cost only a trifle more when considering the total cost of the house and it assures a warmer wall. The better insulation thus provided effects a considerable saving in the winter coal bills and provides a house which is cool in summer. In no case shall plaster be applied directly on the concrete surface unless the house is constructed according to the following specifications:

The wall shall be constructed of two piece block providing a continuous air space from the footing to the eaves and entirely around the building. All sills and lintels shall be of the two-piece type and the inner and outer sections shall be separated so as to provide a clear air space between them. The outside of the foundation below grade shall be water-proofed as herein before specified.

S. 19097
TESTING LABORATORY, CASE SCHOOL OF APPLIED SCIENCE, CLEVELAND, OHIO
 Compression Tests of Concrete Building Blocks
 (For Geo. D. Barriball, 13002 Miles Avenue, Cleveland, Ohio, August 13, 1919)

Mark	Dimensions, Inches	Volume, Cubic Inches	Weight, Pounds			Ultimate Strength, Lbs. Per Sq. In.
			Per Cu. Ft.	Dry	Tested	
B-1	8x8 1/8 x 23 3/4	1120	136	88.5	75	106,900
B-2	8x8 1/8 x 23 3/4	1120	137	89	75	114,800
B-3	8x8 1/8 x 23 3/4	1120	139	90	75	116,900
Average of three.		1120	137	89	75	112,800

All blocks marked as manufactured, 8/6/'19.
 All blocks tested as manufactured, 8/13/'19.
 Age of all blocks, 7 days.
 (Signed) G. H. HUNT.

Typical Certificate Issued by Case School of Applied Science to George D. Barriball, Building Block Manufacturer, Cleveland, Ohio, Giving Results of Compression Tests on Three Blocks. Showing Strength 50 Per Cent in Excess of Specification Requirements and Quite Uniform for the Three Specimens.

"Built Just Before the War"

***This Well Planned Six Room Home
of Beautiful Brick
Cost Less Than Three Thousand Dollars***

This attractive six room home of Brick won first Prize in a country wide small residence competition, conducted by the "American Builder," just before the war.

The competition requirements called for photographs and floor plans of houses which had actually been built, costing \$3,000.00 or less was open to ALL CLASSES of building materials.

Award was made on architectural appearance, interior arrangement and economy of construction.

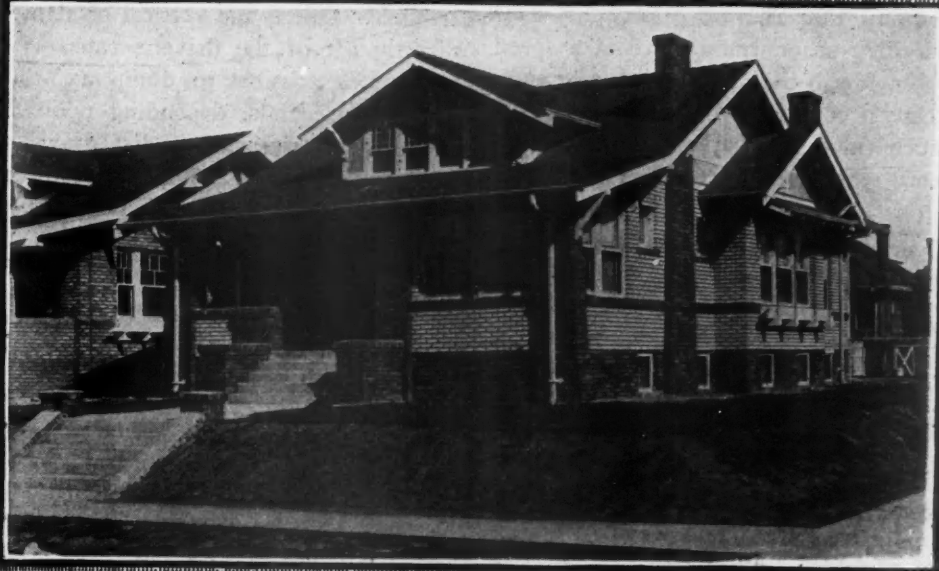
Hundreds of photographs and floor plans were submitted from all parts of the country, but brick scored the signal victory. It won First Prize [✓]

Send for Free Folder of Floor Plans

We would like to send you, without cost or obligation, an illustrated descriptive folder of this prize-winning home.

This folder contains floor plans, interior views and an itemized account of the pre-war cost. It is so complete that any contractor can figure the present cost of this home locally.

**The Permanent Building Bureau
Chamber of Commerce, Chicago, Ill.**



THIS COUPON GETS FREE FOLDER OF FLOOR PLAN

**THE PERMANENT BUILDING BUREAU
Chamber of Commerce, Chicago, Ill.**

**(PLEASE PRINT YOUR NAME AND
ADDRESS TO INSURE DELIVERY)**

Gentlemen:—Please send me Free Folder of Floor Plans of Gates' Prize Brick Bungalow offered in May issue of American Builder. I am also planning to build.....

Give name of lumber and building material dealer.....

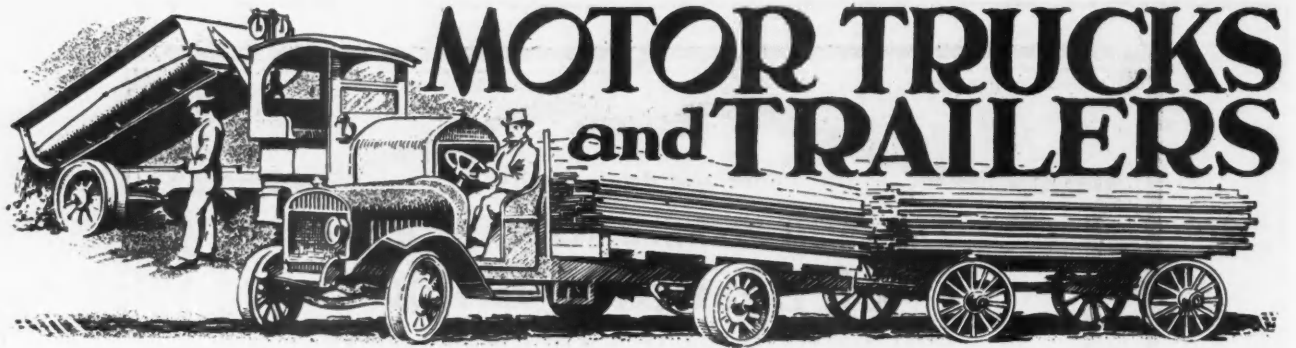
(YOUR NAME)

(YOUR BUSINESS)

(YOUR TOWN)

(YOUR STATE)

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



Loading Devices Aid to Busy Contractor

LABOR-SAVING DEVICES ON MOTOR TRUCKS ELIMINATE DELAY AND CUT LABOR COSTS

LOADING and unloading of heavy building material such as stone, steel, timber and brick, has always been a source of delay and expense to the contractor. He cannot dodge the task, because it is as important as any other step in the building job. It is the bugbear of the cost book, because it means extra man power and time, constant delays, not to mention the inherent difficulties and actual danger to the men engaged in the work.

When the motor truck made its appearance the contractor found relief in one direction, haulage. He found an "iron mule" that could work twenty-four hours a day, and carry an enormous load at a speed that left old Dobbin far in the rear. With a reasonable amount of care it could be worked continuously. There was no such thing as rest, no such thing as feeding in the off season. It cut down the delay between stops.

One problem solved, the next one to tackle was the

handling of the material, which is just as important as the hauling. The introduction of new loading devices and the rapid development of this field of mechanics has helped to cut another big hole in the costs.

These labor-saving and time-reducing devices are used in many different ways and take many forms.

On the larger size of motor trucks, from 2- to 5-ton capacity, the hydraulic type of hoist is used extensively by contractors. It is driven off the truck gearset because of the heavy weight which must be lifted. There are now two types of hydraulic hoists in general use. One is the vertical or slanted type mounted directly aft of the driver's cab. With this type of hoist it is possible to dump a 5-ton load in from 15 to 30 seconds, depending upon the condition of the bulk material, such as dirt, gravel, sand, or crushed rock. The advantage of this power-operated hoist over a hand-manipulated type is its greater speed of operation, especially when the loads carried are above



Five-Ton "Packard" Truck Equipped with Hydraulic Hoist for Dumping. It Is Driven Off the Truck Gearset Because of the Heavy Weight to Be Lifted. This Device Will Dump a Load of Gravel in Fifteen to Thirty Seconds. The Truck Can Be Started While the Dump Is Being Lowered.

Stewart

MOTOR TRUCKS

CHASSIS PRICES

¾-Ton.....	\$1350
2000-Lb.....	1655
1½-Ton.....	2250
2 -Ton.....	2875
2½-Ton.....	3095
3½-Ton.....	3895

f. o. b. Buffalo



Saving expense, piling up profits for builders everywhere

Stewart gives you a hustling, high grade truck of long life and rugged strength, at a lower price than many an inferior truck—why? Because Stewart is a simply designed truck of perfect balance, power to weight to strength to capacity. It has the speed, comfort and convenience of the frailer half-breed passenger-car truck, and the strength, durability and quality of the dreadnaught type truck, without the light construction of the one,

nor the expense of operation of the other. This comes from expert engineering, the elimination of hundreds of needless parts, hundreds of pounds of extra dead weight. That's why Stewarts are popular in 700 American cities, on hundreds of farms, and in 38 foreign countries.

A Stewart costs you nothing because it makes money for you. Write for experience-letters of builders who are operating Stewarts.

Experience of Benjamin Griffin

(Owner of Truck Pictured Above)

In June last, we purchased from you a ton and one-half Stewart truck, and are glad to report that this truck is very satisfactory in every way. The cost of operation is very low and the service you have given us is very satisfactory.

(Signed) BENJAMIN GRIFFIN
New York City

Stewart Motor Corporation, Buffalo, N. Y.

The Stewart Truck has won—by costing less to run



Side Dumps on Trailer Speeds Up Building Work by Eliminating Unloading Delays. These Side-Dumps Are Very Delicately Balanced and Can Be Tilted by Hand. This Truck Can Carry Two Kinds of Material.

2 tons. After the commodity is dumped, it is not necessary to keep the truck at rest, for the driver can start on his return trip while the body is being lowered into its normal position.

In addition to the type of truck body pivoted at its rear end and raised at the front to dump its load, several makes of vertical lift-bodies are now offered. In these the entire body is raised vertically to give the necessary height to permit the material to be unloaded by gravity thru the use of steel chutes. These lifts are especially useful in unloading building material into high hoppers. These bodies are lifted by means of vertical threaded shafts or by a vertical hydraulic hoist. In the latter type the hoist is mounted at the front end and is provided with cables which run along the top of the side frame members of the chassis to the rear body supports so that both ends of the body rise at the same rate of speed. By this means the floor of the body remains horizontal during its ascent.

Where heavy loads have to be lifted from the ground to the truck body, special cranes or derricks, such as that shown in one of the accompanying illustrations, may be mounted and driven from the truck engine. One device is so constructed

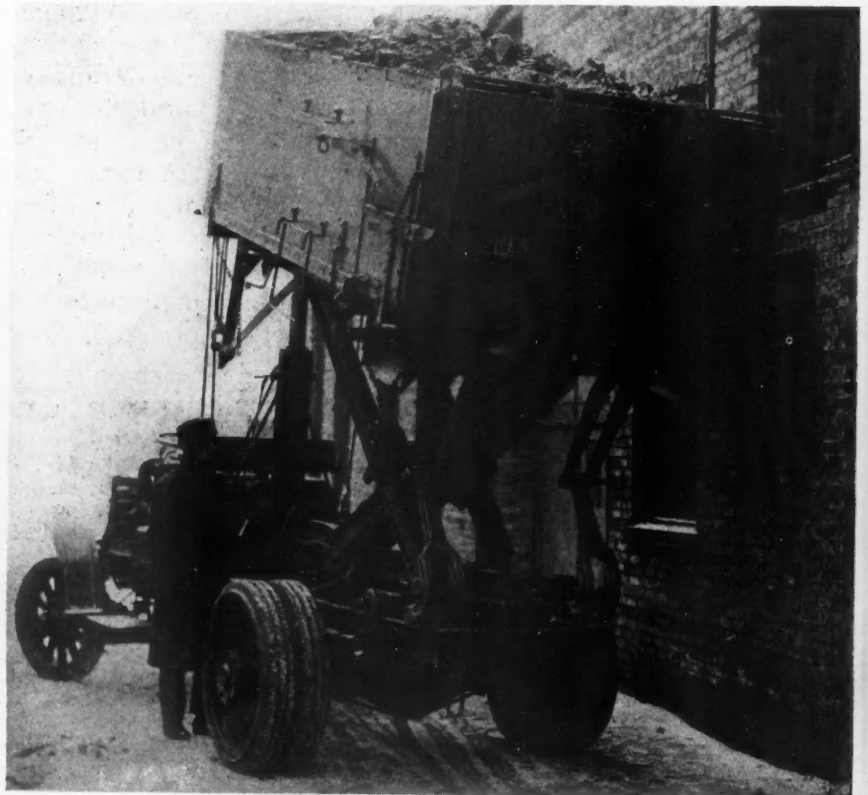
as to enable the contractor to swing heavy stone over fenders or walls. When the loads are especially heavy, some form of outriggers must be employed to help distribute the concentrated load at the base of the crane.

Side-dump bodies so well balanced that they can be tipped by hand, have come into favor to a considerable extent during the past year, especially in hauling bulky building material. Some of these bodies are made in two parts so that two different classes of bulk material may be carried at the same time. They can be used effectively on trailers.

There is also the mechanical truck loader for lifting bulk materials, such as sand and gravel, from the ground directly into the truck body. These unloaders consist of

small four-wheeled vehicles, either hand- or self-propelled, with an inclined framework and a bucket conveyor. While it takes eight laborers about 10 minutes to load 2½ yards of gravel into an average truck body, a mechanical loader will do the same work in 4 minutes at one-sixth the total cost.

In lumber yard work, truck time may be conserved



Elevating the Load to a High Hopper with the "Hilo" Loading Body Which Carries as Much as Five Tons. This Body Is Lifted so the Floor Remains Horizontal During Its Ascent.

"The Nation's' Freight Car"

Final Cost is Actual Cost

Wise truck buyers desire, above all else, high efficiency at low expense, *over a long period of years*. In short, *low final cost*.

No sales talk can guarantee it. Even blueprints and specifications cannot *prove* that it will be delivered. The one reliable promise that it will be rendered is *past performance*.

Fifteen years of past performance stand behind the Diamond T name. *Low final cost is proved* by owners' records. They show conclusively that Diamond T's *do last longer*; that they render maximum efficiency at minimum cost.

We have built good cars and trucks since 1905—trucks alone for the past decade. We have never built a vehicle of which we are not proud to this day. Our very first trucks, by the way, are still running—economically and efficiently.

If these things are true, naturally, your choice will be a Diamond T. Let us prove that they are. A request for more specific evidence, of course, will not obligate you in the slightest degree.

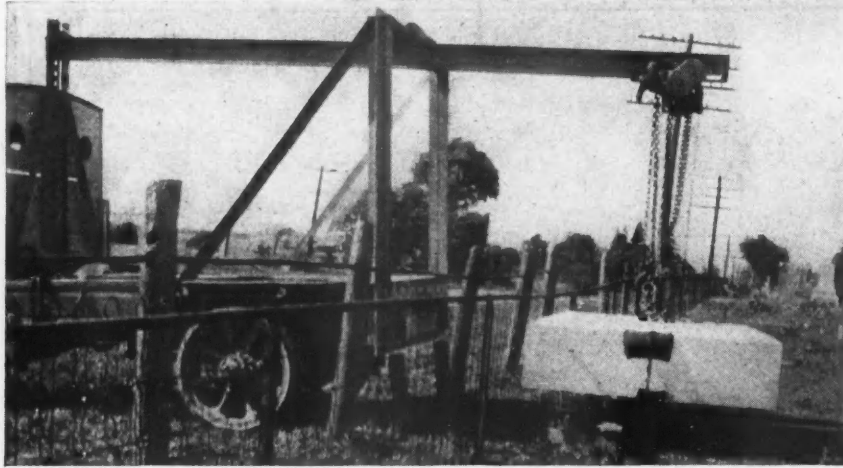
DIAMOND T MOTOR CAR CO.

4556 West 26th Street

CHICAGO, ILL.



Remarkable performance and low-cost haulage are characteristic of the hundreds of Diamond T trucks serving every branch of the building and contracting trades



The Fence Does Not Interfere with This "Henderson" Truck Crane. The Heavy Stone Is Placed Where the Contractor Can Use It Without Extra Moving and Delays.

by, first of all, loading the lumber on a four-wheeled trailer. This can be moved about from point to point by hand. When the different sizes or kinds of lumber in one order are thus collected, the truck is only held up 2 or 3 minutes while the load is transferred thru the use of rollers turned by hand cranks.

These devices have helped to reduce what were formerly considered formidable tasks to mere routine. The loading of a large steel beam or heavy piece of stone by man power is a tedious, dangerous and difficult task. It requires plenty of time and exertion, and time in the building game means money.

By means of this equipment, which is installed on motor trucks at an economical cost, the same task is accomplished in a short time by one or two men. Mul-

tipling the time saved in one operation by the number of times it is repeated will give an enormous total at the end of the year. Likewise, the amount of money saved will be considerable.

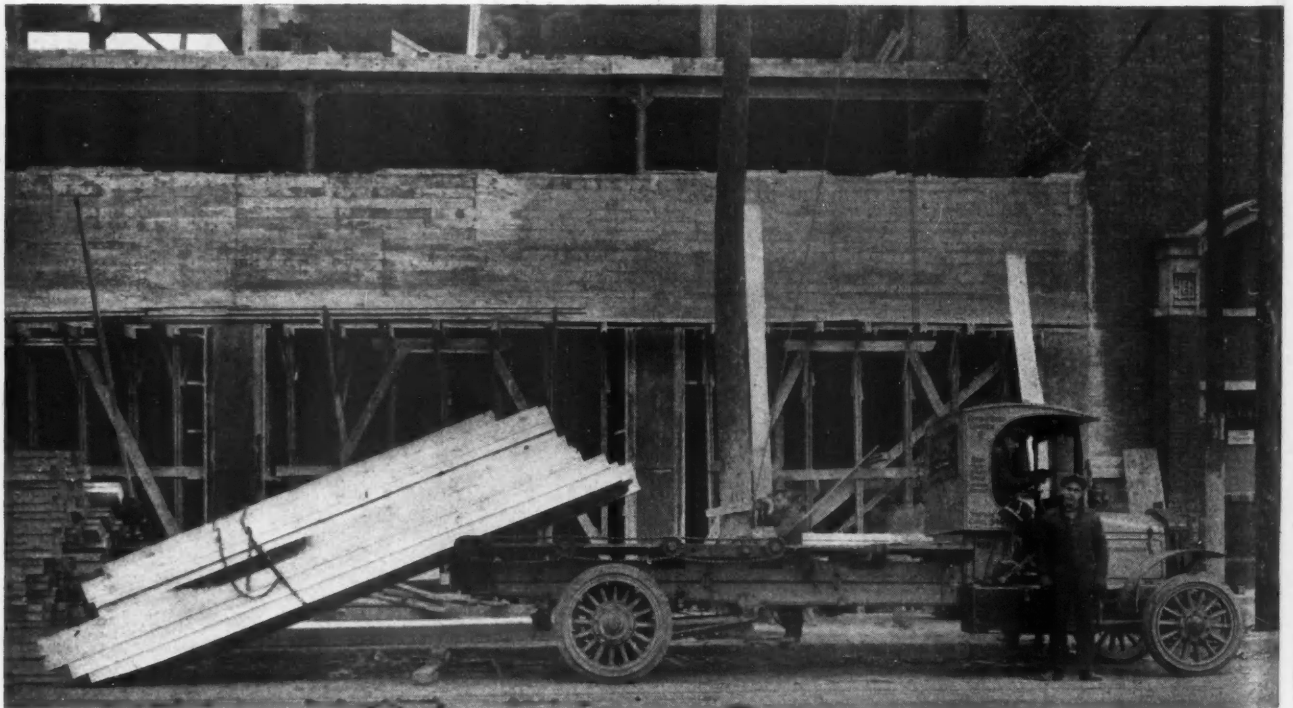
By cutting down the delay in handling, this equipment speeds up building, which is something all builders are striving to do at the present time. Much of the delay in the past has been due to two causes, hauling and handling. The advent of the motor truck with auxiliary loading and unloading devices bids fair to eliminate much of this trouble.



Trucks vs. Horses in Lumber Business

BEFORE the manufacturer, the contractor, the lumberman or the farmer will consider the purchase of a motor truck he must first be convinced that he needs it, that it will transport his product quicker, better and cheaper than horses will, and that it will also aid him in the greater development of his business.

The Thornton-Claney Lumber Company uses both motor trucks and horses. Their two five-ton trucks are used for long hauls, two-horse teams for medium hauls and single-horse teams for "pick-ups" and short hauls. Comparatively few truck owners keep accurate operating cost records, and there are fewer users of both horses and trucks that know each month just



Dumping a Load of Lumber in a Few Minutes. This Five-Ton "Pierce-Arrow" Truck, Owned by the Edward Hines Lumber Co., Is Equipped with a "McGarry" Lumber Loading Device. They Find It an Efficient Time-Saver Around the Yard and on the Job.



Federal two-ton truck operated by the Western Contractors Supply Company, Chicago, Ill.

There's Perfect Satisfaction in Every Federal

Contractors and builders are never selfish in their praise of the Federal. The fact that they are always so eager to recommend them to friends and competitors is proof positive that Federal's conscientious and honest service has won permanent favor in the minds of these business men.

This is the Western Contractors Supply Co's., recommendation of their Federal.

"Our Federal Truck is giving us very good service. We have averaged fifty miles a day since December 1st, and have purchased nothing but gas and oil, and we find it very economical. While we have been too busy to figure what mileage we get out of a gallon of gasoline, we are perfectly satisfied. If we hear of anyone interested in a truck we would recommend the Federal highly."

"Traffic News"—A magazine of haulage will be sent on request

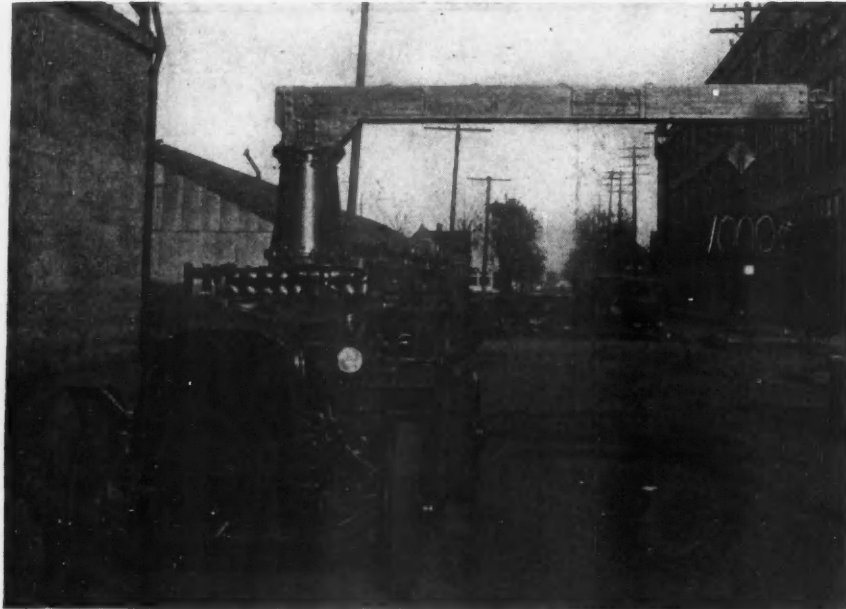


This is the sign of the Tenth Year Federal, a sign significant of ten years of success in every field of truck transportation.

FEDERAL MOTOR TRUCK COMPANY
79 FEDERAL STREET DETROIT, MICH.

Another

FEDERAL



Truck Fitted with Crane for Lifting Heavy Building Materials. The Weight Which Can Be Lifted Is Indicated in the Picture. This Crane Is Especially Adaptable for Heavy Stone and Steel Beams.

Truck No. 2 actually delivered more lumber than all three double teams combined, for they carried a total of 413,118 feet. It cost \$1.64 per thousand feet by using these three double teams, as compared with \$1.45 by truck No. 2, or a saving of 18 cents per thousand feet in favor of the truck. Each month \$41 has been saved by using this five-ton truck in place of three double teams.

For the shorter hauls, trucks of lesser capacities than five tons are successfully competing with the single-horse team. When a horse is idle it eats into the earnings the same as if it were working. On the other hand, the motor truck must be fed only when in operation and it more than earns its "keep."

what their hauling is costing them.

Therefore, the cost figures which were obtained from this Chicago lumber company will undoubtedly prove of much interest. In order to simplify the reading of these figures they have been tabulated to make comparisons easier. The two trucks carried an average of 408,422 feet of lumber in twenty-five days at an average cost of \$1.53 per thousand feet, based on a daily operating cost of \$25 per truck. Based on a daily cost of \$9 for each double team, the three teams delivered an average of 137,706 feet of lumber at \$1.64 per thousand, and the two single-horse teams at a cost of \$7 per day delivered an average of 59,947 feet in the month at a cost of \$2.91 per thousand.

Even tho the trucks had heavier loads and longer hauls they delivered over three and a half times as much lumber as the double teams, over six and a half times as much as the single teams, and at less cost.

DELIVERY RECORD FOR JUNE, 1919, FOR SOME OF THE TEAMS AND TRUCKS OWNED BY THORNTON-CLANEY LUMBER COMPANY, CHICAGO.

Kind of Vehicle Used	Total Number of Feet Delivered.	Number of Days Operated.	Number of Feet Delivered per Day.	Estimated Cost of Trucks and Teams per Day.	Total Cost of Teams or Trucks.	Cost of Delivery per M. Feet.
Truck 1—5-ton truck.	385,537	25	15,421	\$25	\$625	\$1.62
Truck 2—5-ton truck.	431,306	25	17,252	25	625	1.45
Team 1—double team	113,416	24	4,726	9	216	1.90
Team 2—double team	153,276	25	6,131	9	225	1.47
Team 3—double team	146,426	25	5,857	9	225	1.54
Team 4—single team.	68,888	25	2,756	7	175	2.54
Team 5—single team	51,006	24	2,125	7	168	3.29

Average cost per thousand feet, using two 5-ton trucks.....\$1.53
 Average cost per thousand feet, using three 2-horse teams..... 1.64
 Average cost per thousand feet, using two 1-horse teams..... 2.91



One of the "Diamond T" Fleet Operated by the Thornton-Claney Lumber Co., Chicago, Ill. Note the Special Equipment for Unloading and Body for Carrying Long Timbers. Two Trucks Like This One Hauled Lumber at an Average Cost of \$1.53 Per Thousand.

Water Circulation and Fan Operation

IN adding water to the cooling system, it is not necessary to bring the level closer than about 2 inches from the top of the radiator, for the water, when heated by the engine, expands and fills the radiator completely. On the other hand, always keep the water level at least 1 inch above the top ends of the radiator core tubes, to insure an even distribution of water to all the tubes in the core when the engine is running.

It should be borne in mind that for a radiator to function properly it is necessary that an adequate and

DUPLEX TRUCKS

B U I L T F O R B U S I N E S S



The Duplex Limited

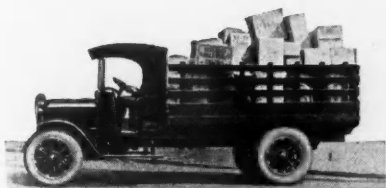
High Speed—Pneumatic Tired—Medium Capacity—Full Electrical Equipment—Here is a Truck That Does Its Work Economically

ONE of the significant developments of these times in the truck industry is the increasing tendency for men to buy their trucks—and to let fewer and fewer be sold to them.

Look at the success of the Duplex Limited. Already it is an established success—with a steadily growing demand coming from all sections and from men in all lines of business.

If you contemplate buying a truck of medium capacity, look over the Duplex Limited. Have your local Duplex dealer show you the Limited. Note its wonderful ruggedness and mechanical superiority.

It is a Duplex through and through—and as such a very safe investment for all general hauling.



IT is the principle of this lumber company, that there is nothing better in the lumber business than good stock, reasonable prices and intelligent service.

They have found that when a farmer can have his building material delivered promptly at the spot where he is working, a long step has been taken to overcome mail-order competition.

CRAPO LUMBER COMPANY
WILLIAMSTON, MICH.

Gentlemen:

We live in a town of 1200 people, and are said to be the only lumber company in Michigan, in a town of this size, to operate three trucks. Be that as it may, we know we have been busy when other yards were idle, because we had the stock and could deliver it, at any distance by truck. During 1917 and 1918 when most yards were doing a very light business, we were pushed to the limit. We do commercial trucking and hauling, and have been able to write off our books, repairs, depreciation, gas and driver, while doing our own work, but at the same time deliver free to our customers, who took full loads and lived within reasonable distances of us.

As to the Duplex Four-Wheel Drive truck, imagine a Kentucky thoroughbred with the pulling qualities of a Clydesdale, a motor that will purr like a contented kitten, or drown out the roar of an express train, that will switch cars, move buildings, and, given reasonable care and attention, will work for you night and day—that is a Duplex, the truck that took us out of the "Small Time" and put us in the "Grand Circuit"

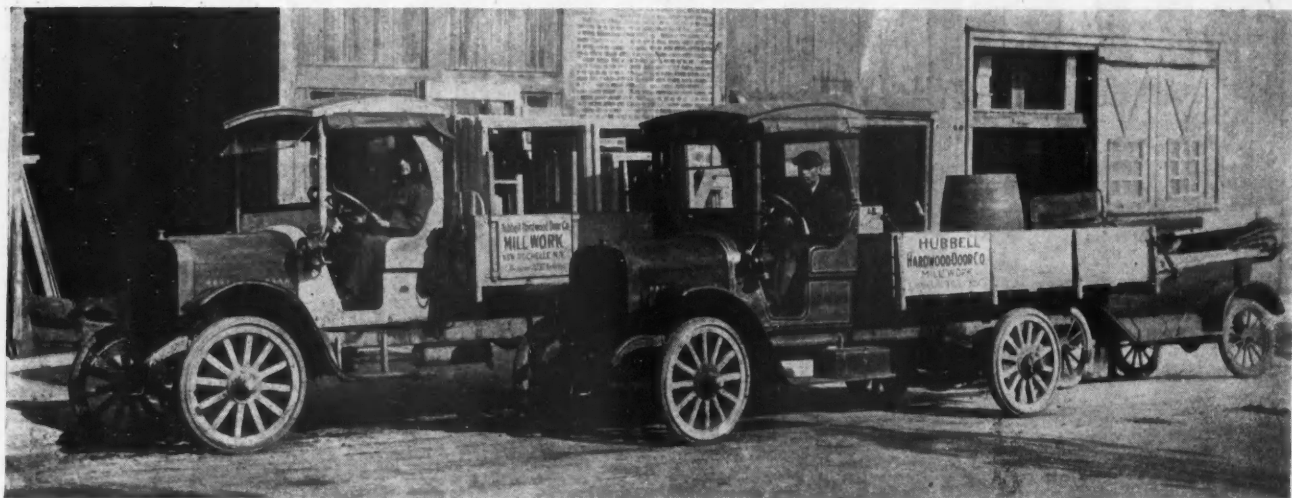
Very truly,
CRAPO LUMBER CO.
E. W. H.

They have proven by their superior service that Duplex Four-Wheel Drive trucks enable the country yard to serve a larger scope of territory with better and quicker delivery. This same quicker and cheaper service applies to city hauling as well. See the Duplex dealer and find out how to increase your lumber business and at the same time make a gilt-edged hauling investment.

Duplex Truck Company

Lansing • Michigan

One of the Oldest and Most Successful Truck Companies in America



"Like Wine They Grow Better with Age." Two "Acmes" Which Have Given Faithful Service to the Hubbell Hardwood Door Co., New Rochelle, N. Y., for Over Three Years and Are Still in the Running. They Have Incurred Little Expense in That Time.

steady flow of water thru the radiator is assured and likewise that all the fresh air possible is drawn in over the radiator tubing by the fan, as it is this supply of cool air which is expected to absorb the heat from the radiating fins. Care should therefore be taken to see that the fan belt and the fan bearings are kept in good condition, as in truck work particularly the speed of the vehicle in motion is relatively slow and is not enough to insure the circulation of an adequate supply of air thru the radiator without the aid of an efficient fan in good operating condition. In other words, a radiator must be "fed" an adequate supply of water and air (the former of course being used over and over again) just the same as one expects to feed fuel to an engine for its operation.

Trucks Going Strong After Three Years Work

OVER three years ago the Hubbell Hardwood Door Co., New Rochelle, N. Y., bought a two-ton truck for hauling purposes. This truck gave such good results that they followed up five months later with another of the same size.

Today, after more than three years' continuous service in work of transporting building material and finished lumber, both trucks are still on the job and giving the same grade of service as they did when they were purchased. During that time they have incurred little expense or trouble.



Lumber Dealer Increases Hauling Service

THE well-known Buffalo firm of Wm. Henrich's Sons Co., retail lumber dealers, have an enviable reputation for prompt efficient service among hundreds of firms whose lumber needs they have satisfactorily supplied for many years.

This progressive firm was founded in 1866 by Mr. William Henrich, a life-long resident of this city, on the site of their present location at Clinton and Spring Streets. From a small beginning the business has grown steadily until today the main plant, in which planing and high class millwork are done, covers an area of about 50,000 square feet.

In addition to this, there are two storage yards, one in close proximity to the planing mill and another a short distance away, with railroad



The Lawrence Lumber Co., Lawrence, Mass., Does a Big Box Business and Find That the Motor Truck Is a Handy Assistant in Hauling Their Products. This "Federal," Equipped with a Utility Body, Is Getting Primed for a Long Haul and Is Carrying the Limit and Then Some.



General Motors Trucks

GMC Trucks Yield Profits for Builders

FOR the builder a motor truck is a valuable investment only to the extent it yields a profit in connection with his business.

It may yield much or little profit, depending on its long life, its economy of operation and its ability to run on and on regardless of obstacles.

Such factors as these form the basis of the policy behind GMC Truck design. GMC engineering has con-

ceived and built GMC Trucks to mechanically carry out the plan.

In other words, the GMC factory *builds in* quality, so the user may get out of his motor truck satisfactory performance over a long period of time.

This policy guarantees that GMC Trucks shall constitute a profitable, dividend-paying investment for the owner.

Let your next truck be a GMC.

GENERAL MOTORS TRUCK COMPANY
PONTIAC, MICHIGAN

Branches and distributors in principal cities

(657)



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



Another Efficient Combination of Truck and Trailer in the Lumber Business. This "GMC," Owned by the Restrick Lumber Co., Is Light and Speedy and Gets the Special Material to the Building Job in Quick Order.

facilities that enable the prompt receiving and shipping of all kinds of lumber from and to outside points. Millions of feet of lumber in various sizes and grades are stored in these yards, so that customers may be served with speed and precision, no matter how large or small their wants.

Wm. Henrich's Sons Co. have built up their retail lumber business very largely thru catering to contractors, factories and department stores, but nearly every branch of industry is represented on the long list of its patrons. The aim of the company's officials is to promote the spirit of service and efficiency in all

their business dealings and in striving toward this end they have equipped their plant with every time and labor-saving device that will bring them nearer to service perfection.

A most important consideration in this respect has been the installation of facilities for the quick handling and hauling of lumber from mill or storage yard to customers.

During the latter part of January a 3½-ton truck was purchased with a special body built to the firm's specifications. The time and labor expense of hauling lumber was cut to a remarkable degree with the first

use of this truck and the manner in which this was accomplished will undoubtedly prove a revelation to every lumber dealer.

Whereas formerly the time consumed to unload 2,500 feet of lumber averaged one to one and a half hours and necessitated the labor of three men, the new method requires the services of only the driver of the truck and takes about *ten minutes*. To accomplish this, the body was equipped with a roller bearing device which dumps the load of lumber without disturbing it, at the same time piling it evenly and uniformly on the ground. The same method is employed for load-



Wm. Henrich's Sons Co., Lumber Dealers in Buffalo, N. Y., Have Built up a Big Business in Twenty-Five Years by Prompt Service. This 3½-Ton "Stewart" Is One of the Links in the Successful Business Chain. It Is Equipped with a Special Lumber Carrying Body.

Jackson

FOUR WHEEL DRIVE TRUCKS

End the Stalls that Eat Up Profits

Having a loaded truck stalled in a mudhole down the line is like waiting for Johnny to come home from the store, while he spends an hour or two playing marbles. Oftentimes it gums up the whole works. When you send out your Jackson truck, you know it is going to deliver that load on time and just where you want it.

With its perfected four wheel drive the Jackson has twice the usual traction; push and pull in all four wheels. That's the secret. In deep sand, swamp land, mudholes, dirt piles, and through seemingly hopeless traction difficulties, the Jackson just plows its way through like a tank on the battlefield.

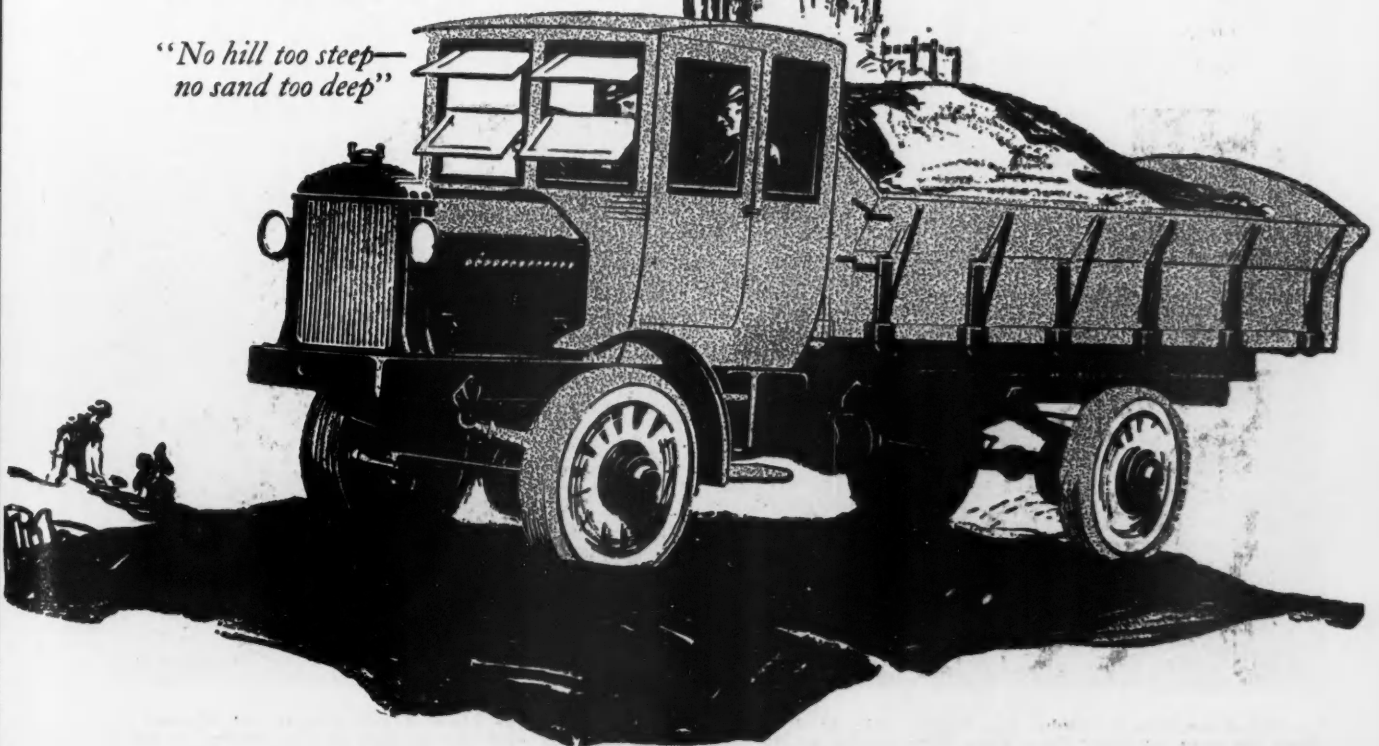
In spite of its brute strength the Jackson is clean cut, and drives, rides and controls as easy as a passenger car. Equipped with self-starter, easy steering device, patented front-wheel drive,

and a cushioned all-weather coupe-cab, making the driver's job more comfortable.

The Jackson truck puts an end to the griefs of heavy hauling. It will haul through situations that stump other trucks. Write us direct, or arrange with your nearest dealer for a demonstration.

JACKSON MOTORS CORPORATION
Sales Dept. 159 Jackson Motors Bldg.
Jackson, Michigan

*"No hill too steep—
no sand too deep"*



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



Two-Ton "Indiana" Truck with Semi-Trailer That Has Been Working for the Sipsy River Lumber Co., Aliceville, Ala. Their Specialty Is Long Hauls and Prompt Service. They Save Considerable Time Using Trailers to Eliminate Delay at Loading Points. A Loaded Trailer Is Hooked on as Soon as the Empty One Is Detached.

ing. The lumber is placed on wooden horses with rollers; the truck is backed up to these and the entire load transferred to the truck. While one delivery is being made, the wooden horses are being loaded for the truck's next trip.

The addition of this truck to the fleet of Wm. Henrich's Sons Co. has greatly increased the efficiency of their handling facilities. The satisfaction of customers with this speedy, proficient handling of lumber orders is hailed by this firm as proof of the service trucks, equipped with this type of body, can render every lumber dealer.

We suggest that AMERICAN BUILDER readers write to the truck makers for their latest haulage data.

Cleaning the Carburetor

A CARBURETOR should be occasionally cleaned. There is a strainer gauze in the gas trap just beneath the float chamber. Remove the large nut that holds this gas trap in place. The trap can then be taken off and the strainer gauze removed and cleaned without any difficulty.

A gritty deposit will sometimes accumulate in the dash pot. This depends upon the quality of gasoline procurable. If you find that the air valve has a tendency to stick occasionally, it can be eliminated by opening the pet cock and pumping the air valve up and down several times. Any dirt will be forced out thru the pet cock below.



Dickelman Mfg. & Lumber Co., Forest, Ohio, Find This "Trallmobile" Takes the Place of Two Horses and Wagons While They Have the Auto for Other Uses. They Have Hauled as Much as Fifteen Hundred Feet of Pine Lumber Over Heavy Grades with This Economical Combination.



"My Kissel Truck is always ready for work—a necessity in road building."

C. H. WITTENBERG, Road Contractor and Builder, Hartford, Wisconsin, purchased a 3½-ton Kissel "Heavy Duty" Truck, equipped with dump body and hydraulic hoist, for use on highway road work, hauling stone, screenings and gravel, giving continuous service during the entire year of 1919 on Waukesha County highway work. The truck averages 1,100 miles per month, carrying 4 cubic yards of stone, weighing from 10,000 to 11,000 pounds.

In addition to this 3½-ton Kissel "Heavy Duty" Mr. Wittenberg has 2 five-ton trucks of another make on the job, and a careful check showed that his Kissel was hauling equal loads, bucket for bucket, with the other trucks, showing the substantial and built-in qualities of the Kissel and proving its equal earning capacity to the five-ton jobs at less investment.

Photos 1 and 2 above show Mr. Wittenberg's loading equipment.

Photo No. 3—Mr. Wittenberg's "Heavy Duty" Road Builder on its way to the stretch of road being built up.

Photo No. 4 shows the Kissel "Heavy Duty" spreading its load without the driver leaving his cab.

Photo No. 5 shows the truck returning over the same road after spreading its load.

Send for Kissel Performance Proof in Highway Building—a series of folders containing data and statements of Contractors employing Kissel Trucks in different kinds of road work.

Kissel Motor Car Co.

Hartford, Wisconsin, U. S. A.



Line Level Valuable Builder's Instrument

SMALL DEVICE READILY DETERMINES HEIGHTS OF FOUNDATIONS AND GIVES LINES FOR EXCAVATION

THERE are many small tools and instruments which modern builders use that make their work more easy and more accurate. One of these instruments is a level. Without a level masons and builders would have a difficult time keeping true the walls they construct.

One of the simple levels that are efficient and make the work of builders more accurate is a line level, such as is shown in the illustration. This instrument is small and can readily be carried in a pocket, and takes up but little space in the tool chest or kit. But it is a mighty good thing to always have at hand, for it is useful in many ways.

In the illustration the level is shown getting the right height for a wall, where the grade is uneven. The other end of the string is tied to a stake at the proper height. By moving the level up and down the rule until the bubble shows the proper height has been reached, the line of the wall at any given point is obtained.

This instrument can be used to secure the necessary levels in estimating excavation; for leveling foundations and piers; to determine the height of foundations for any sort of a building; for leveling lawns; getting the pitch for sidewalks that are on a grade, and for any other purpose where heights above grade are required.

In construction this is a well-made instrument. It is made of aluminum and brass and the glass vial is internally ground to prevent friction. It is of unusual length for an instrument of this kind, making it more accurate and there is no weight on that part of the line that determines the level. A threaded plug at one end makes it easy to adjust the balance.

This level has been found by builders to be extraordinarily efficient, while at the same time it is easy to

operate. One man can handle it nicely and get accurate results. Also, it is not expensive.



Builder's Develop Sense of Proportion

PARTS that are out of proportion in the main or parent part always startle an observer by their incongruity. A big chimney on a little house, or a little chimney on a big house, are fair examples. An enormously big porch on a very little house is often out of harmony. Likewise a narrow water table on a very large house gives the impression that the architect has not calculated correctly. A wide water table on a small house will create an equally bad impression. To affect an observer pleasantly, whether he is an architect or not, there should be a conformity of sizes. The esthetic sense of the human being demands congruity in lengths, widths, heights, volumes and shapes. The thoughtful builder recognizes this fact and includes it in his calculations.

Proper proportions cannot be made a matter of rule. The builder must acquire the sense of proper proportions if he wishes to design shapes and sizes that harmonize. He can best acquire skill by observing effects. In this way he will come to recognize intuitively what dimensions best fit. Close observation will safeguard him, cause him to turn away unconsciously from those shapes and dimensions that disturb our sense of what is harmonious.

E. V. LAUGHLIN.



A Level Is an Essential Instrument on the Job. It Gives the Proper Lines and Enables the Workmen to Keep the Walls True. Insert Shows How Levels Are Secured by the Use of a Line Level.

ACME



The Truck That Paid for Itself in Six Months

"Confirming our conversation with your Mr. Sutton, please enter our order for two 2-ton Acme Trucks.

"You will no doubt be interested in our decision to standardize on the Acme truck. This decision is due to the fine service we have received from our two Acmes and the splendid attention which your own organization has accorded us. As you know, we bought from you our first Acme last March. This was a two ton truck and we have been running same constantly for the past eleven months over all kinds of roads, hauling logs and lumber, and without any expense whatever for repairs or loss of time on account of trouble. Our second Acme has proven equally satisfactory and we are naturally looking for the same reliable service from the two Acmes for which you now hold our order.

"Before deciding to purchase trucks and do our own hauling, we were paying \$4 per M for hauling lumber. We have kept care-

ful records on our first Acme and find that the cost per M has been only \$1.02, this including cost of driver, gas, oil, etc., but not making any allowance for investment. However, as our records show that the truck paid for itself the first six months, we have no further doubt as to the wisdom of our investment in Acme trucks.

"Thanking you for your uniform courtesy and your continued interest in the service we receive."

The above letter was written February 16, 1920 by Roberson, Strader & Co., of Greensboro, N. C., to the Sutton Auto Co., Acme dealers. Nothing more need be said, except if you haven't Acmes working for you, you haven't the best trucks for your hauling. Write for our book "Pointers to Profits," which tells about Acme and its proved construction that means the maximum of truck service.

Built in 1-1½-2-3½ and 5 ton models
Acme Bodies Built Complete in Acme Factories

ACME MOTOR TRUCK COMPANY
203 Mitchell Street
Cadillac, Michigan

The Seal of
Dependable Performance

Trade Mark registered
in U. S. and foreign countries



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



NEWS OF THE FIELD

The Largest Saws in the World

Henry Disston & Sons, Inc., of Philadelphia, have recently finished two of the largest circular saws ever made. They are of the spiral inserted tooth type and are to be used by a well-known concern in the far West for cutting shingle blocks from the large trees of that section.

Each of the new saws measures 108 inches (9 feet) in diameter, and in the rim are inserted 190 teeth. One may gain some idea of so tremendous a saw by comparing it with a 54-inch saw, which is large as we ordinarily think of the term. The 54-inch saw requires for its making an ingot of steel weighing approximately 180 pounds, and its weight when finished is about 125 pounds. The 108-inch saw started out as an ingot weighing 1,140 pounds, and after reheating, rolling and trimming, the remaining weight was about 795 pounds. In size, a 54-inch saw is apparently just half that of the 108-inch one, but actually the 108-inch is four times the size of the former, as a measurement of square inches of surface will show.

In the making of large circular saws, Henry Disston & Sons have had long experience. As long ago as 1876 they made one 100 inches in diameter for exhibition purposes. Some years after they made another 100-inch saw for cutting stone, each tooth of which was studded with a black diamond to give the necessary cutting edge.

The turning out of a huge saw is a difficult process when one realizes that the ingot must be not only fashioned into a plate exactly straight and true, but also that the steel must

be uniform in quality thruout the entire surface. Such are the facilities and improvements at the Disston works that the standard machinery was used thruout. All that was needed in addition was extra man power as "holders-up" during the smithing process.

To fully appreciate one of these immense saws, one must see it in action; starting off slowly, the speed gradually increasing, the humming attaining a higher and higher pitch, until full speed is reached, at which time the teeth are traveling about 130 miles an hour. It is then that the forcefulness of this flying mass of toothed steel becomes strikingly impressive, and the sight of this huge saw resistlessly and quickly cutting an immense log is one to be long remembered.



Automobile Advertiser Joins New-Way Company

Mr. F. L. Waite, well-known automobile advertising manager, has joined the New-Way Motor Company and will have charge of the publicity.

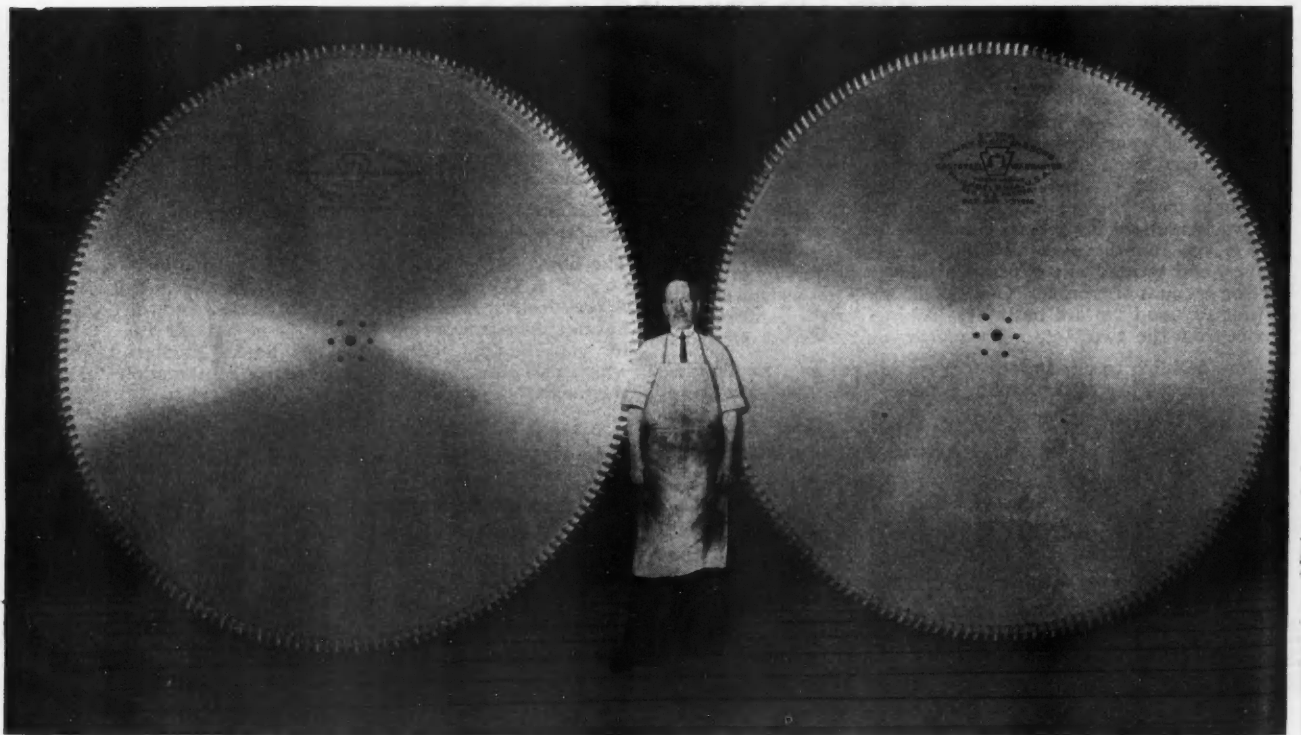


American Mixers in India

Contractors in India are becoming more and more convinced of the advantages of labor-saving machinery, for, altho labor is cheap, it is often inefficient. In a country where the "one man, one job" idea is carried out to the extent that the "syce" or groom who looks after your horse would consider it an insult to be asked to cut the grass in the "compound" and where any attempts on the part of the European to speed up time-honored methods of 1,000 years ago are met by the final argument "Dustoor hai" (it is the custom), the introduction of machines which can replace the hosts of Hindu laborers necessary on a construction job is part of a building program which India so urgently needs.

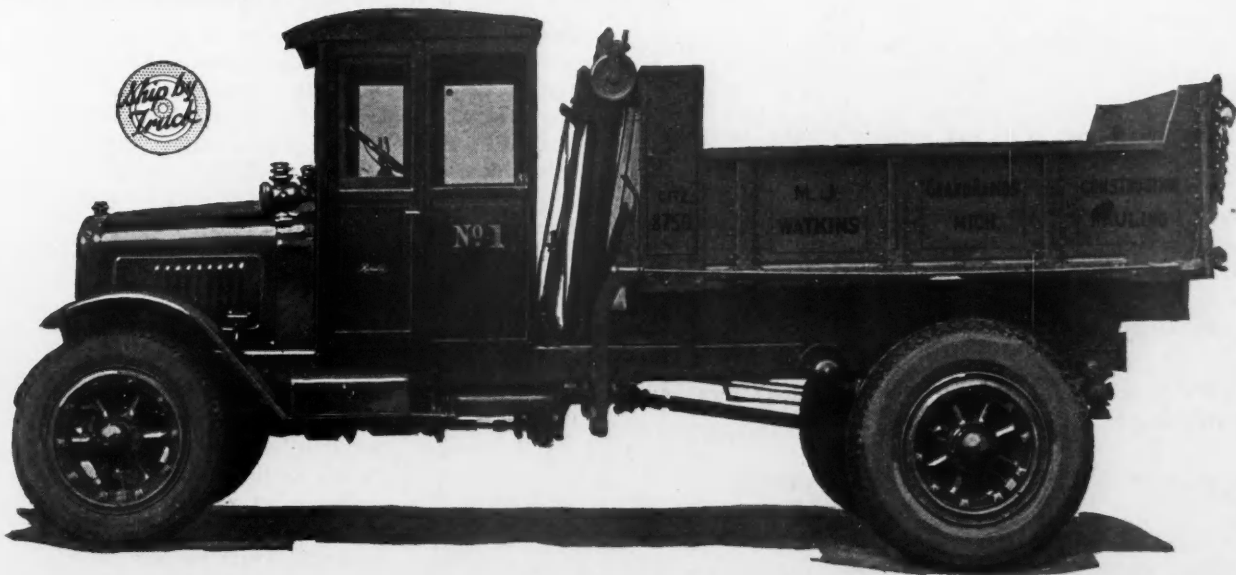
The mixer shown in the accompanying picture is the first to arrive in Karachi, India. It is one of a consignment of sixteen from America.

In his letter, Mr. Moon, the representative of the Allied



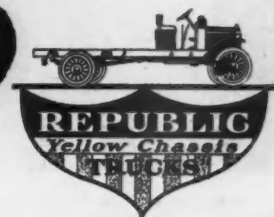
Largest Saws in the World. These Saws Measure 108 Inches in Diameter and Have 190 Teeth. Each of the Giant Saws Started Out as a Steel Ingot Weighing 1,140 Pounds and After Heating, Rolling, and Trimming, Weighs 795 Pounds.

A truck wins preference only by *performance*. Therefore, the fact that Republic Trucks have won the greatest truck-preference in the world is the most convincing evidence of their greater ruggedness and economy. By doing *harder work, for a longer time, at lower cost*, Republic Trucks have proved their superiority to more than 60,000 owners.

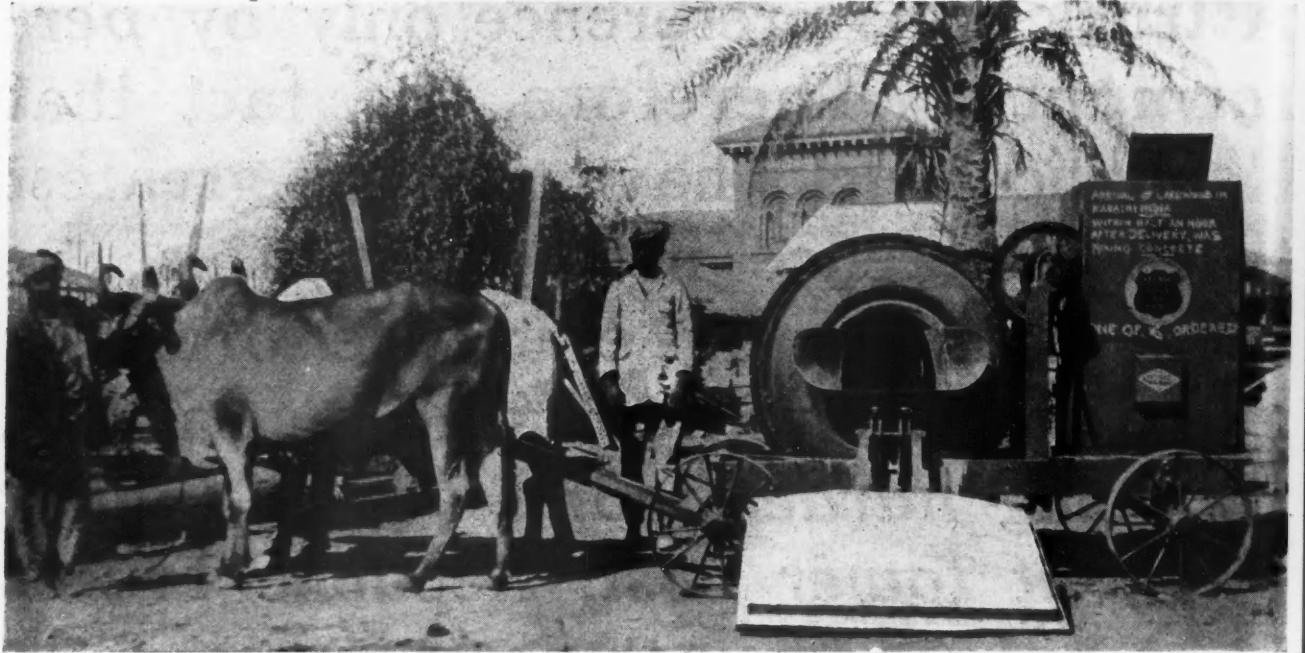


REPUBLIC TRUCKS

Republic Motor Truck Company, Inc., 953 Michigan Ave., Alma, Michigan



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



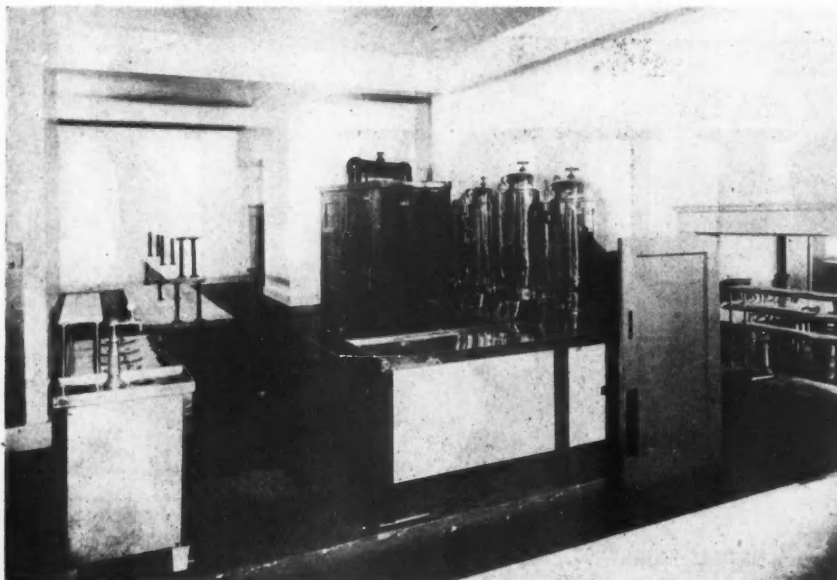
One of a Batch of Sixteen Lakewood Mixers That Arrived in India Recently. It Was Ready for Work a Half Hour After the Crate Had Been Removed. Labor Is so Slow That Big Firms Are Importing Modern American Machinery.

Machinery Company of America, brings out a point frequently overlooked by American export houses. He especially comments upon the care with which this mixer was packed and states that because of this it was possible to set the machine to work mixing concrete within half an hour after it had been uncrated.

The necessity for good and suitable crating for export trade has been emphasized many times in American, British and other consular reports. Nothing is more annoying than to find on unpacking a machine some 400 miles from the nearest repair shop that some small but vital part is damaged or missing, or that the packing cases are so inconvenient in size that it is practically impossible to handle them with the very elementary means of lifting available.



RENT is a monthly reminder that you don't own your own home.



Section of New Westinghouse Cafeteria Which Is Equipped with Latest Time-Saving Devices. All Dishes Are Washed and Dried by Electricity. The Kitchen Is Equipped with an Electric Pie Baker with a Capacity of Sixty-five Pies in 15 Minutes.

Westinghouse Opens Large Employees' Cafeteria

One of the largest industrial eating places in the world was recently opened by the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa. This new cafeteria which is a three-story reinforced concrete and brick building, 236 ft. by 100 ft., has a seating capacity on the first two floors alone of nearly 2,600 persons. In addition, on the third floor is a dining room with a capacity of 500 and an auditorium with a seating capacity of 1,000.

Gradual inclines or ramps are used in order to facilitate moving the diners from floor to floor.

The first and second floors are devoted to cafeteria service. By means of the auditorium on the third floor a suitable meeting place for the various employees' associations and organizations is obtained. The auditorium is equipped with a stage 26 ft. by 18 ft., with foot-lights, stage settings and a convenient dressing room. A motor-driven motion picture machine is installed in an asbestos booth in the rear of the auditorium, and will be used in connection with various lectures, entertainments and other gatherings held under the auspices of the company—or some of its employees' organizations.

The cafeteria is equipped with the most modern labor-saving conveniences that are obtainable. On the first and second floors are eight service counters, 16 coffee urns, milk freezers with a capacity of 40 gallons each, and sanitary drinking fountains.

Soiled dishes are carried from the first and third floors to the second floor where two large motor-driven dish washers are installed, which wash and dry the dishes.

A portion of the first floor adjacent to the cafeteria is fitted up with a motor-driven washing machine, mangles, steam dryer for the purpose of washing and drying linens, motor-driven ice cream



Copyright 1920, by The Goodyear Tire & Rubber Co.

Again—Pneumatic Economy Proved

A TEST of solid vs. pneumatic truck tires was conducted in the winter, spring and summer of last year by a corporation operating a very large motor delivery fleet. Two trucks were used—No. 134, shod with solid tires on the rear wheels, and No. 135, shod with pneumatic tires on the rear wheels. Both were equipped with pneumatics on the front wheels. Nevertheless, the difference in the rear tire equipment was sufficient to produce the following wide difference in results:

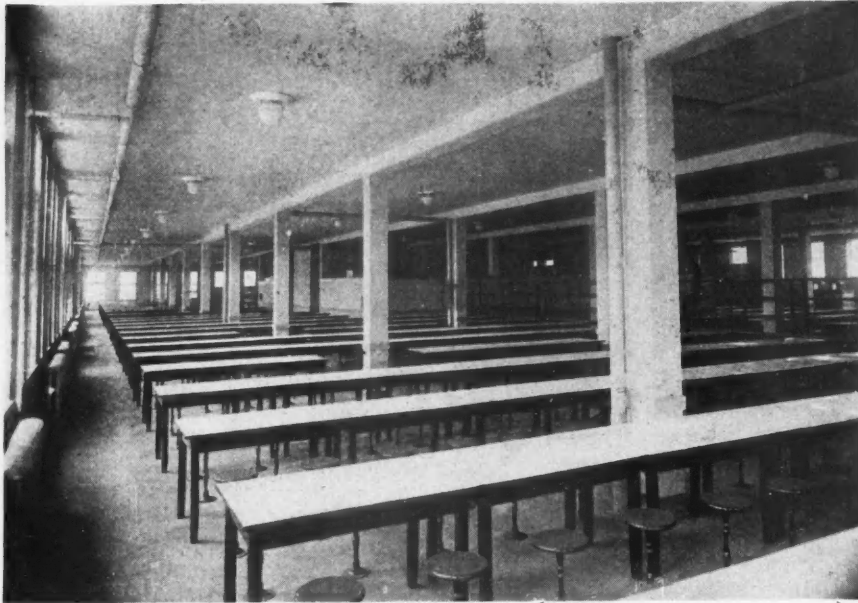
	Truck No. 134 (Solid tires rear, pneumatic tires front)	Truck No. 135 (Pneumatic tires on all four wheels)	Difference in favor of All- Pneumatic equipment
Number of days operated . . .	129.5	129.5	
Delivery or pickup stops . . .	4,183	5,822	39% More customers served
Total units (pounds)	874,791	989,065	13% More product hauled
Miles traveled	4,476	6,414	43% More distance covered
Gallons of Gasoline	1,125	1,110	45% Less fuel per mile
Pints of Cylinder Oil	605	494	76% Less cylinder oil per mile
Drivers' and Helpers' Wages	\$1,375.15	\$1,512.82	23% Less labor cost per mile

THE results of this test afford a vivid idea of the reasons so many businesses throughout the country are using Goodyear Cord Tires on their trucks.

You can obtain operating and cost data of similar scientific comparisons of pneumatic and solid truck tires by writing to The Goodyear Tire & Rubber Company, at Akron, Ohio.

GOODYEAR

CORD TIRES



Dining Room of Westinghouse Cafeteria. The Three Dining Rooms have a Capacity of 2,000 and in One Moving Pictures Are Shown During the Lunch Hour. The Building Is 336 by 100 Feet.

freezer with a capacity of 10 gallons and an ice-making machine with a capacity of 2,000 pounds every 12 hours. There is also an ice cream storage artificially cooled.

All food will be cooked on the third floor and will be supplied to the cafeterias by sub-conveyors. The kitchen is equipped with large gas ranges as well as double unit combination gas and coal ranges, steam meat roaster, steam service table, potato peeler which peels 40 pounds of potatoes in less than two minutes, bread cutter, potato masher, all motor driven, and a coffee urn for dining room service. Two steam heated kettles with a capacity of 60 gallons each are used to make soup, also an electrically heated pie baker with a capacity of 65 pies in 15 to 20 minutes, one large refrigerator for cooling meats and two smaller ones to cool vegetables and dairy products. All the refrigerators thruout the plant are cooled by brine pipes.



Keiser Joins Lakewood Engineering Company

William N. Keiser has been appointed manager of the general construction equipment department of the Lakewood Engineering Company, Cleveland.



William N. Keiser, New Construction Equipment Manager of the Lakewood Engineering Co., Cleveland, Ohio.

Mr. Keiser was born in the vicinity of Logansport, Ind., and was graduated from Purdue as an electrical engineer. His first job was with the General Electric Company, for whom he built power houses and underground systems. His next association was with a public utility company as chief electrical engineer.

Subsequently,

Mr. Keiser was sales manager of the Parsons Company, Newton, Iowa. Later he was with the Hydraulic Steelcraft Company, Cleveland, from whom he severed relationship to come to Lakewood.



E. C. Simmons, Hardware Merchant, Dead

E. C. Simmons, founder of the hardware company which bears his name, died of heart failure at his home on April 18. Mr. Simmons was eighty years old. He had been identified with the hardware trade here for sixty-four years. A son, George W. Simmons, was formerly Red Cross Commissioner in Siberia.



Paper Manufacturer Wins \$1,000 Prize

The first prize of \$1,000 offered by the Lakewood Engineering Company, Cleveland, for the best treatise on industrial haulage, using Lakewood Tier-Lift trucks, was awarded by the committee appointed

by the Society of Industrial Engineers to Clarence Irving McNair, Jr., of Cloquet, Minn. Mr. McNair, who is secretary of the Northwest Paper Company, of Cloquet, won the prize with a paper entitled: "Analysis of the Application of the Tier-Lift Truck to the Pulp and Paper Industry."

Second prize was awarded to F. C. Peters, chief mechanical engineer, and G. R. Reese, assistant mechanical engineer, New Jersey Zinc Company, Palmerton, Pa.

The award committee consisted of A. Russell Bond of Scientific American Monthly, Prof. Dexter S. Kimball, dean of the School of Engineering, Cornell University, and Irving A. Berndt, vice-president of C. E. Knoepfel.



Save Those Cement Bags

If a cement plant ships 1,000,000 barrels of cement a year in sacks, 4,000,000 sacks are necessary to take care of this shipment. Under actual conditions when shipments are made every day, the cement plant at the end of a year would find itself short of a very large number of sacks because dealers or cement users have not returned all they received. The following year it would, therefore, be necessary to supplement the stocks of sacks by purchasing new ones. Sooner or later some sacks are certain to be lost thru neglect or because put to improper use and thereby permanently kept from being again used as cement containers. No one knows exactly what becomes of them, but if lost while in your possession, it means money lost to you.

Many building and highway contractors have shown commendable enterprise in purchasing and storing during the past winter large quantities of cement in anticipation of immediate need when the construction season opens. Naturally this has temporarily prevented the circulation of many cloth sacks. Nevertheless there are enough empty sacks in users' and dealers' possession thruout the country, which, if returned to the cement mills, would make the number held out of circulation thru storage of cement relatively insignificant.

Remember, cloth cement sacks represent an outlay of money by you until you have returned them for credit, and if they are not returned promptly, that the cement manufacturer must provide for new containers to take care of his business with you. This represents an unnecessary waste because far more containers must be manufactured and used than would actually be necessary if every cement sack was kept at work.

ATKINS SILVER STEEL SAWS

The Finest  on Earth

YOU CAN depend upon the quality that you will find in Atkins Saws. They are the finest saws money can buy. Results speak for themselves. Try an Atkins, or better still, buy a set for your kit and you will find that you can do your work better and with less effort.



ATKINS Silver Steel Saws are used by Master Carpenters everywhere, and this fact in itself is a recommendation of their efficiency.

Young or old, carpenters who invest in Atkins will not make a mistake.

Send for Nail Apron; enclose 30 cents stamps and forward to Indianapolis.

E. C. ATKINS & COMPANY, Inc.

"The Silver Steel Saw People" Established 1857
Home Office and Factory, Indianapolis, Ind.

Canadian Factory, Hamilton, Ont. Machine Knife Factory, Lancaster, N.Y.

Branches carrying complete stocks in all large distributing centers as follows:

Atlanta
Chicago
Memphis
Minneapolis

New Orleans
New York City
Portland, Ore.
San Francisco

Seattle
Vancouver, B.C.
Sydney, N. S. W.
Paris, France



**Lesson in
Plan Reading**

FREE!

Send now for this FREE lesson which we will send to prove how quickly you can learn Plan Reading by our new, easy method. Not a penny to pay for this lesson. Just ask for it. Without a good knowledge of plans your opportunities are limited. At work you don't get the chance to study blue prints or to have their meaning explained. We make the chance for you. We place in your hands plans used in actual construction by contractors in Chicago and other cities, and you get lessons by men in charge of building work who will help you at every step and make you an expert plan reader.

**Builders' Course
On Easy Payments**

Our Builders' Course gets right down to the things you need to know. And you can get it on easy payments. A small first payment when you enroll—then payments monthly—so small you will never feel the cost. At least write and find out what this course really offers and how you can make more money by learning what we will teach you in a short time.

Learn By Mail

Use your spare time at home to learn how to be a better workman, a better foreman or a better contractor. Even after you complete the course you have the privilege of consulting us when you want suggestions. We will always be ready to help you.

Some Things We Teach

Plan Reading Use and meaning of all the lines. Plans and elevations. Reading dimensions. Detail Drawings. Laying out work from plans. Practice in reading plans from basement to roof, etc., etc.

Construction Brick work, stone work, carpentry, plans and specifications. Every detail explained for residences, office buildings, factory buildings, etc., etc.

Estimating Figures on every kind of building work fully explained. Labor and material. Problems worked out from plans. Practical builders' methods studied from plans and specifications of actual building of every kind.

Arithmetic A complete course arranged especially for builders and contractors.

Architectural Drafting Also other branches of drafting. Send for special catalog on these courses.

Send the Coupon

Get this information now. Learn how to make more out of your work or out of your business by knowing more about it. All this information is free. Send for Free Lesson and this information—now. Just send request on the coupon below.

Chicago Technical College

536 Chicago "Tech" Building Chicago, Illinois
Without obligation on my part, send me the Free Lesson in Plan Reading, also information on your Builders' Course in Plan Reading, Estimating, etc.

Name.....
Street.....
City..... State.....
Present Occupation.....

Preserving Old Buildings by Waxing

WHEN New York City recently decided to spend twelve thousand dollars to wax the old city hall in order to preserve it, construction people became interested.

The process is not by any means new, but this is the first large scale experiment. Weathering is prevented by a process of dissolving and recrystallizing of the stone surface. The surface is raised above the melting point of the wax compound, which is 140 degrees Fahrenheit. Then hot melted paraffin, containing creosote dissolved in turpentine, is brushed across the stone and permitted to penetrate to a point of saturation. In marble the penetration may reach a half-inch. Bricks can be completely pierced without destroying the adhesive properties. As the wall cools, the wax congeals, and if some of the liquid remains on the surface it demonstrates that the pores of the stone or brick are filled completely to the depth reached. Then a reheating causes the absorption of this excess and leaves the surface clear.

The paraffin combination is not affected by weather, alkali or acid. The use of creosote prevents organic growth upon the surface. Evidence of the preserving value of the process is available in the obelisk case. This monument was set up in Central Park in 1881. In four years 780 pounds of stone chips fell to the ground, by reason of the new climate. It was in 1885 that the paraffin process was applied and altho the work carries a guarantee of only ten years, there is still no indication of weathering.



**To Keep Doors and Windows
from Swelling**

IT is annoying to have doors and windows stick in damp weather, and nothing brings criticism quicker upon the head of the carpenter who fitted them. The fault is caused by moisture entering the pores of the wood and enlarging the various parts. If the pores of the wood are effectually closed with oil, moisture will fail to enter, and the doors and windows will seldom stick. The builder who has regard to his future good name will therefore have at hand a can of linseed oil with which to saturate the fresh surface of the door and window the moment he finishes dressing it. It is a wise precaution, also, to oil the grooves in which the sash slides. If these two things are done the window will seldom give any trouble.

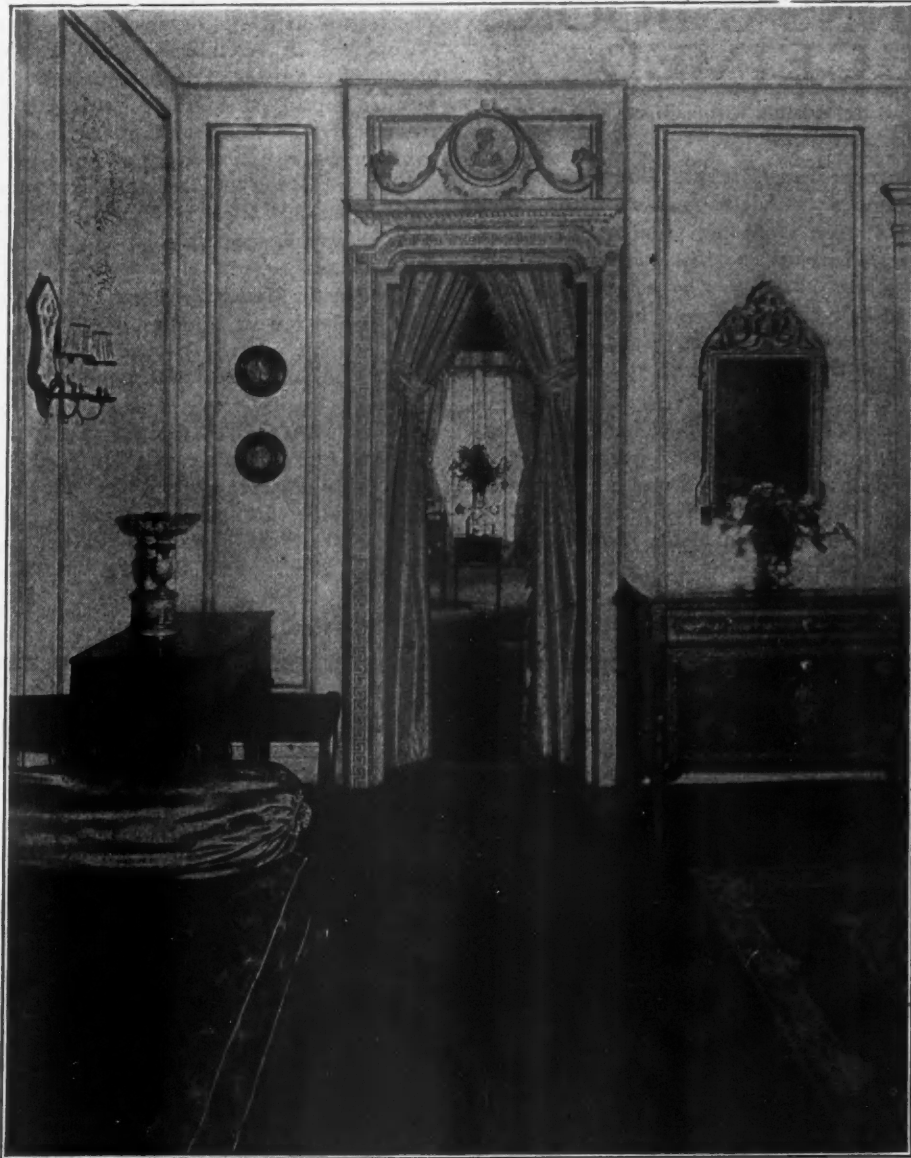


Selling Paint Specialties

SPECIALTIES are the profit lines in the paint trade. Dealers could greatly increase their trade in specialties by advertising what they have and what they are for. To be sure, painters know, but a big market can be created among housekeepers for home application. These people do not know.

DEVOE VELOUR FINISH

For Walls and Woodwork



DEVOE VELOUR FINISH IS THE PERFECT FLAT FINISH OIL PAINT FOR WALLS, CEILINGS, and WOODWORK.

The fine grinding of pigments and colors make possible a finish so soft in texture as to resemble velvet.

Surfaces decorated with this material can be washed

clean with soap and water without spotting or injuring the finish in any way.

Our decorative Service Department has planned harmonious color schemes for many prominent public institutions and private homes. We will be pleased to submit for any of your work panels showing decorative designs in one or many colors.

DEVOE & RAYNOLDS COMPANY, Inc.

101 Fulton Street, NEW YORK, N. Y.

Chicago Boston Buffalo New Orleans Houston Savannah Kansas City Denver Cincinnati



CATALOGS BULLETINS & BOOKS RECEIVED

The following literature, dealing with subjects of interest to builders is now being distributed.

"How to Use Cement for Concrete Construction for Town and Farm," a very complete book on that kind of construction, has just come from the press of Stanton & Van Vliet Company, Chicago, Ill. The author, H. Colin Campbell, is a well-known engineer, who has made a study of concrete, and has been for many years in the service of the government and is now on the staff of the Portland Cement Association as director of the editorial and advertising bureau.

This book is a valuable addition to a builder's library and covers concrete construction for both town and farm. It supplies a long felt want among builders and others who are interested in concrete. It is one of the few books that covers cement and concrete construction in all its phases.

As a text book for manual training schools, it should be valuable. The instructions are explicit and easy to comprehend and there are 250 drawings and photographs illustrat-

ing different kinds and stages of concrete construction.

"Quick Concrete Mixing" is the title of a twenty-four page cover booklet recently issued by the Standard Scale & Supply Co., Pittsburgh, Pa. The various low-charging concrete mixers which the concern manufactures are explained and illustrated. Other contractors' equipment is also listed.

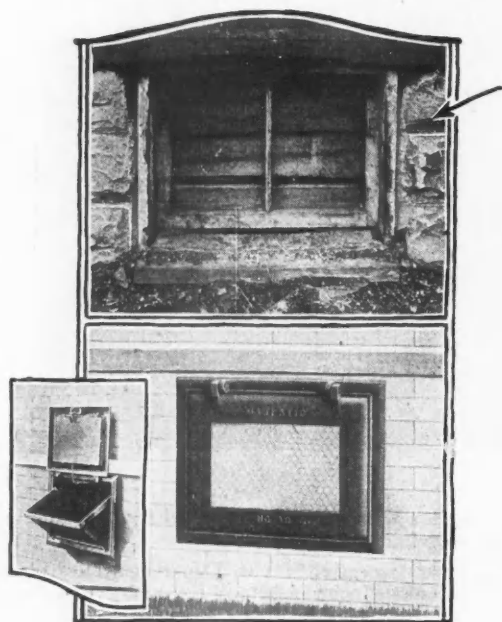
Graphite for March contains some interesting articles on buildings and construction work in which Silica-Graphite paint has been used. This monthly magazine is published by the Joseph Dixon, Crucible Co., Jersey City, N. J. The feature article is on scientific lubrication.

Concrete in Architecture and Engineering, published bi-monthly by the Portland Cement Association, has a detailed report on concrete house construction as recommended by the National Conference and short articles on concrete construction in other types of buildings.

"Sargent Book of Designs" is a cover-booklet issued by Sargent & Co., New Haven, Conn. It contains illustrations and descriptions of a complete list of hardware and lock sets.

The Austin Method of erecting permanent factory buildings in the fewest number of working days is described in a booklet recently issued by the Austin Co., Cleveland, Ohio. In this booklet the construction of factories is shown by illustrations and floor plans. This method calls for standardized designs and specifications.

Nokol Automatic Heating for Your Home is the subject of a new catalog issued by the Steam Corporation, Chicago, Ill. It deals with the operation of the Nokol apparatus which is installed in heating plants and uses oil as a fuel. The booklet contains several phantom drawings showing the action inside the plant in which this appliance has been installed.



THIS HOUSE NOT ABANDONED

This house with the battered siding and broken bin windows is not abandoned. It just *looks* that way. It is in a good residence neighborhood and merely shows how the glass was broken, and the siding battered when coal was delivered.

In this emergency the battered, broken opening was boarded up. But the house was disfigured, cold air rushed under the floors—and there was no light in the coal bin.

Contrast with this the attractive Majestic Coal Chute—which thoroughly protects your home against damage. The wire glass window admits plenty of light and adds to the appearance and value of your property. A Majestic Chute would have saved its cost in necessary repairs on the other house.

Contractors can save money for clients—Increase the value of their houses. Suggest Majestic Coal Chutes for new buildings and as installations in old houses. Write for specifications and details. Working drawings gladly supplied. Our Milk and Package Receiver and Underground Garbage Receiver are wonderful home helps. Ask about them.

The Majestic Company
1002 Erie Street Huntington, Ind.

Majestic COAL CHUTE

1. Protects Against Damage
2. Enhances Property Value
3. Lessens Depreciation
4. Saves Money

OWN YOUR HOME

BUILDERS!

THOUSANDS of people are planning on a home of their own this year.

High rents and scarcity of houses have made people think of building more than ever before.

\$3,000,000,000

Will be spent this year in building

You are going to need new equipment. Mixers, back fillers, hoists and other machines that will speed up your contracts. Let us send you prices and full information on

THE WONDER 4

It Fits Your Purse and Your Job!

The Wonder 4 will take on any job, large or small, and make money on it. Quick and easy loading, thoro mix and rapid discharge.

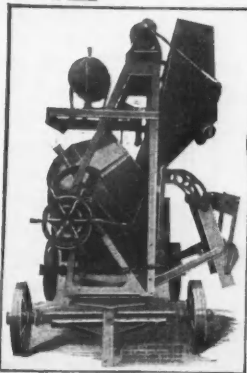
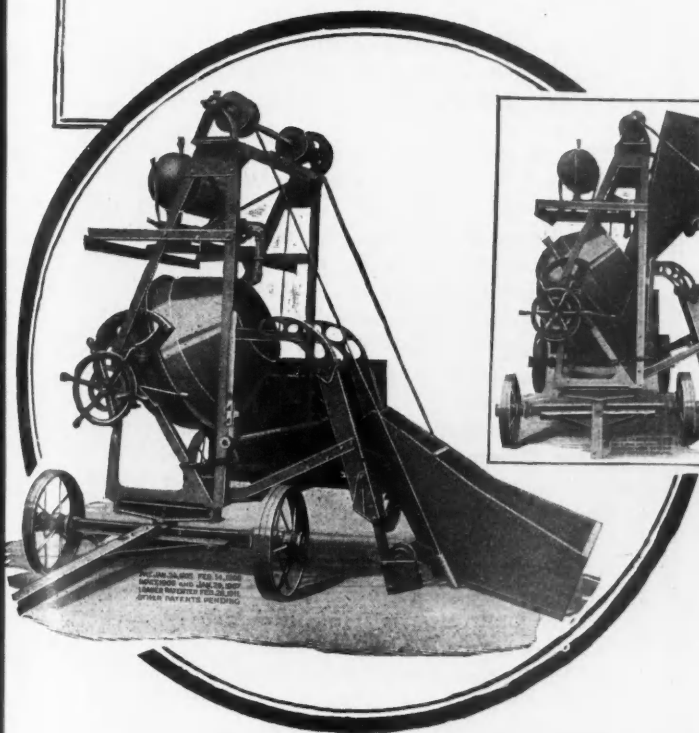
Write a postal now for our catalog and see the "Wonder" before you buy

WATERLOO CONSTRUCTION MACHINERY CO.

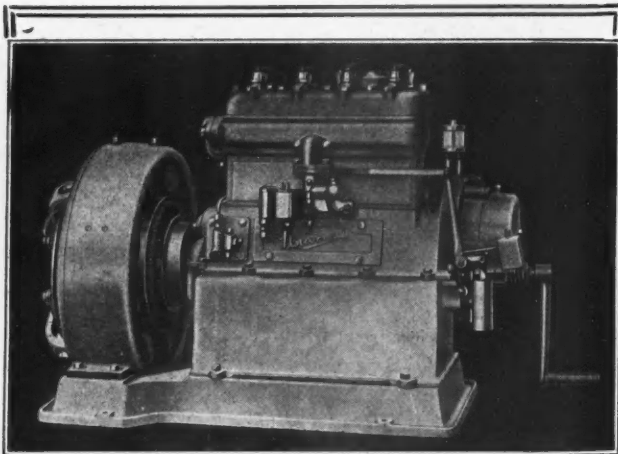
Formerly Waterloo Cement Machinery Corporation

103 Vinton Street, Waterloo, Iowa

LET'S BUILD AND SAVE RENT!



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



Universal **4 K W**
ELECTRIC
GENERATING
SET

The Universal 4 K W set is being specified for all new buildings requiring isolated electric service, because of its smoothness of operation, reliability and economy.

It has sufficient power to carry the overloads now imposed on small lighting plants. It can be used to supply current direct on the line 110 volts, or operate through storage battery as desired. Its capacity of 4000 watts gives ample power to carry lights, motors, and utensils, with 200-20 watt lamps if desired.

CINEMA

The Universal is known among the moving picture trade as the ideal plant for operating picture machine and house lights of a small theatre.

ARMY AND NAVY

Used over 1500 Universal 4 K W sets during the recent war.

AT HOME

Many large farms, homes, and churches use one or more Universal sets to supply their current.

It will interest you to read how this best known of plants is constructed in our big especially equipped factory.

Send for Bulletin No. 30

UNIVERSAL MOTOR CO.
OSHKOSH, WISCONSIN

White Pine in Home Building is advocated in a thirty-six page booklet issued by the White Pine Bureau, St. Paul, Minn. In this publication are several photographs of beautiful homes constructed of white pine with floor plans and also photographs of attractive white pine entrances, fence and pergola porches.

"Good Bungalows for Birds" is the title of Vol. 42 of the pocket library issued by the Southern Cypress Manufacturers' Association, New Orleans, La. It is an extensive compilation of interesting facts on the housing of birds and has a supplement with twenty working plans.

"The Bogalusa Brand of Select Long Leaf Pine and Structural Timbers" is the subject of a pamphlet in colors issued by the Great Southern Lumber Co., Bogalusa, La. It contains a feature article on the characteristics and uses of select structural material, with photographs and tables on working unit stresses and load limits.

"Farmer's Friend," the grain elevator manufactured by the G. & D. Manufacturing Co., Streator, Ill., is set forth in detail in a booklet recently issued by that company. The actual operation and installation of the portable elevator is shown by cross section drawings and photographs.

"Protection," as afforded by safes, vaults, cabinets and deposit boxes, is discussed in a cover booklet offered by the Cary Safe Co., Buffalo, N. Y.

"Regent Semi-Indirect Bowls for Decorative and Commercial Lighting" is the subject of Catalog No. 8, issued by the Ivanhoe-Regent Works of the General Electric Company, Cleveland, Ohio. It illustrates in colors the various indirect lighting systems manufactured by that company with general information on prices, fixtures and installation.

"Some Greenhouses We Have Built" is the story told by the latest catalog issued by Lord & Burnham, New York, N. Y. It contains descriptive articles and photographs of greenhouses in Canada and the United States, and has as a frontispiece a full page reproduction of a painting of a beautiful garden.

"Hitchings Greenhouses" is a resume of greenhouses constructed by Hitchings & Co., Elizabeth, N. J., with additional information about conservatories and cold frames. This booklet contains many photographs of greenhouses and interiors and also describes the heating plant for that structure which is also manufactured by the same company.

"The Science of Safety Refrigeration" is set forth in detail in a booklet published by the Automatic Carbonic Machine Co., Peoria, Ill., who manufacture the "Automatic Evercold" refrigerating machinery. Diagrams and prints are used to illustrate the text.

"Builders' Hardware" is the title of the 1920 book issued by the National Manufacturing Co., Sterling, Ill. It contains a very extensive display of hardware for builders, which is manufactured by that company and is illustrated in catalog style.

Tank Regulators for Automatically and Accurately Regulating Temperature are among the Sylphon products described in detail in the cover pamphlet issued by the Fulton Co., Knoxville, Tenn. The "Ja-Nar," another device for controlling temperature from radiators, is manufactured by this concern and is the subject of a small leaflet.

Better Built Homes is an attractive group of pictures of homes in a folder and published by the Curtis Companies, Clinton, Iowa. It also contains photographs of built-in furniture, which the Curtis factories manufacture.

The Mueller Pipeless Furnace is the title of a twenty-four-page color booklet published by the L. J. Mueller

Your Trailer Will Get Men and Material to the Job



FIVE MEN in the car, ten in the trailer. This contractor's job was four miles out of town. However, with his trailer, he could take his men out in the morning and back in the evening, besides hauling all of the materials needed in a hurry. The trailer also enables a contractor to move men from one job to another with practically no loss of time.

With a Miami Trailer behind your automobile, you can haul the same load as a truck. When you use a truck, your trailer will double its capacity at an additional operating expense of only ten per cent.

Miami Trailers are made to last. The first Miami Trailer built over eight years ago is still in active service. Miami Trailers track perfectly, the pull being smooth and easy, without strain on frame or springs. With fourteen standard body designs, there is a Miami to meet the requirements of every line of business.

Write for further information, prices and name of nearest dealer

Miami
TROY, OHIO, U.S.A.
Trailers

THE MIAMI TRAILER COMPANY, Box GB-5 Troy, Ohio, U. S. A.

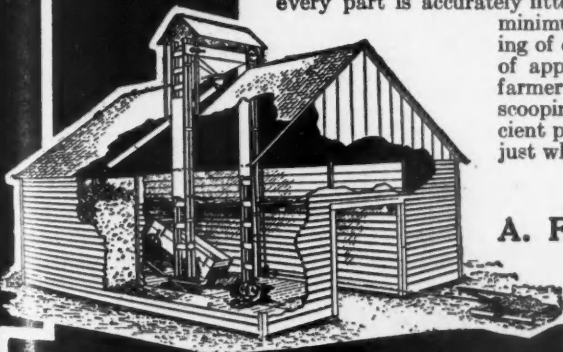
BE THE MEYER MAN IN YOUR COMMUNITY

WE WANT one reliable wide-awake representative in each grain-growing community, to introduce "Meyer" Elevators. It will be of interest to you to consider the merits of the "Meyer" and the profits so easily made.

Behind every Meyer Elevator sold stands our absolute guarantee. You can readily see, on examining a Meyer, how we can afford to give such complete protection to our agents and purchasers; every inch of material used is of the best quality, every part is accurately fitted and firmly fastened, the design is such that there is a minimum of friction, maximum capacity and speed, and no shelling of corn. That it actually does so is attested by the hundreds of approving letters coming to us from pleased owners. Every farmer in your community who is still wasting time and labor by scooping his grain by hand, or who is bothering with an old inefficient portable elevator that spills his grain and gets out of order just when he needs it most, is an easy prospect for a Meyer.

Write today for catalogs and full information

A. F. MEYER MANUFACTURING CO.
340 Walnut Street, MORTON, ILLINOIS



Furnace Co., Milwaukee, Wis. A detailed account of the installation of the pipeless furnace with photographs and cross section drawings is contained in the booklet.

Simonds Guide for Millmen for March, 1920, contains some interesting sketches by Simond saw salesmen and information on the grinding of the saws which the Simonds Manufacturing Co., Fitchburg, Mass., produce. This little booklet is published bi-monthly in the interests of lumbermen, sawyers and carpenters.

U. S. Floating Power Plant News is a monthly publication issued by the United States Motor Truck Company, Cincinnati, Ohio. It contains short articles and pictures showing the U. S. truck in use in all kinds of industries, as well as detail illustrations of parts and chassis.

The Dutch Boy Painter, which is a small magazine distributed monthly to paint and lumber dealers, is published by the National Lead Co., New York, N. Y. In addition to short articles of information on the use of paint, it contains a question box in which readers can submit questions.

Exercises in Lettering Architectural and Other Alphabets is the title of a booklet in the vest pocket series published by the Bruce Publishing Co., Milwaukee, Wis. It was prepared by George G. Greene, of the Lane Technical High School, Chicago, and contains several types of alphabets, with directions how to draw them.

Deming Pumps for Hand and Power are described and listed in a large catalog issued by the Deming Co., Salem, Ohio. It is printed in book form and contains several hundred pages in which the many different styles of pumps manufactured by the Deming factory are described and illustrated.

The Maydole Hammers are set forth in an attractive thirty-two-page catalog with cover issued by the David

Maydole Hammer Co., Norwich, N. Y. The same concern has also issued a little booklet containing the history of David Maydole, by James Parton. He founded the concern of that name.

Newport Automatic Feed Boilers is the subject of a color booklet with cover published by the Newport Boiler Company, Chicago, Ill. In it are found several illustrations of homes and buildings in which the battery heater has been installed, as well as detail drawings of the boiler and descriptive text.



Spring Painting

IT'S now high time for master painters and paint dealers to get after property owners and start them to thinking about spring painting. Some newspaper advertising will help. Letters to owners of shabby buildings are a little more direct and specific appeal. Personal solicitation is the most effective of all.

Here's a true story: A tenant had lived in a certain house for thirteen years. It had never been painted during that period of time. Meanwhile the back steps had fallen down, also the fence around the back yard; the shingles on the front porch had decayed, and, as a result, the roof timbers had rotted so that several boards had fallen off the porch ceiling. The whole house presented a dingy appearance.

The tenant moved out; said he wouldn't stay in such a tumble-down structure. Then the landlady got busy. Spent a lot of money on repairs and painted the building.

And what do you think she said?

"It's funny no painter ever noticed that house and asked me for the job of painting it, isn't it?"

And there's many another painter and paint dealer asleep at the switch on thousands of similar prospective jobs waiting for somebody to solicit them.

BOMMER

Floor Surface Spring Hinge

Double or Shingle Action, Holdback, Ball Bearing. Every moving part of this hinge can be oiled from a single hole on outside of side-plate.



The most durable hinge of its type; holds the door open when swung to 90 degrees at either side

Your Hardware Merchant Can Supply Them

Bommer Spring Hinge Company, Brooklyn, N.Y.



Stained with Cabot's Creosote Stain
C. M. Hart, Architect, Bay Shore, N. Y.

Stained Shingles

The Warmest, Most Artistic and Most Economical of all House Finishes

Wood shingles are two or three times warmer than the gummed paper substitutes, and they are cheaper, last longer and are incomparably more artistic and attractive. When stained with the soft, moss-greens, bungalow-browns, tile-reds and silver-grays of

Cabot's Creosote Stains

they have a richness and beauty of tone that no other finish can equal and the creosote thoroughly preserves the wood. Use them also on siding, boards, sheds and fences. Anyone can apply them with best results at least expense.

Cabot's "Quilt"

makes floors and partitions sound-proof by breaking up the sound-waves and absorbing them. It makes walls and roof cold- and heat-proof by a cushion of minute dead air spaces that prevents the conduction of heat. From 25 to 50 times as efficient as cheap building paper.

You can get Cabot goods all over the country
Write for samples and name of nearest agent.

SAMUEL CABOT, Inc.

Manufacturing Chemists BOSTON, MASS.
1133 Broadway, New York 24 W. Kinzie St., Chicago
Cabot's Brick Stains, Stucco Stains, Conserve Wood Preservatives, Damp-proofing, etc.