

JUNE, 1907

Price, 20 cents

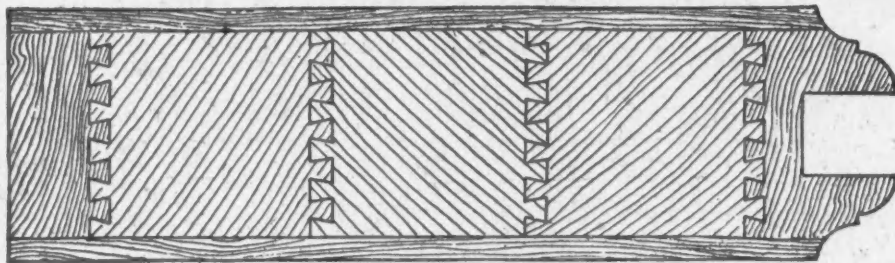
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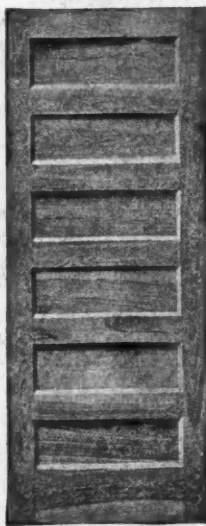
LUMBERING IN NEW ZEALAND



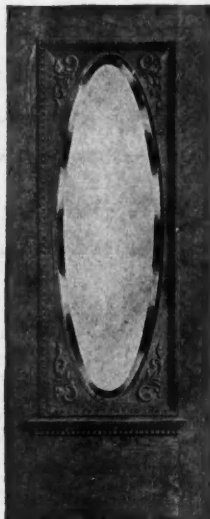
The
KORELOCK
DOOR

THE **KORELOCK** CORE
Every
KORELOCK

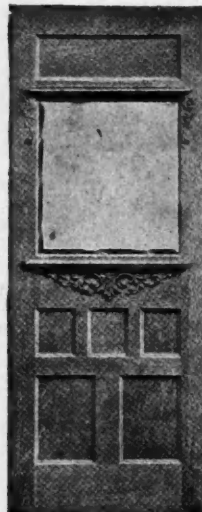
The
KORELOCK
DOOR



No. 377
Birch, $\frac{3}{4}$ " x $\frac{1}{2}$ " — \$2.75, F.O.B. Cincinnati
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door is guaranteed not to
bind, twist, swell
or shrink.



No. 12

You would not think of buying Pine, Yellow Pine or Cypress Furniture for a Home. Why use Doors which DO NOT HARMONIZE with your Hardwood Furniture, when you can have HARDWOOD DOORS at about the SAME COST?

OUR BIRCH VENEERED DOORS

COST LESS TO FINISH | STAY FINISHED A LIFETIME

SOFTWOOD DOORS
MUST BE REFINISHED FREQUENTLY
Thus increasing the cost continually



No. 28

Write for Our Door Catalogue—Bargains in Birch and Oak Doors

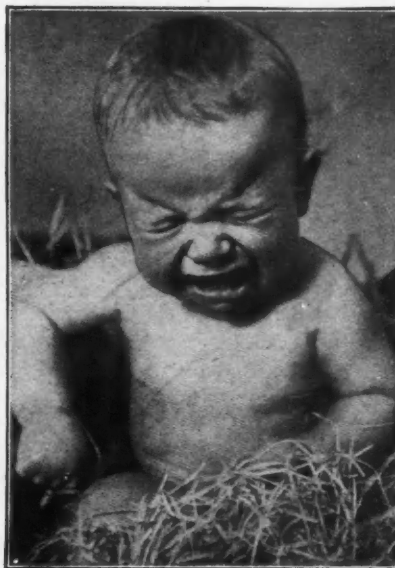
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The "Little Shaver" is sold under our absolute guarantee,

to do the best and fastest work, and is the strongest and cheapest on the market, will scrape more square feet in an hour than four men can in the old way on hands and knees. Has direct pressure on the knife, the handle having no pressure bearing control whatsoever. This guarantees against any possible chance of the machine jumping and making a wavy floor. Large or small man can work the "LITTLE SHAVER" without first adjusting the handle.



The "Little Shaver" Floor Scraper

Pays for itself on five thousand square feet of flooring.

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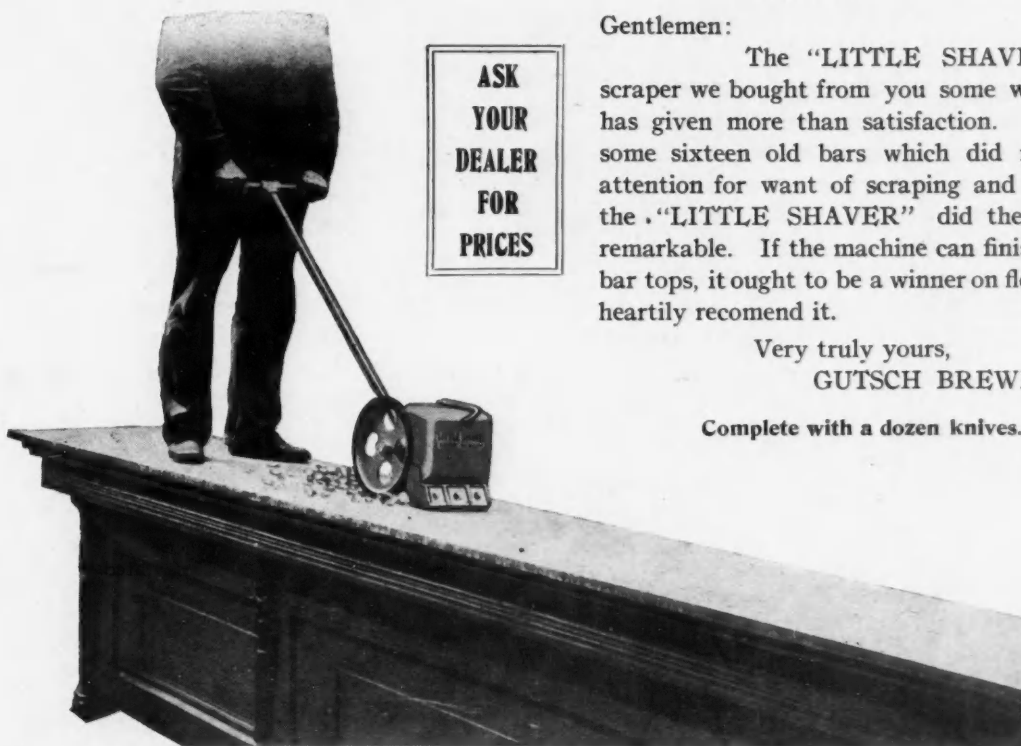
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Very truly yours,
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Complete with a dozen knives.

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DEALER
FOR
PRICES**



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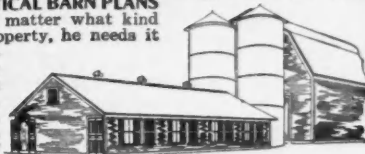
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GOOD FARM BUILDINGS will increase the value of your property, add to its appearance and pay for themselves over and over in a short time. Any farmer who is wide-awake can have good, valuable, attractive and useful barns and out-buildings at a small cost if he gets our barn book.

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ANY CARPENTER OR BUILDER or even a farmer himself who is handy with tools, can take our "NEW \$5,000 BARN BOOK" and put up many of the buildings.

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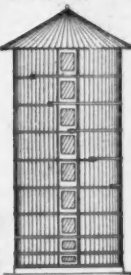
Poultry House.



SECTION OF HORSE HOUSE

EACH AND EVERY PLAN

in the book is accompanied by a lengthy written description explaining and giving the details of the drawings, and so worded and arranged, numbered and indexed, that it must be readily understood by anyone who reads it. Your money back if you are dissatisfied.



ELEVATION OF SILO
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90 Buildings—250 Illustrations

THIS IS THE ONLY BOOK of its kind in existence, and is actually worth \$25.00 to any up-to-date farmer; no matter whether you intend to build or not, get it any way and study it and see the "new wrinkles" in barn building it contains, and where, with a little ingenuity, you can change or improve your own buildings so that it will be the means of saving feed, money and labor, and increase the value of your property. It is so very cheap that it is within the reach of every farmer.

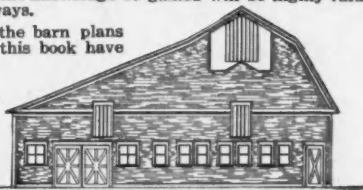


Smoke House

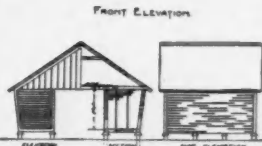
THE ILLUSTRATIONS on this pages show but a very few of the many different kinds of barns and out-buildings in the book, and give no idea whatsoever as to cost or construction, as space will not permit here. But in the book itself each and every one of the buildings is shown by large drawings of floors, sides, ends and frame work, together with perspective views, sufficient to guide any carpenter or builder in the construction of same. The reduced illustrations here are only used to indicate, in a very incomplete way, just what might be expected from the book. It is a book which should be in every farm home, if you only intend to repair a little, or just build a small chicken coop. It is a good thing to even sit down and read, as the knowledge so gained will be highly valuable in hundreds of other ways.

A GREAT MANY of the barn plans in this book have

been contributed by farmers themselves from all over the United States and Canada, and are therefore the product of practical experience from farmers who have learned by actual necessities the barn that was most practical and best suited to their needs. They are not fancy barns and buildings, but practical barns such as every farmer likes. They contain a great many little advantages that are not usually found in ordinary barns.



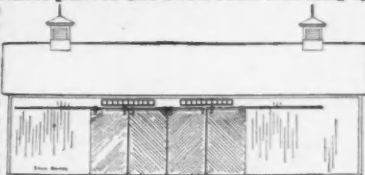
A Practical Farm Barn.



FRONT ELEVATION
Corn Crib.

THE BOOK is really the combined thought and work of the best minds in the country in regard to farm buildings, and it cost several thousand dollars to compile the book, besides the cost of printing and publishing it. It contains what might be termed a veritable store-house of practical barn lore not to be found within the covers of any other book, or obtainable in any other way.

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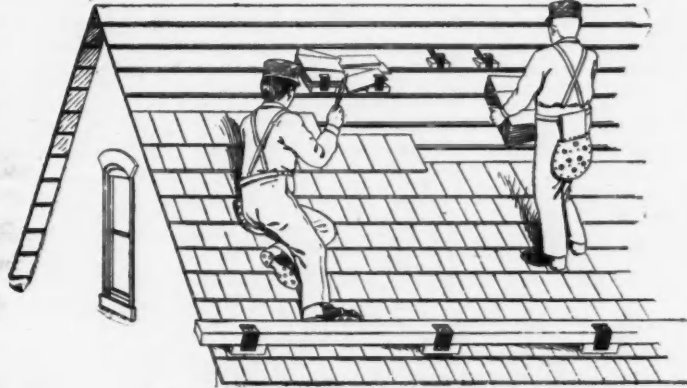
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Stowe's Shingling Kit

Consists of
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Roofing Saddle
Sandals



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Stowe's Roof Saddle

Is arranged so the operator may shift from one hip to the other without adjusting, and in-

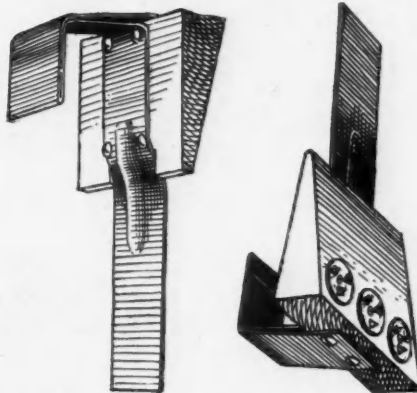
sure not only a safe and comfortable seat, but saves clothing.

Has nail pocket

Prices for any part or for complete kit quoted on application.

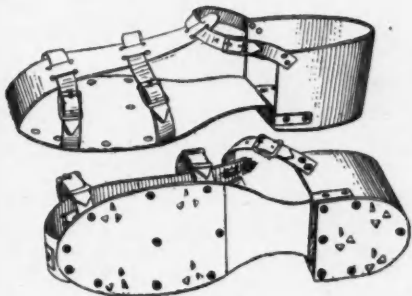
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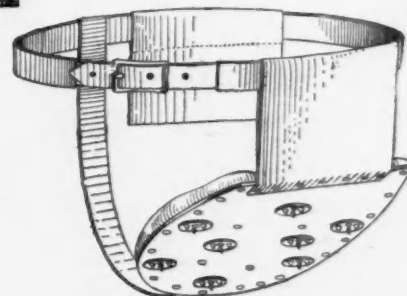


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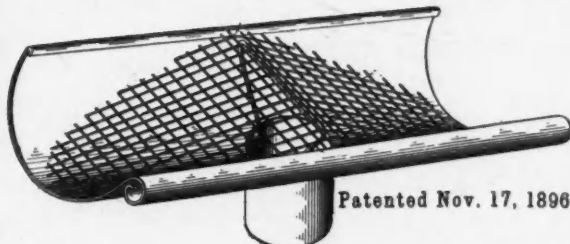
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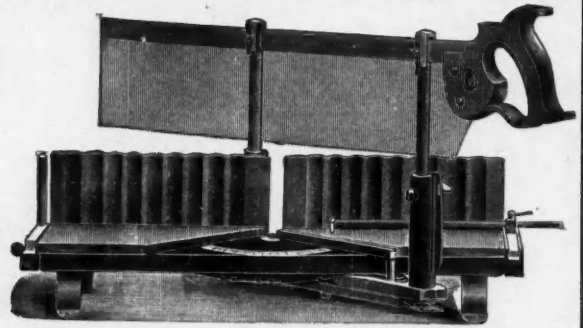
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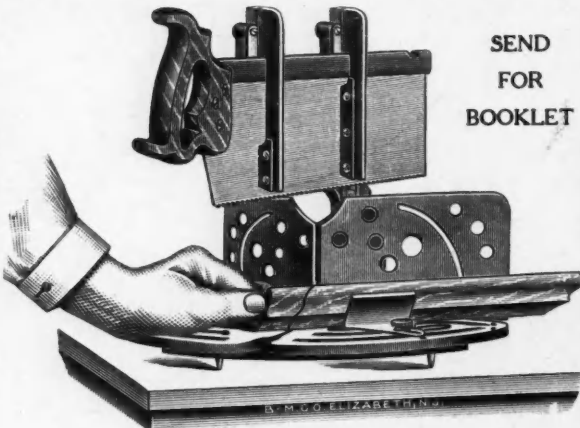
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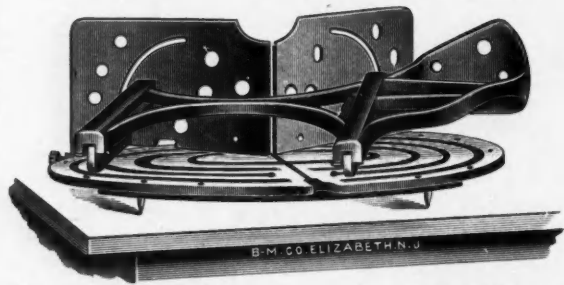


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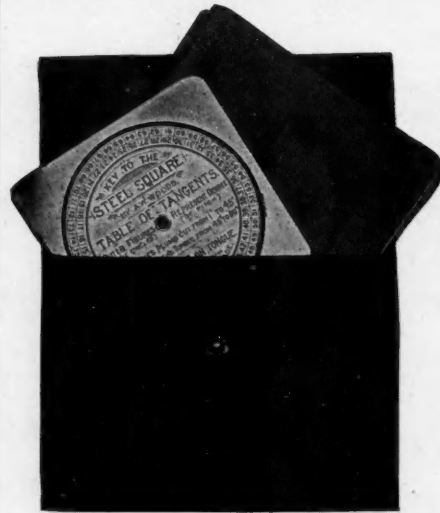


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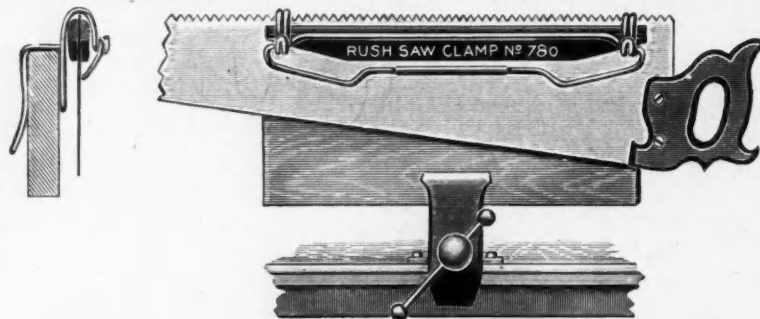
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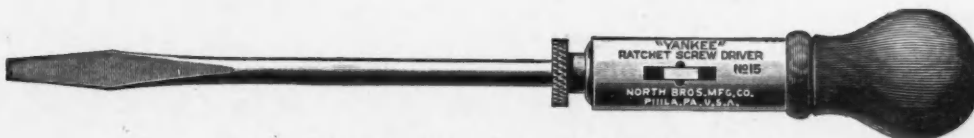
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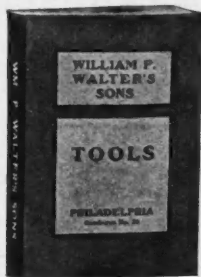
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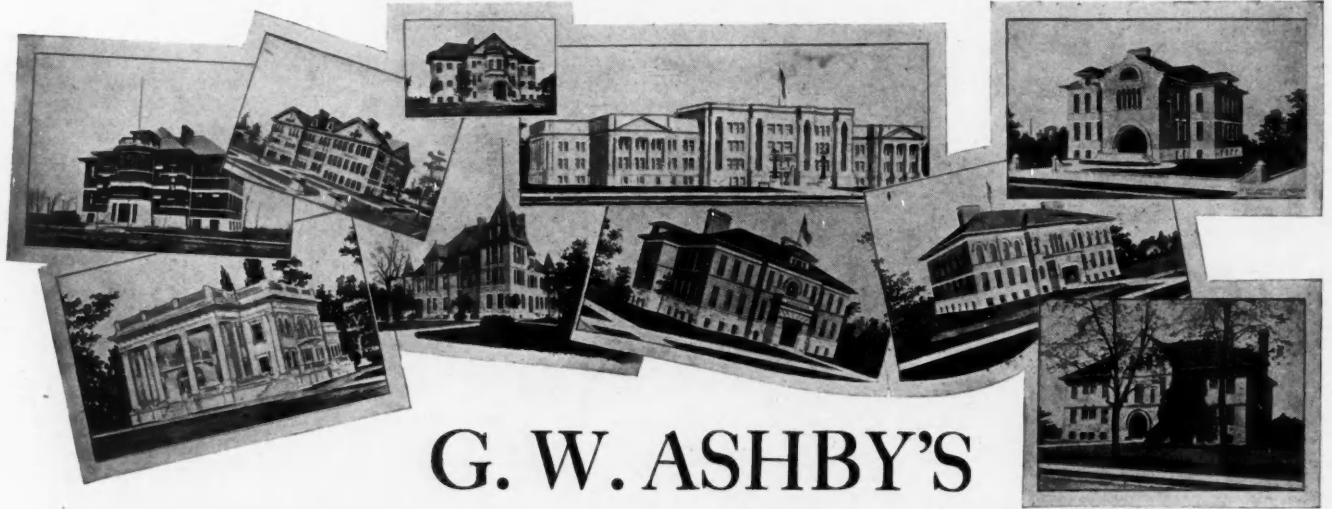
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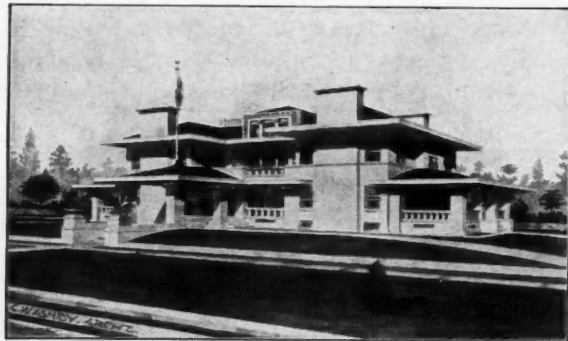


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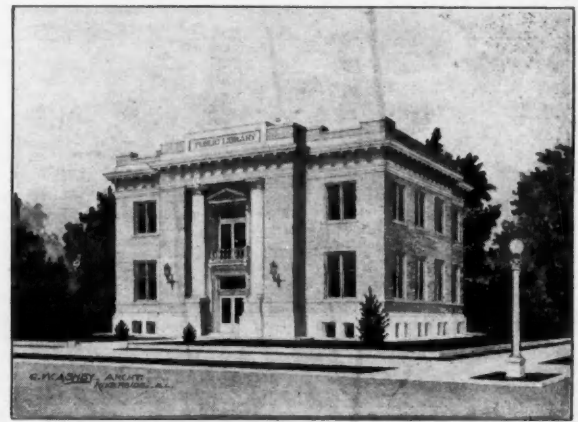
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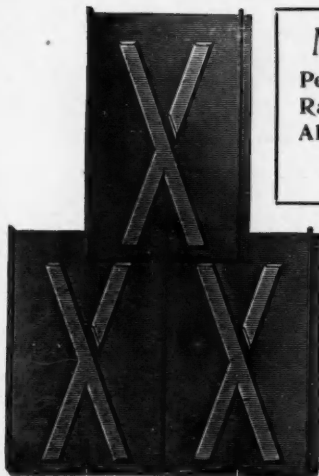


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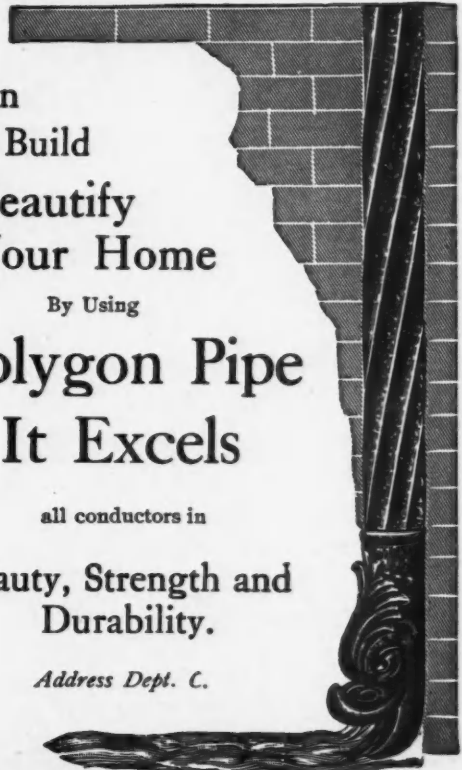
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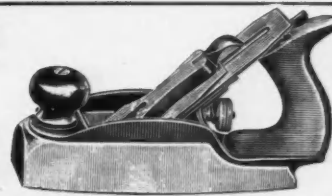
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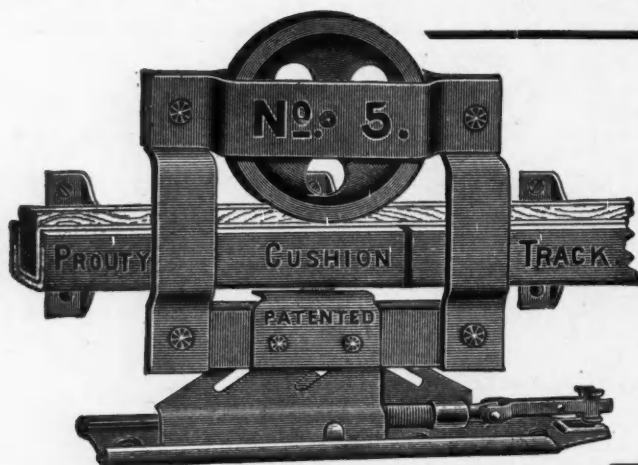
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Send us the names of three or more owners who will buy furnaces and we will send you, free, two of the best carpenter's pencils you ever saw.

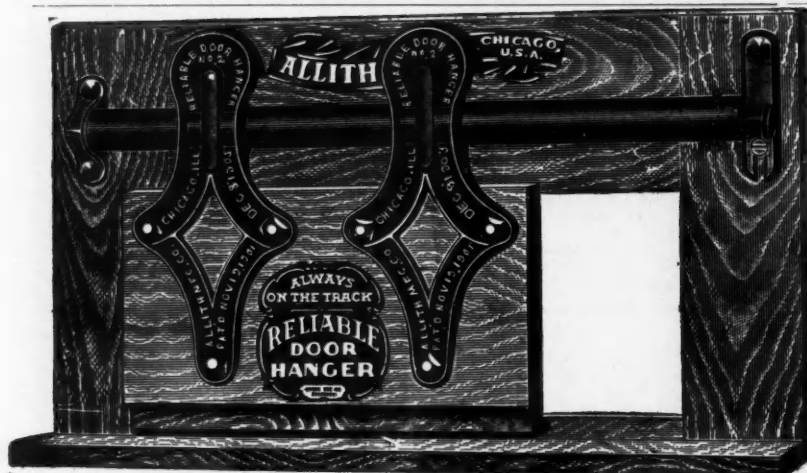
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Easy Running, Great Strength

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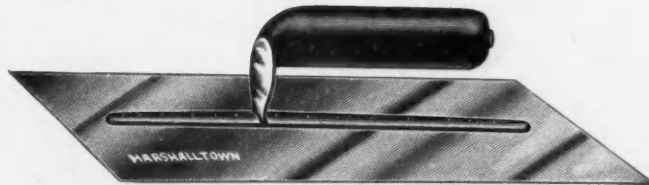
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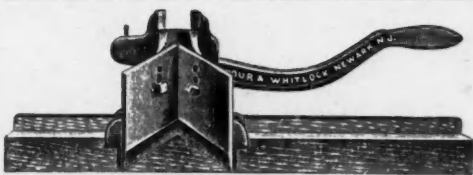
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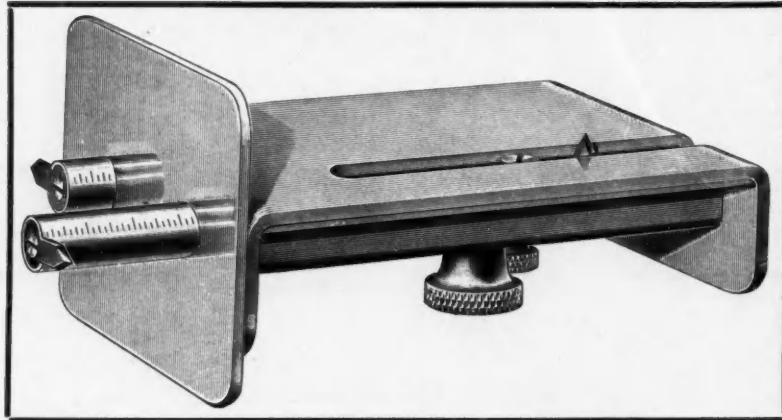


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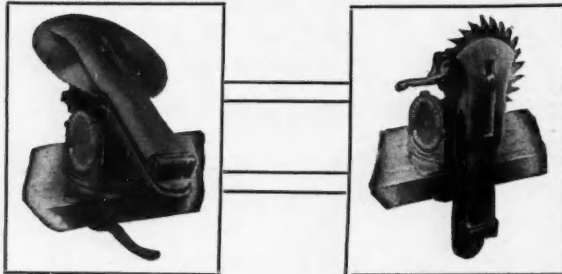
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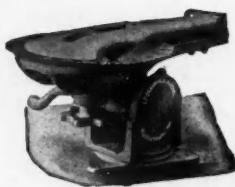
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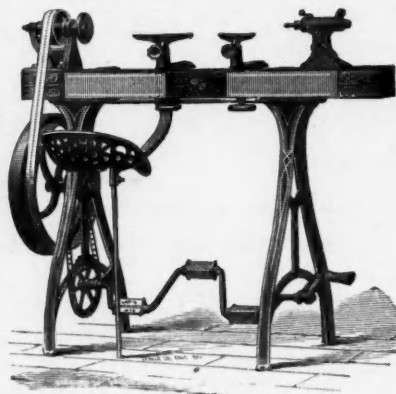
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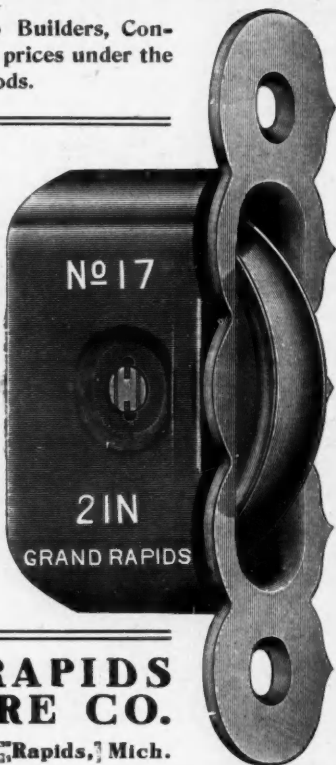
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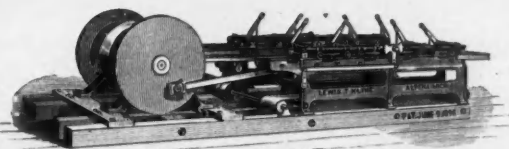
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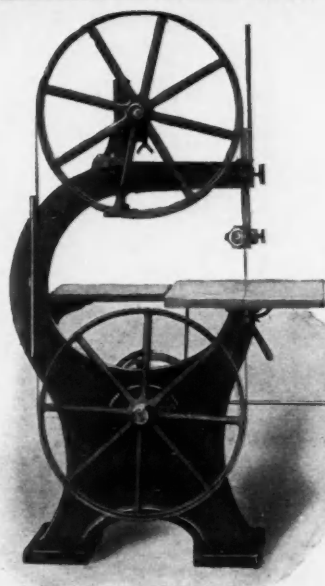
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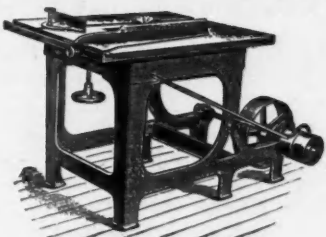
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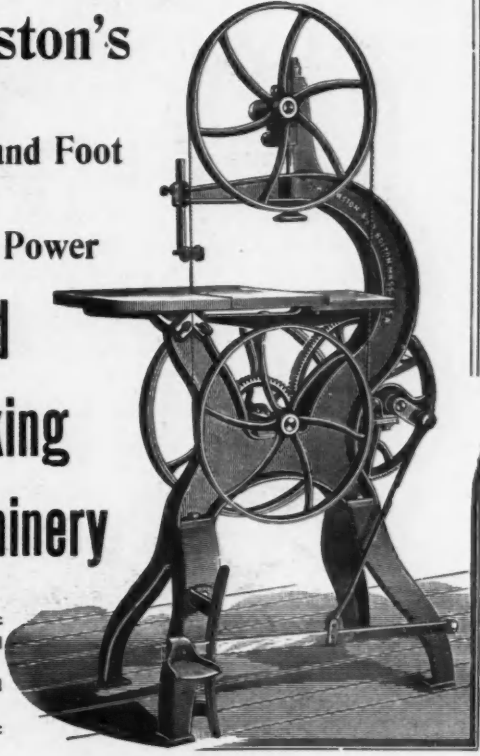
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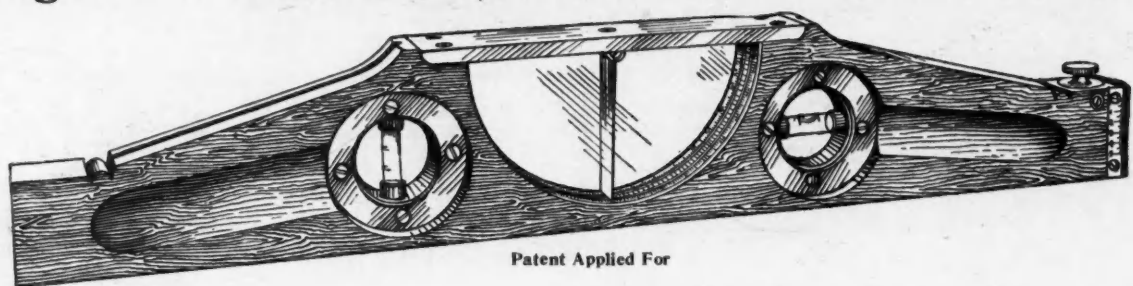
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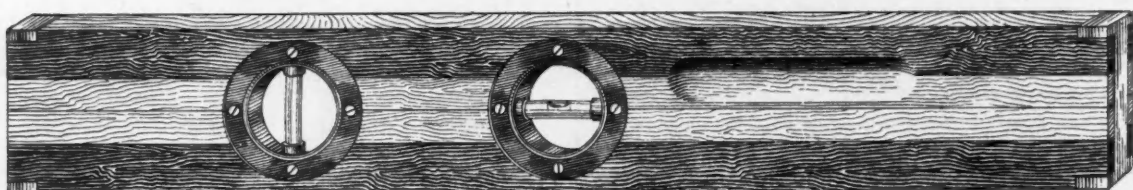
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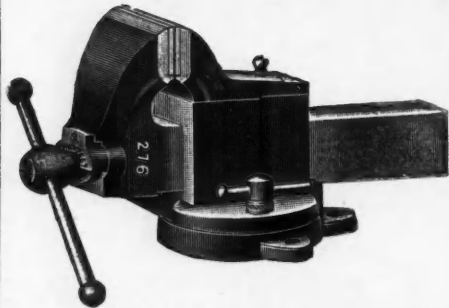
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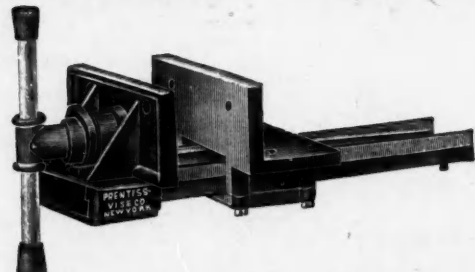
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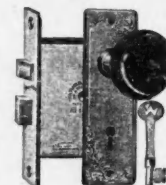
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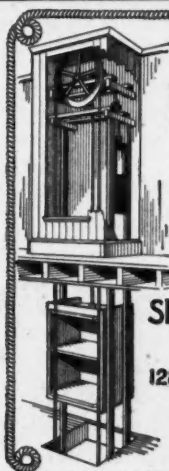
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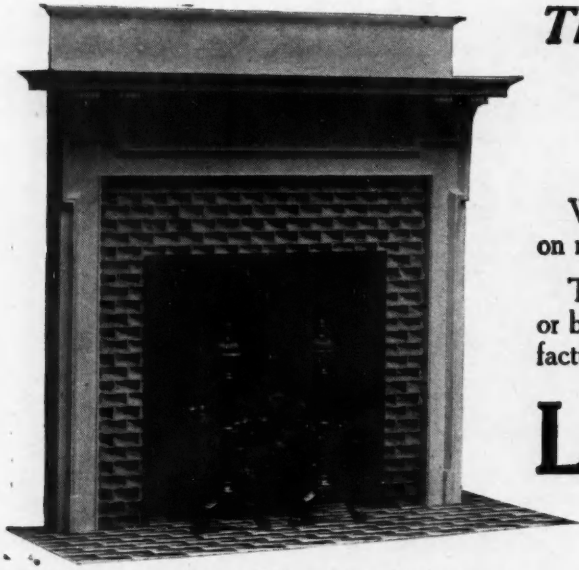


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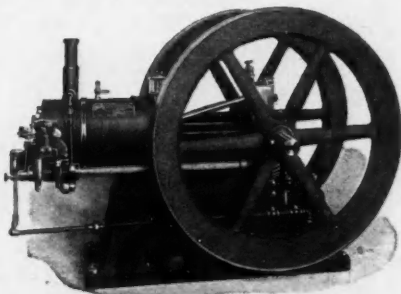
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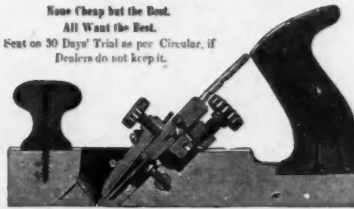
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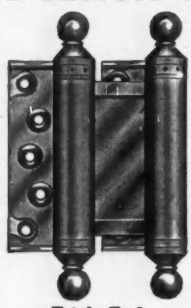

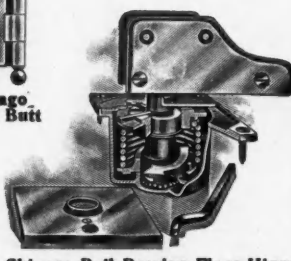
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Our Timber Situation

IN THIS issue we have a graphic description of the timber industry in New Zealand, written by a man who has the interest of that country at heart. While they lament the fact that the devastation of the vast timber lands was not checked sooner, still they do not stop at that, but immediately set about to remedy the matter. Could we not profit by the spirit shown and the action taken by these people of New Zealand to remedy the timber situation in this country? Upon examination we find that this country annually consumes between three and four times more wood than all its forests grow in that time. That our forest products are a great source of wealth is shown by the fact that the value of the annual output is estimated at \$1,075,000,000. A source of such enormous wealth should not be neglected but should be looked after very carefully, for at our present rate of consumption, as compared with the new growth, it is clearly a case of killing the hen that lays the golden egg.

+

Obeying Specifications

CONTRACTORS occasionally become careless in regard to living up to the specifications under which they agree to erect a building, substituting other articles for those named. In doing this they lay themselves open to the liability of considerable loss. A suit recently brought by a contractor in New York state to recover on a contract was appealed to the supreme court and defended on the ground of failure to obey the specifications. The supreme court ruled as follows:

We have set forth some specimens, out of more than twenty admitted failures to comply with the specifications, and at the same time have given in substance the reasons of the contractor for the omissions. The contract was not substan-

tially performed in all respects and there is no evidence to support the finding of the trial court that it was. There is no substantial performance when no attempt is made to comply with certain express requirements of the specifications, and no excuse or explanation is given for the failure. A contract is not substantially performed by substituting for that which is expressly required, materials, methods of workmanship which, in the opinion of the contractor and his experts are "just as good" unless the substitution relates to a matter of minor importance, is made in good faith and for sufficient reasons, and there is an adequate allowance for the difference. The owner has a right to what the contractor agreed to give him, and unless he has it or when the failure is neither wilful nor substantial, is fully compensated for the omission, there is no substantial performance and there can be no recovery. It is not sufficient for the contractor to build a house, but he must build the house contracted for and substantially comply with the specifications as to the method of construction, materials and workmanship before he is entitled to payment. In the case last cited, we said: "The contractor may not deliberately violate his contract by the use of earthen construction instead of iron and small pipes instead of large ones, and yet claim that he has done as he agreed because the result is just as good. Unless the owner had the right to contract for what he wanted and to get what he contracted for, there was no use in making the contract. A building contract, like any other, is to fairly perform according to its terms, and any substantial change, unless authorized by the owner or architect, is made at the risk of the contractor. In order to avoid injustice, the law tolerates unsubstantial deviations made in good faith, but it exacts full compensation therefor and permits a recovery on the theory of substantial performance only after the proper deductions have been made. The contractor had no right to substitute his own judgment for the stipulations of the contract, or to recover on the basis of complete performance, when * * * he wilfully and intentionally used inferior and less expensive materials in the place of those agreed upon.

This ruling shows how important it is to live up to the specifications under which a contract is made. As an example, in this case an instance is cited where one sash cord was substituted for another. The contractor testified that although a certain sash cord was called for, it was not used, but another substituted, because, as he said, "I never heard of that cord. I did not know anything in regard to the two different kinds of cord. The cord I used is considered the best in the market." The architect, who drew up the specifications, testified that the cord used was not durable and that it was already partly worn out. The contractor in this instance has not only lost his suit, but has also lost the friendship of the architect. It will be seen that too much care cannot be taken in carrying out the exact conditions of a contract.



Hints to Young Carpenters

MY PREVIOUS talks to the young mechanic have been chiefly along the line of censure for work unskillfully performed, or faults that ought to be avoided. Many of the remarks might well have been applied to myself in years gone by, and it is only natural to presume that, at the present time, there may be others.

After I had served my apprenticeship of three years, I proudly told my friends that I had "learned the trade." I was somewhat younger then than I am now, and fully believed it to be true. The circumstance reminds me of the young man who had been away from home for some time. Upon his return, his mother said to him one day, "John, I see that you don't go to church any more; you used to attend regularly before you went away."

"Yes, mother," he replied, "but I was young then and didn't know any better."

The ignorance of youth may be condoned, but what excuses have we to offer for that of maturity? A young man may get the impression that he "knows it all," but the longer he works at the trade the more he will see that he has still much to learn; in fact, he never learns it. No matter how proficient he may become, he still finds, each day, some new problem to solve—something he has never done before. He is always acquiring more knowledge of the craft, be it ever so little; and when old age compels him to lay aside his tools, he has made the discovery that there is yet room for improvement.

There is one thing I would like to impress upon the mind of the young mechanic, and that is, don't say you know how to do a thing when you do not. If you are honest and truthful, the chances are all in your favor; you will more likely be instructed, instead of allowed to go ahead and, perhaps, spoil a piece of work.

It is a fact, well known to most contractors, that there are some journeymen who misrepresent themselves when seeking employment, but why a man should do so is beyond my comprehension. A few days, at the farthest, will be sufficient to discover his rating, and then, instead of lending a helping hand, the employer may feel more like kicking him off the job.

That our present system of apprenticeship is accountable, to some extent, for such misrepresentations, is very evident. I well remember, when a "carpenter" was what the name implied—a framer, and builder of structures; and a "joiner" was the one who made the sashes, doors and moldings, and set them in place; and a young man who had learned the combined trade of "carpenter and joiner" had no need to misrepresent himself.

Then there is the class that will tell you frankly that there are some things they cannot do. I had a man tell me once that he could do anything in the line of carpenter work—except make a window-frame! Wonder if he expected I would believe that.

I don't like to hear a man say that he "can't" do this or that; if it ever has been done, it can be done again. "I don't know how," would be more to the point. "I can't" will accomplish nothing; but "I will," and "I will try," will remove mountains.

A. G. BEARD.

The New Zealand Timber Industry

BY S. V. BRACHER

ENGLAND'S antipodean colony of New Zealand, or Maoriland, as some of its people like to call it, has long been famous for its democratic legislation. Statesmen the world over look upon it as a laboratory of experimental politics. Female-suffragists, prohibitionists, advocates of industrial arbitration, socialists, all consider themselves justified in pointing to its prosperous, free and law-abiding people as constituting nearly a million (for such is their number) of living arguments for reform. But while such is the chief notoriety of Maoriland, it is in other ways unique and interesting. To woodworkers, of whatever department, a glance at its timber industry will be not altogether a waste of attention.

The history of the great timber forests of New Zealand may be called an economic tragedy. Forms of beauty that cannot be replaced, utilities that would never lose their value, sources of national wealth inestimable, have been wiped off the face of the country like the sums off a child's slate. It is no exceptional story. All new countries know something of it. The settler fells and burns the forest because he must have grass. The lumber man takes all he wants, spoils more and leaves the future to take care of itself. Nobody worries about the wastage of the forest, until the day comes when the people realize that the climate is not so good as it used to be, and the water supply is irregular, and the price of timber is nearly doubled, and there are no more logs for the hearth. Then they begin to calculate how long the timber supply will

last, they husband what is left, and they plant where their fathers destroyed.

New Zealand's natural endowment of timber was magnificent. The twenty million acres of forest that remain, with their estimated forty thousand million superficial feet of milling timber, are but a miserable remnant. Almost all of what are now the best farming districts were once covered with "bush." If none

but the good agricultural land, or, say, none but the really useful land, had been cleared, there would be little to regret. But many large areas that have been robbed of their timber are not likely ever to carry another crop of such potential profit. And the surrounding country has suffered.

Mr. H. J. Matthews, the chief forester, tells of "climatic changes resulting inevitably from the wholesale clearing of bush lands." He says: "Almost every spring brings floods down the water courses, in which the streams fed by melting snow and spring rains formerly flowed gradually. Winter winds now sweep over



A Giant of the Forest

large areas, damaging alike stock and crops." When the trees are removed from steep hillsides, the thin coating of soil, no longer protected and held together by the roots, is washed away, and subsequent rains, with nothing to absorb them or to delay the passage of the water, swell the streams and rivers far beyond their normal capacity. Thus the lower valleys are flooded, crops buried under inches of silt and river banks washed away.

The New Zealand government established a forest

department in 1876, but after ten years it was abolished, because times were bad and it was costing more than the country felt like giving to posterity. Early in the "nineties" the department of lands and survey took up forestry and enforced regulations to check the waste. In 1896 state nurseries were started, to



Bullock Team, Daunevick

raise trees for planting out on public lands and to experiment with different varieties. This latter work is the more necessary on account of the variety of climate in a country which stretches more than a thousand miles from north to south and has an endless variety of aspects, elevations and soils. In ten years over thirty-two million trees have been raised in state nurseries and plantations. Prison labor is largely used in the planting out. During the year ending March 31, 1906, over three and a quarter million trees were planted permanently on 1,435½ acres, bringing the total area planted up to 5,494 acres, on which nearly eleven and three-quarter million trees were growing. Much more than this has been done by private persons and local governing bodies.

The pity of it is that the experiments, as well as the observations made in the virgin forests, are leading to the planting of imported varieties instead of the unique and beautiful indigenous trees. To the question, "Why don't you plant native trees?" the chief forester replies, "Because it will not pay." He explains that the native trees are expensive to grow because of the shelter they require, that the thinnings of the plantations are useless for anything but firewood, and that the period of growth is very long. Exotics,

on the contrary, such as the oak, larch, spruce, Oregon pine and eucalypti, will give two or three crops of mature timber before the native trees begin to be valuable. Of course that settles it. And yet nobody who has felt the solemn charm of the high bush, or delighted in the delicately penciled grain of rewarewa, silver pine or rimu, can help being sorry that so much of this beauty is vanishing forever. The descendants of the present colonists will only know the bush in a few scenic reserves, and the timbers in heirlooms of antique furniture.

It is officially estimated that the supply of native timber will only last another seventy years. A departmental statement on forestry informs us that, if the present rate of planting is maintained or increased, "our timber supplies will in another twenty years, or perhaps a little later, be considerably augmented by the gradual maturity of the trees raised under the direction of the government, and so the coming loss of the present native forests may not be so keenly felt as would have been the case if steps had not been taken to meet the difficulty." It is, however, stated on good authority that the situation is so grave that the planting rate ought to be increased at least tenfold, and the question of prohibit-



A Steep Incline, Rautapo

ing the export will have to be faced before very long. There were 414 sawmills working in the New Zealand forests in 1905, and their output for that year was 413,289,742 superficial feet. The total horsepower of their engines was 9,427 and they employed 6,912 hands.

The kauri pine is the finest tree, and kauri is the best timber in New Zealand. The tree grows only in the sub-tropical northern portion of the colony. A kauri forest is one of the grandest sights in nature. Out of an underwood of varied shrubs, and from a



Group of Kauri Trees After a Fire

soil carpeted with delicate ferns, rise the great smooth grey trunks—close together—four feet to eight feet in diameter, and branchless for a hundred feet upwards. There the limbs spread in a thick roof, with small deep-green leaves. The shed bark of centuries has formed a mound of humus at the feet of each of the giants and the soil conceals lumps of the valuable kauri gum, the amber like resin that has exuded from the trees. Some of them are amongst the oldest trees in the world. They germinated centuries before the Christian era, but are still fresh and vigorous. It is stated that no other timber known to commerce has so many valuable qualities as kauri. It is used for all kinds of work, from railway sleepers, bridges and wharves to joinery and cabinet making, and is held to be unequalled for the masts and decks of ships. It is straight, even and elastic. It is prettily marked in the grain, and varies in color from yellowish white to brown.

The center of the kauri industry is the port and city of Auckland. The big logs cut in the rough bush country are generally floated down the streams and along the coasts to the big central planing, molding and joinery mills.

"Some New Zealander ought to write the life of the timber camps before they disappear from the land," says a special commissioner of the Auckland *Herald*, who recently traveled through the far north of the province. "There is plot enough in the scheming for kauri rights, incidents enough in the logging work, successes and failures in the big contracts. When most people were sheltering from the terrible rains that flooded the country in mid-January, the timber men were working their hardest. Gangs were out in many a wild ravine and lonely creek bed; dams had to be tripped, though men risked death in the work, and there was rafting to do. The timber men cannot seek bunk or fireside when the floods are loose; they must labor at top speed to make use of the huge forces that Nature sets in motion at such times. A year's work may be lost by shirking, but there is no shirking. Daring deeds were done in those torrential rains, skilful work performed, but the public hear nothing of their deeds, because, like all strong men, the timber workers are silent, and as they labor in the seclusion of deep forests their skill has no witnesses."

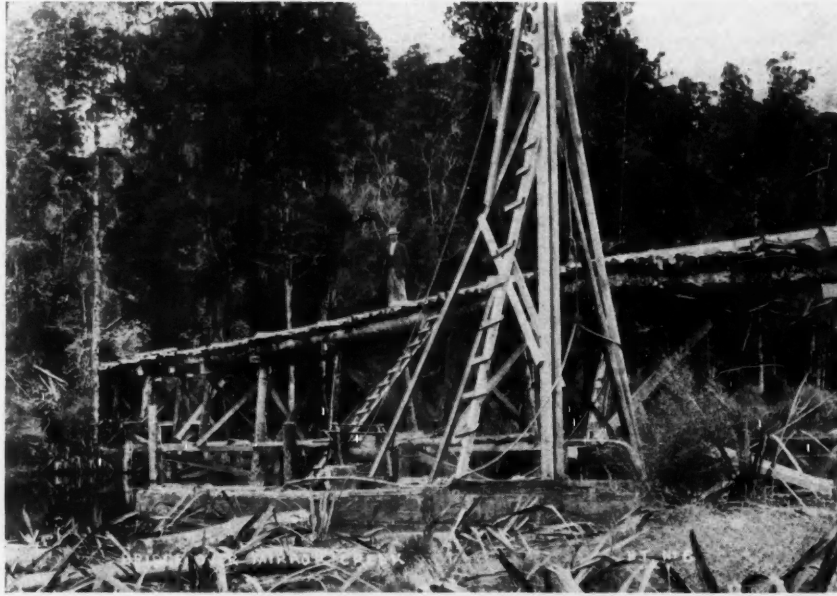
On March 31, 1905, the kauri left standing was estimated at 1,112,000,000 superficial feet, and it was being cut at 144,000,000 feet a year. The supply was



Hauling the Logs

calculated to last only eight years more. Sometimes a fire sweeps through a kauri forest (see illustration) and hastens the destruction.

Totara comes next in value, and it will yet be many years before it is worked out. It is found in all



**Bridge Over
Mirror Creek**

parts of the country and it is an exception (though not, economically speaking, a brilliant one) to the rule that native timbers grow slowly and are useless in the early stages. The government is therefore making some totara plantations, and it is predicted that within a century they will produce valuable timber. The wood is of a red tint, straight, compact and only less easily worked than kauri. Its defect is brittleness and its chief merit is that it lasts remarkably well in the ground and has unsurpassed powers of resistance to the teredo and other worms. For this reason it is the favorite timber for marine and other piles. It is also used in ornamental work, the burr or knots being in demand for veneers.

Rimu, or red pine, is the most plentiful of the commercial timbers of New Zealand. It is unsuitable for bridges, as it will not last in contact with water, but for build-

ing and almost all other purposes, it is second only to kauri. The prevailing color of the grain is red, but it varies infinitely and is very beautifully marked.

White pine, or kahikatea, is the prey of a small boring insect after the timber has been a little time in use. "Though the kahikatea be a great tree," says the Maori proverb, "yet the small mokoroa grub can pierce it." The wood is white, compact, straight and even. It is used for all kinds of temporary work, and is especially valued for the boxes in which New Zealand and Australian butter is put up for export, as it is almost the only timber that does not taint

the butter. White pine forests thrive on swampy soils, and in some districts assume quite a remarkable character. "The uniformly straight naked trunks often exceed 100 feet in height, carry very short branches at their tops, and are so close together that at the distance of a few



**Modern Method
of Hauling Logs**



A Bush Saw Mill

yards the view is completely blocked, and nothing is to be seen but the column-like trunks, from two to five feet in diameter, the undergrowth being insignificant."

Matai, or black pine, is hard and heavy, but not difficult to work. It is smooth and even in texture, and shrinks little. It is used for most constructive works, and is particularly favored for flooring. Miro, called black pine in the southern districts, resembles matai, but shares the damp-resisting and worm-proof qualities of totara. It is the strongest timber in New Zealand. Its pretty grain gives it a place in cabinet making.

Other valuable timbers are: Puriri, excessively hard, heavy and durable, and with handsome, cloudy, dark-brown grain, but never found in large logs. Pohutakawa, of a deep-red color, lasting, strong and dense, very valuable for ship timbers. Ake-ake, a shrub timber, yellowish, with dark streaks, satiny and beautiful for cabinet work.

These are the chief timbers of commercial importance, but there are many others which have great

beauty and may be used with good effect in ornamental work. There are also a number which are valued for special constructive uses, and others for fencing and firewood. At the International Exhibition, now being held at Christchurch, New Zealand (Nov., 1906-April, 1907), the public works department is showing specimens of sixty different native timbers, all of which have their uses. The government of the colony was awarded a gold medal for timbers at the Colonial and Indian Exhibition, in London, 1905, and a gold medal for timber and veneers at the Colonial Products Exhibition, 1906.

The illustrations give a good idea of the New Zealand bush, with its ferns and creepers, its luxuriant undergrowth and its dense evergreen foliage. They show also some of the methods of haulage of the logs which, owing to the steep, broken ground of much of the bush country, is often a matter for much contriving. A large proportion of the machinery, both in the bush mills and in the sash and door and general woodware factories, is American.

Methods of Building in Morocco

KINDS OF DWELLINGS IN USE IN THE FAR EAST—METHOD OF CONSTRUCTING THEM—SAMPLES OF NATIVE ARCHITECTURE

By Geo. E. Holt

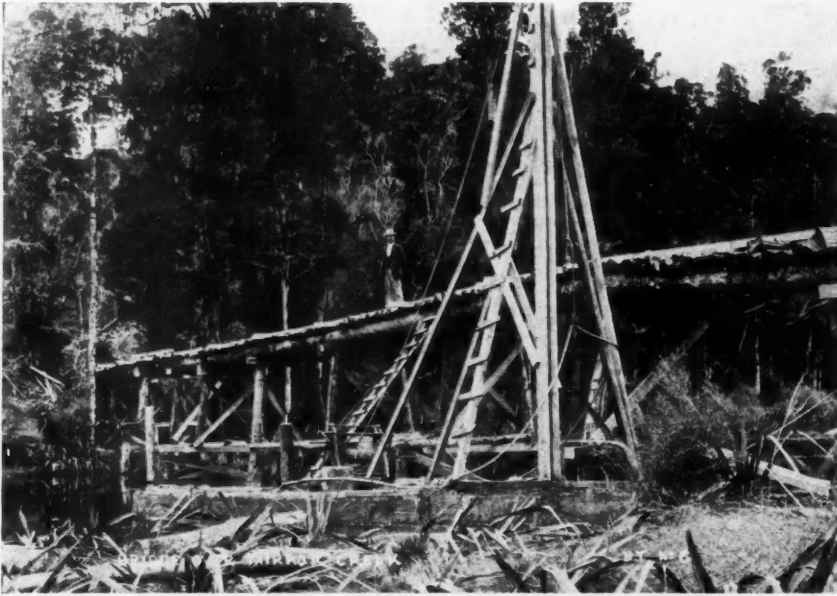
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Perhaps the thing which most surprises one is to find that in an hour's walk from town to country, one will see more sorts of constructions going on than one supposed was possible. In one place he will see a native bamboo hut in process of building; in another a "dobe" hut will be going up; here a Moor will be engaged in piling the stones for the foundation of a house; next to it will be the framework for a dwelling of the most up-to-date pattern; there will be a modern business house with a certain amount of steel in its construction; adjoining it will be a long, narrow, shed-like building to be used as shops by Moor or Jew. And may I be pardoned for the digression, but a Moorish story occurs to me. A man was engaged in building a house, when a friend chanced to pass by. Said he:

"My friend, are you not making your house too small?"



A Residence Street



**Bridge Over
Mirror Creek**

parts of the country and it is an exception (though not, economically speaking, a brilliant one) to the rule that native timbers grow slowly and are useless in the early stages. The government is therefore making some totara plantations, and it is predicted that within a century they will produce valuable timber. The wood is of a red tint, straight, compact and only less easily worked than kauri. Its defect is brittleness and its chief merit is that it lasts remarkably well in the ground and has unsurpassed powers of resistance to the teredo and other worms. For this reason it is the favorite timber for marine and other piles. It is also used in ornamental work, the burr or knots being in demand for veneers.

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Methods of Building in Morocco

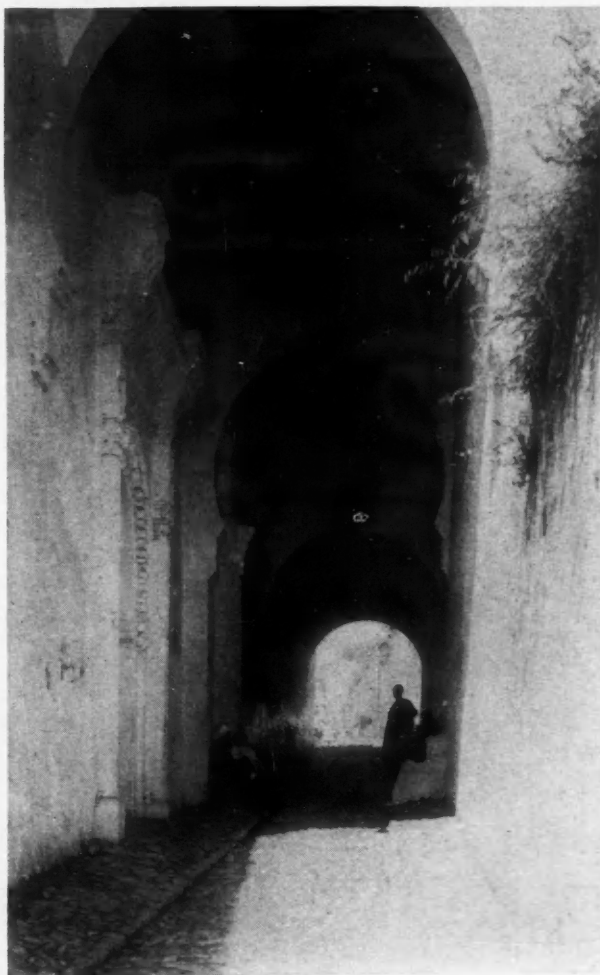
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"My friend, are you not making your house too small?"



A Residence Street

"Would to God I could fill it with friends," was the rejoinder.

In the building of the bamboo houses, the natives let nature do most of the work. They pick out a spot



Laying a Concrete Roof

where the bamboo grows and cut down all but those in the right location to serve as walls for the house. The canes cut down are woven into those left standing, so that four walls are built. These are covered with other canes, upon which are laid sheaves of grass to a depth, sometimes, of as much as a foot. As the weather is never severe, the airiness of the construction does not matter. Frequently I have seen walls formed by canes still growing. It is a good scheme to have your house grow as the family grows, but here the bamboo does not grow quite as rapidly as do the families.

The next class of buildings are the wooden sheds erected to be used as shops, or *fondaks*, by Moorish or Jewish merchants. They are nothing but sheds and their construction is not complex or difficult. The roof slants to the rear, and is usually about seven or eight feet above the ground in front. There are no doors or windows, there being no front to the shop—



A Bamboo House

only a counter over which the merchant does business. People are not supposed to enter the *fondaks*.

Probably the third class of buildings, from the viewpoint of simplicity of construction, is that of which

a type is shown—a tent-like affair consisting merely of a lot of pieces of canvas, gunny-sacks, flour-sacks, matting, odds and ends of everything, sewn together to form a cover which is thrown over supporting poles.

Whenever possible, the natives like to build these against some other structure. If they can "locate" against the side of a saint's tomb—a squat, square block of plaster construction—they are happy, as they are then not only on blessed ground, but they have to have no back for their tent. Along the city walls, these tents—often with rounded tops—may be seen, clinging to the stone work like the mud nests of wasps. These are not merely temporary shelters—they are the homes of the people, summer and winter, rain and sun. The succeeding class of building is the class built of a sort of concrete,

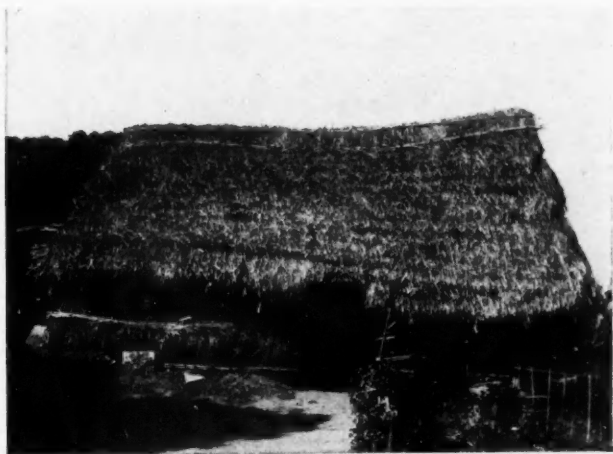
mortar, plaster, cement, clay, anything, and covered inside and out with a coat of whitewash which, contradictorily, is usually of a depressing blue or dirty yellow



Hotel in Morocco

tinge. Our illustration shows a group of these buildings, flat, one-story affairs, with wooden lean-tos tacked on. They are built upon a stone foundation sometimes (that is the best one can say, a thing is never always done here), a flimsy frame of wood holding the mortar in place. A strange thing about this class of buildings, which are the most common in Tangier, and which are frequently of two stories, is that while they are so flimsily constructed that frequently the roofs cave in, still they are practically fireproof. There have been but three fires in Tangier in two years, as far as I can ascertain, and none of these was at all serious. The fact that but few of the buildings have chimneys, that charcoal fires in earthen pots are the customary cookstoves, and that no heating is necessary, probably

accounts for some of this astonishing immunity from disastrous fires, but the construction of the buildings must also cut a big figure. In Fig. 2, a workman is laying a concrete roof upon the lean-to, smearing it on very crudely with a brush. Upon the other shed is a roof of the curved toles which are so popular for roofing here, and which are both durable and fire-proof. To the American builders who shave, the



Heated with Charcoal Fire

scene in the foreground of this picture will be interesting: that of a native barber at work. There is nothing formal about it, is there?

My readers must not make the mistake of thinking that my photographs illustrate unusual scenes in Moroccan building construction. They do not, but on the contrary, they are pictures which might be almost duplicated a dozen times in a stroll through the city. Methods are crude, so crude that the American builder might think that they were exceptional cases.



Plenty of Ventilation

A better class of plaster building is constituted by those erected in an earlier day, in which there was some display of art. Fig. 1 shows a street among these old houses, where the arches and entrances are rather pretty. The "overhead" construction is also shown rather well in this picture.

Next upon the list is the class of frame and mortar buildings, of which there are but few, and most of which have been erected by the foreign element. The hotel building shown in Fig. 4 is a very good sample of this style of building, although it has architectural points which might be corrected.

The last, and highest, style of buildings in Morocco, aside from the mosques, are the modern dwelling houses, erected by foreigners residing here. Many of these are built entirely of concrete blocks, which makes a much prettier and more durable material than anything except the genuine stone. A few are built of brick, and some of both brick and concrete.

In my next letter, I will take up the modern methods of building construction employed here.



Buildings Made Immune to Quakes

Mr. Gilbreth, the New York contractor, due to his investigations, believes that:

1. A steel frame, properly painted and buried in masonry, will not rust enough in thirteen years to affect its strength any measurable amount.
2. The better the steel is coated with mortar, the less it will rust.
3. Portland cement is better than lime mortar for imbedding steel to prevent it from rusting.
4. Unpainted iron rods buried in mortar composed of lime and a large proportion of Portland cement rust very little, certainly not enough to impair their strength.
5. Columns should be of such cross section that they can be thoroughly imbedded in Portland cement, avoiding a hollow column unless latticed and filled with very soft concrete.
6. Wherever possible, preference should be given to those shapes of steel that present the least surface to the action of rust.
7. If steel is not thoroughly cleaned from rust before it is painted, the paint will not greatly retard the progress of the rust.
8. It is much easier to cover steel thoroughly with concrete than with brick masonry. If brick masonry is to be used the bricklayer should thoroughly plaster the steel work ahead of the brick work.
9. The quality of the paint used, though important, is not so important as surrounding every part of the steel with Portland cement.
10. Interior columns do not rust as much as exterior columns.
11. Cinder concrete does not injure to the slightest degree a steel floor beam that has been painted.
12. No pipes or wires should ever be placed behind fireproofing, as they will buckle from the heat and push off the fireproofing.
13. Terra cotta blocks are not as good as concrete for fireproofing interior columns, nor do they protect the steel from rusting as well as does Portland cement concrete.



Constructing Casement Windows

EXAMPLE OF THE CONSTRUCTION OF INWARD OPENING CASEMENTS IN FRAME WALLS—EXTRA PRECAUTIONS TAKEN TO MAKE WINDOW RAIN AND WIND PROOF

IN THIS installment we present for consideration a second example of the construction of inward opening casements in frame walls. The construction is better than the first example for the reason that more precautions are taken to make the window proof against rain and wind.

The sash and frame are rebated at the jambs and sill and a small mold is tongued into the jambs and head outside of the sash in the manner shown. This mold is undercut so as to form a channel to catch any water which may beat in at the edges of the sash. This water discharges on the sill.

The bottom rail of the sash has a molded drip let into it, so as to shed any water which may trickle down the outside surface of the sash. The under side of the bottom rail of the sash has an undercut and directly under it, in the sill, a channel is cut. This channel catches any water which may beat in between the sash and the sill during driving rainstorms, and is discharged on the sill through perforations in the raised lip of the sill, as at "X" in Fig. 177. These perforations consist of holes bored and reamed smooth. Three are usually provided for a window of ordinary width. Both the channel and the perforations should be painted.

The frame and sash are constructed and set so as to form a reveal on the inside of the window, and when this is required, care should be exercised to allow ample space for window shades between the inside surface of the sash, when open, and the jamb lining. To secure this space, it is usually necessary to thicken the jamb of the frame and provide the filling piece "A," in Fig. 176. Shades for inward opening casements are usually placed on the sashes and the filling piece should be of a slightly greater width than the thickness of the shade when rolled up. The shade can, of course, be placed on the jamb of the window above the sashes, but this necessitates rolling the shade up entirely whenever the windows are to be opened.

Storm sash, blinds or insect screens may be hung on the outside casing of the window, but, if required, the sill should be rebated for them. The outside casing

is molded, and mitered at angles, and at the head is flashed with tin, copper or other suitable sheet metal carried up about six inches behind the shingles. The sill is grooved on the underside for the shingles, and on the inner edge for the inside stool.

The wall is constructed in the usual manner of studs, sheathed, papered and shingled on the exterior, and lathed and plastered on the interior. Grounds (G) are set wherever necessary for a nailing for the trim, base, wainscot, and other interior finishing woodwork.

The trim is molded and hollow backed, and at the angles is put together with slip tongues or dowels, and mitered. A molded back band follows about same. It has an architrave head, and the fascia is plain and blocked at the top for the crown molding. This molding may be cut out of one and one-eighth inch stock or built up of several members. Crown moldings, except where they abut the ceiling, should be capped on top, otherwise they form a lodging place for dust and dirt.

The trim finishes on a stool with molded edge. This stool, with its bed molds, corresponds to the cap of the wainscot, which is shown skirting the room. Walls behind wainscots, base, trim, and other interior finishing woodwork, should be plastered to the floor, but the white coat may be omitted. The jamb and head linings are tongued into the frame.

Fig. 175 is a vertical section taken through the head of the window. Fig. 176 is a horizontal section taken through the jamb of the window. Fig. 177 is a vertical section taken through the sill of the window. Fig. 178 is a partial elevation of the inside of the window.

+

Were Burning Tainted Money

The big touring car had just whizzed by with a roar like a gigantic rocket, and Pat and Mike turned to watch it disappear in a cloud of dust.

"Thim chug wagons must cost a heap iv cash," said Mike. "The rich is fairly burnin' money."

"An' be the smell av it," sniffed Pat, "it must be thot tainted money we do be hearin' so much about."

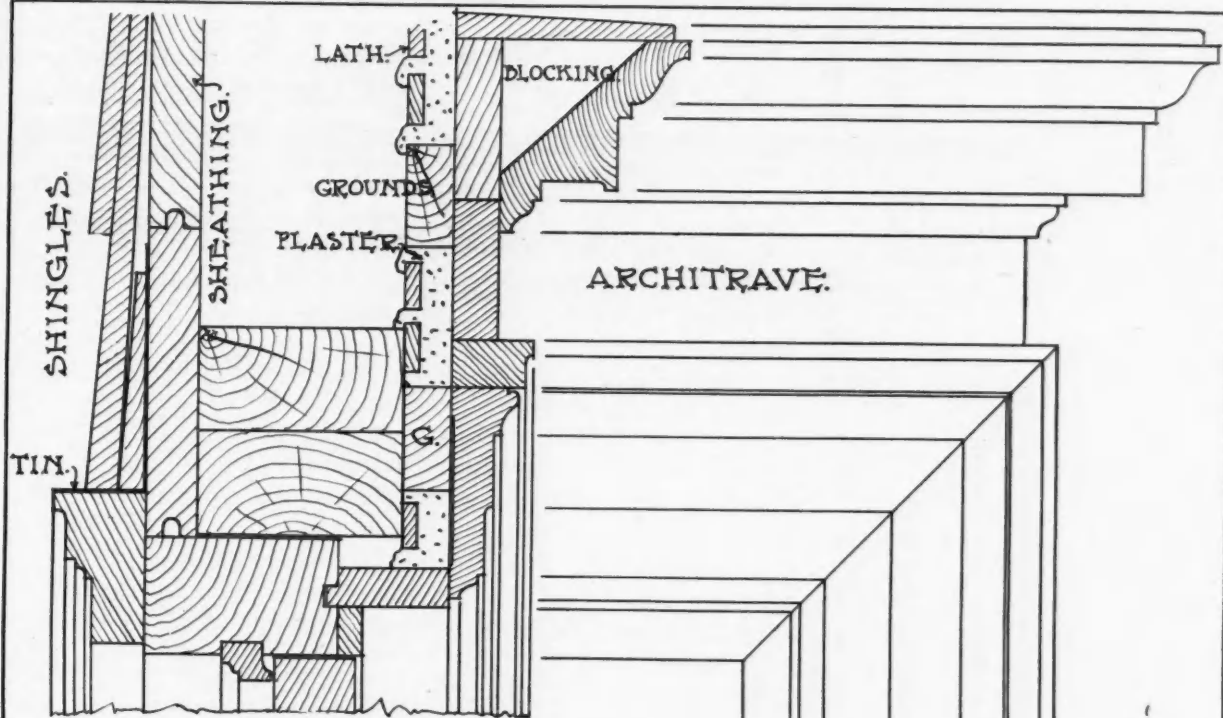


FIG. 175.

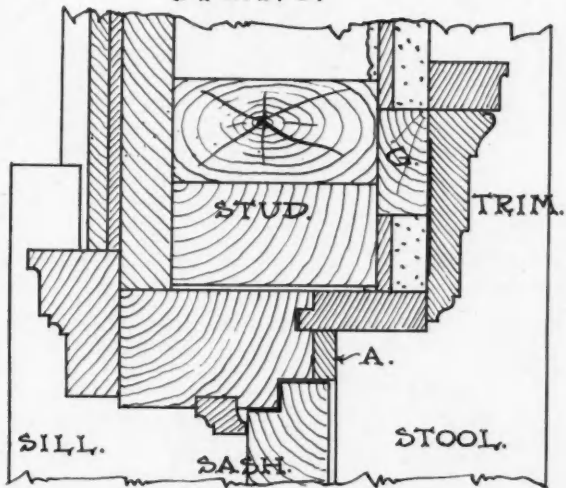


FIG. 176.

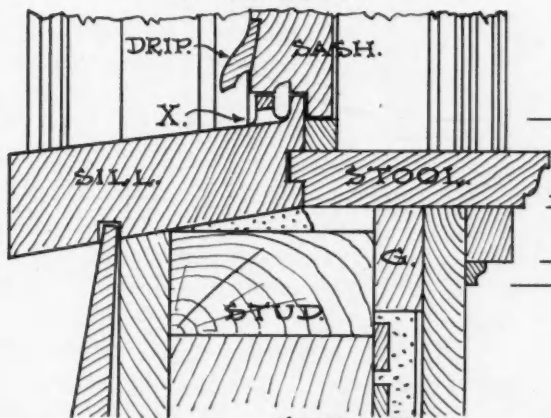


FIG. 177.

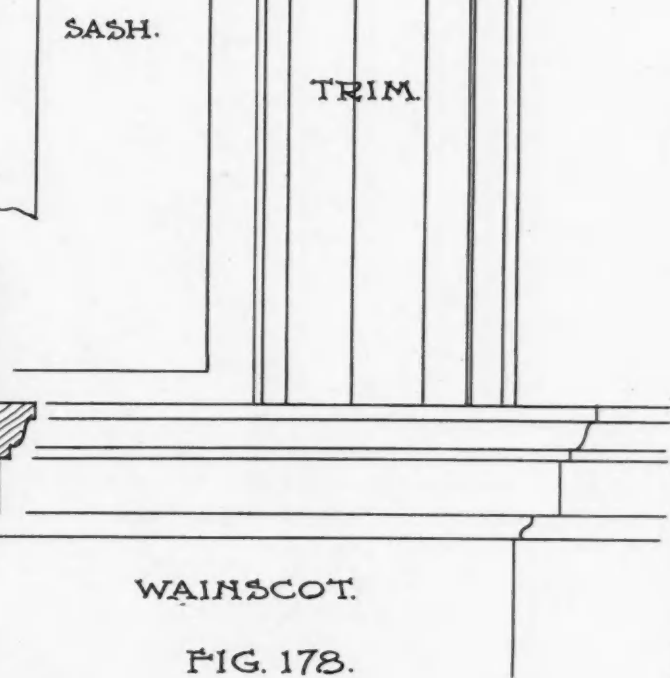


FIG. 178.

PLATE XLII.

WINDOWS.



STEEL SQUARE.

ALFRED W. WOODS

How to Use the Steel Square

ORNAMENTAL AND PRACTICAL ILLUSTRATIONS OF THE OCTAGON IN VARIOUS CONNECTIONS WITH THE STEEL SQUARE AND HOW TO APPLY THEM IN PRACTICAL CARPENTRY WORK

SPRINGTIME with all its sunshine and flowers is here, and from the field of toil and experience we have plucked a daisy from the polygonal species. This particular daisy is better known as belonging to the octagon variety. See its thorny stem and saw-edged leaves, which might indicate that it is difficult to secure. Even hidden under its broad forked leaves are thorns, as if to catch the unsuspecting—but not so. This is only an ever-blooming imaginary flower. Yet it may be cultivated, propagated, variegated—we came near say annihilated, but no; it never dies. It is always growing, and the more we cultivate it, the more it yields to square treatment. It is our aim to sow the seeds just as the little grain of wheat, hoping and trusting that some may fall to the owners of productive fields and yield bounteously for those who care for it. As it germinates and sends forth its tender shoot, fostered with the intellectual sunshine and showers, that is within them, it will grow and grow, ever changing in form, and when it is matured, be gathered in and garnered in the storehouse of usefulness. But, in the meantime, to secure this, a lot of straw had to be threshed and chaff blown to the winds. So it is with our work. We have been threshing straw and blowing a good deal of chaff from the wheat, but we hope it has served its purpose at the right time. For a time it was needed to nurture the grain, but at maturity it is cast off and only the good remains. We therefore trust that the readers are not blowers, but good cultivators as well as separators, and are retaining only the useful part.

Now we will tell how to cultivate the octagon on the square, though we have nothing new to offer, except in form, as we will use the long since established proportions.

In Fig. 119 is shown a simple treatment on the square. Here is an octagon one foot in diameter. Note the figures used on the square are the same as

those used in our last article for changing the square stick to an octagon. We also give in connection with this, the lengths in decimals to the fifth place, which are convenient for finding the lengths of the sides of octagons of large dimensions.

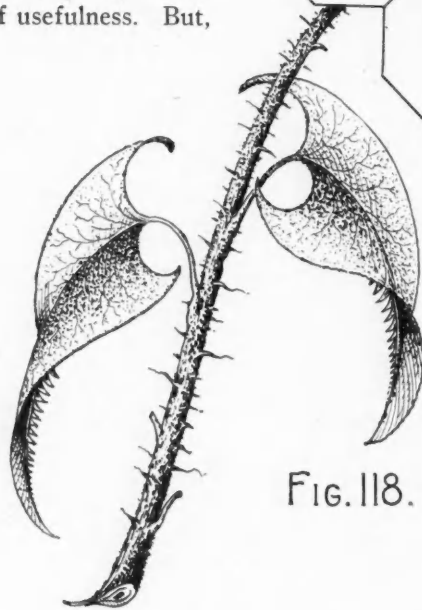
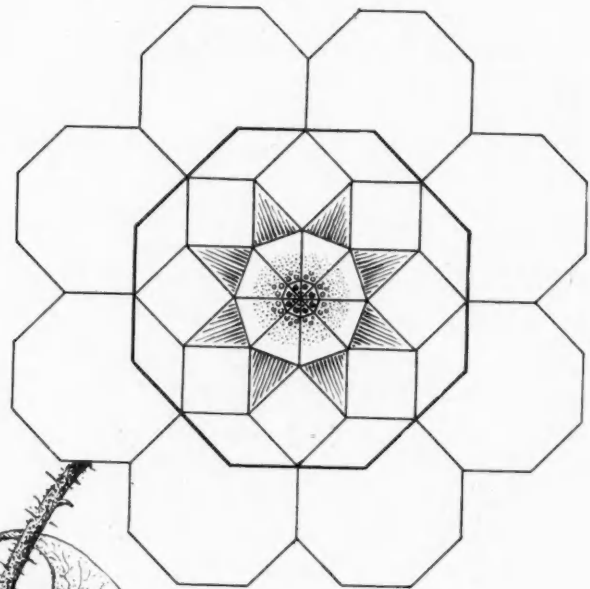


FIG. 118.

In Fig. 120 is shown another illustration of the octagon. The same figures are used on the tongue of the steel square as in the former illustration. By setting one arm of the compass at 6 and with the other at the heel, inscribe an arc, intersecting a line square out from the starting point, will establish the center of the octagon, as at A. Now suppose we take double these dimensions on the blade, as shown, repeating the operation as before, and we will have another octagon double the dimension of that shown

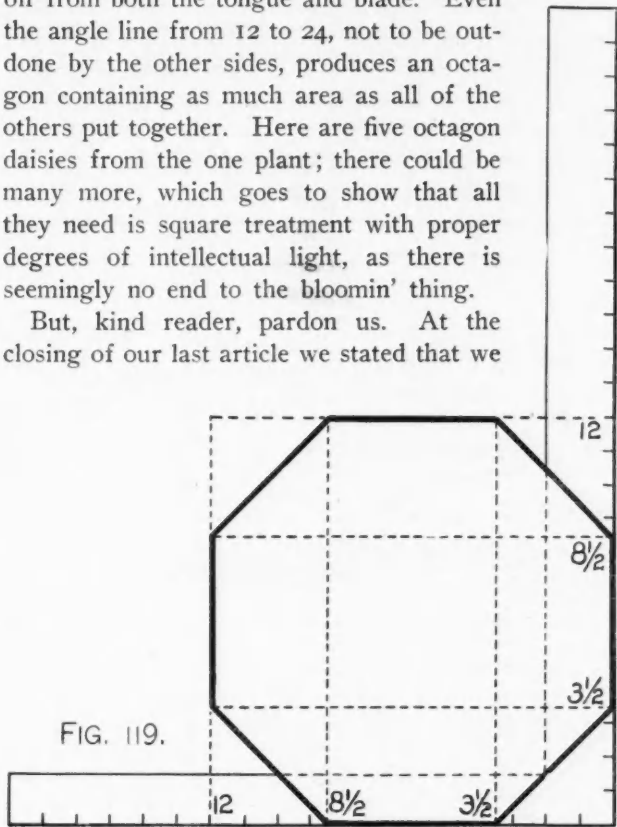
in connection with the tongue, but containing four times the area. That is growing some, is it not?

Here is a point to which we wish to call attention, i. e., while we are cultivating these octagon daisies on the square, they are liable to grow crooked—"Just as

the twig is bent, so is the tree inclined"—but it is a tree just the same. It is so with our daisy. Without they have plumb, square treatment, they, so to speak, go off on a tangent.

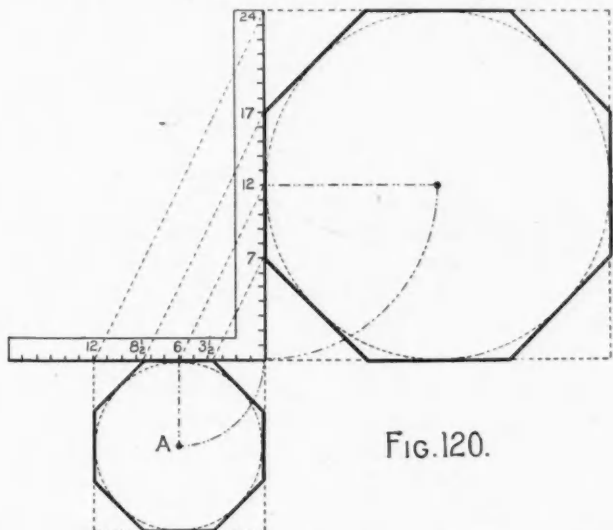
See Fig. 121. Here there are octagons branching off from both the tongue and blade. Even the angle line from 12 to 24, not to be outdone by the other sides, produces an octagon containing as much area as all of the others put together. Here are five octagon daisies from the one plant; there could be many more, which goes to show that all they need is square treatment with proper degrees of intellectual light, as there is seemingly no end to the bloomin' thing.

But, kind reader, pardon us. At the closing of our last article we stated that we

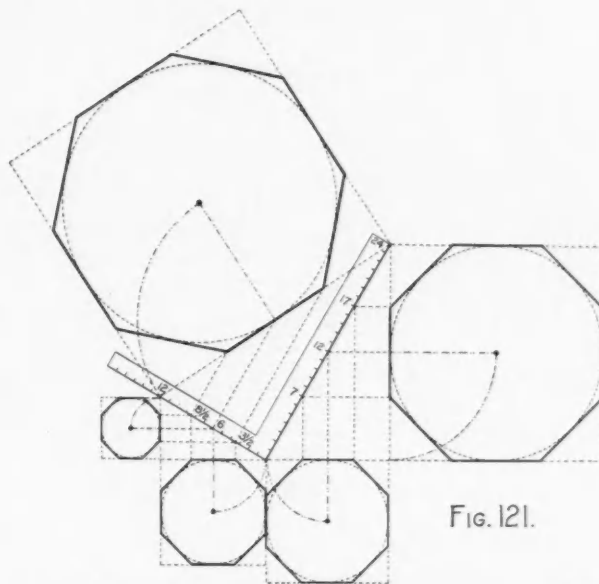


$\leftarrow 3.51475 \times - 4.9705 - \times 3.51475 \rightarrow$

would take up the cuts of rafters for octagon roofs. However, springtime has been a long time getting here this year, and when we saw a chance to gather in a few daisies, could not resist the temptation. So we are now only at the point where we expected to



commence. As we have already taken up our usual space, and perhaps talked too much, we will only enter into the first stages of the subject, leaving for the following a more extended article on the practical



part of the subject. There are many interesting points that could be brought out, and we may dwell for some time along this line of the work.

Fig. 122 furnishes the beginning or foundation for the regular octagon. By regular we have reference to a building having eight equal sides. Quite often towers are built with true octagon corners and with four of the sides longer than the others. This is not a regular octagon, and if the roof lines run to a common center, there will necessarily be a difference in the pitch for the long and short sides, as will be seen by referring to Figs. 123 and 124. In the former, the roof is regular, the latter irregular, and therefore, while the general treatment on the square is the same, it requires a change of figures.

Going back to Fig. 122, we will not stop now to tell why those figures are used on the square, because we have explained that part a number of times in previous articles. We leave it with the reader to solve the problem till next month, when we will gather our daisies and frame them into a bouquet such as are met with in practical examples in building construction.

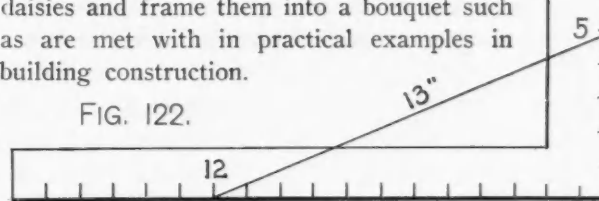


FIG. 122.

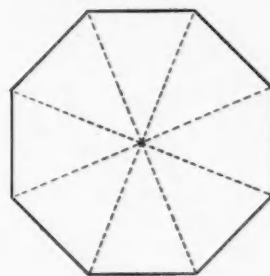


FIG. 123.

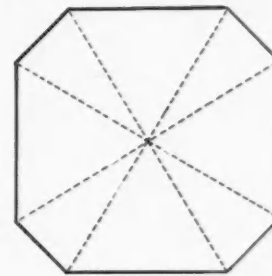


FIG. 124.

The Strength of Beams

A LITTLE BIT OF ARITHMETIC WHICH MAY BE WORTH WHILE FOR OUR READERS TO KEEP IN MIND—
HOW IT CAN BE APPLIED IN YOUR WORK

By T. B. Kidner

“WILL you decide a little argument which my mate and I have been having?” said a carpenter friend of mine as he and his mate came into the office the other morning. “We want to know which is the stronger of two pitch pine beams we have outside here. One is 9 inches by 6 inches and the other 8 inches by 7 inches, and both are to be used over openings of 12 feet span. My mate thinks the 9 by 6 is the stronger of the two, but I hold that the 8 by 7 will carry more weight.”

“I shall be very pleased to work it out for you and can tell you the result in about a minute,” said I, “but

Referring to the illustration, Fig. 1, we find that, taking pitch pine as our wood, a piece 1 inch by 1 inch, on bearings 1 foot apart, will break with a central load of 5 cwt. Now it is quite clear that if we increase the breadth to 3 inches, as in Fig. 2, it will take three times five, or 15 cwt., to break the piece.

But suppose that we put this piece of 3 by 1 pitch pine on edge and see what it takes to break it. Instead of 15 cwt. we shall find that it takes no less than 45 cwt. to do so. Or, as the books put it, the strength of a beam is “as the square of its depth.” That means that instead of saying, as in Fig. 2, three times five,

REMEMBER THE RULE !!

WRITE DOWN →

X means multiply by.

Figure for wood
in cwts.

Divide by →

X breadth X depth X depth

Opening (in feet)

=

ANSWER

B. W.
in cwts.

if you have half an hour to spare I should prefer to show you how I arrive at my figures, and thus enable you to make the necessary calculations for yourselves whenever you desire.”

As work was not very pressing that morning, they readily agreed to take a lesson, and I proceeded somewhat as follows:

A piece of wood 1 inch square placed on bearings one foot apart will break under a certain weight. This weight varies with different woods and in different specimens of the same wood, but most authorities have agreed to regard certain average weights as standards. These averages were obtained from hundreds of experiments and are, therefore, fairly reliable. The following table deals with a few woods only, but is sufficient for our present purpose.

Breaking weights of wood beams 1 foot long, 1 inch broad and 1 inch deep, loaded in the center and supported both ends (the length means the span of the opening; that is, the distance in clear of bearings):

Ash	7	cwt.
White oak	5½	cwt.
Georgia pitch pine	5	cwt.
Norway red pine	4	cwt.
Spruce	3½	cwt.
Teak	8	cwt.

we square the three and say three times 3 are nine and nine times 5 cwt. is 45, which is the breaking weight (approximately) of a piece of 1 by 3 pitch pine on edge over a 12 inch bearing.

But suppose further that instead of the bearings being 12 inches apart the distance between them had been 2 feet. It is clear that the beam would only carry half as much, and we should have to divide our answer by two. And as the longer the beam the less it will bear, this gives us another rule which will be referred to later.

The diagrams, Figs. 1, 2 and 3, represent in a pictorial and striking way one of the most useful formulas or rules which a carpenter can carry in his head, and by which he can calculate the strength of any beam in a couple of minutes.

“But,” objected my friend, the seeker after information, “you haven’t answered our question yet. And, as for making calculations, I haven’t done any arithmetic since I left school and know just about enough of it to reckon up my pay when pay-day comes round.”

While bound to admit that his case was not uncommon amongst many first-class craftsmen, I pointed out that the necessary calculations for finding the strength of a beam do not call for more than the very simplest operations in multiplying and dividing, and

THE STRENGTH OF BEAMS

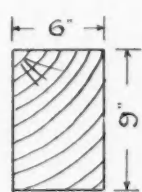
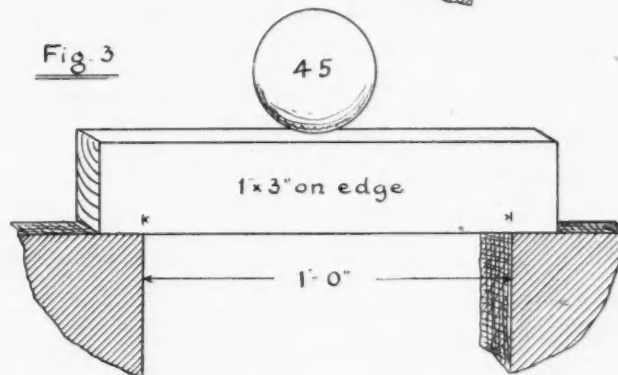
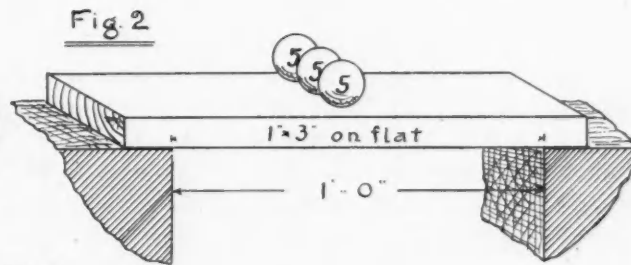
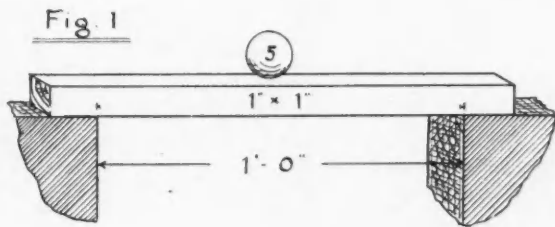


Fig. 4

Figure for p.pine
Breadth *Depth squared*
5 cwt X 6 in. X 9 in. X 9 = $\frac{2430}{12}$ = 202 $\frac{1}{2}$ *Breaking weight*
12 ft. *Span* *cwts.*

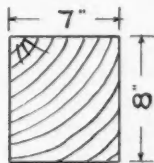


Fig. 5

5 cwt. X 7 in. X 8 in. X 8 = $\frac{2240}{12}$ = 186 $\frac{2}{3}$ (or $\frac{5}{3}$) *cwts.*
12 ft.

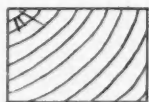


Fig. 6

5 cwt. X 9 in. X 6 in. X 6 = $\frac{1620}{12}$ = 135 *cwts.*
12 ft.

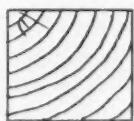


Fig. 7

5 cwt X 8 in. X 7 in. X 7 = $\frac{1960}{12}$ = 163 $\frac{1}{3}$ (or $\frac{2}{3}$) *cwts.*
12 ft.

thereupon proceeded to work out, as shown in Figs. 4 and 5, the problem propounded by him at the outset of this article.

The diagrams explain themselves fairly well and, as will be seen from them, the 9 by 6 man was the winner, presuming that the beams had been placed (as they should be) with their greatest dimensions upright.

But suppose the same beams had been laid on their flat instead of on edge, how would they work out then? Figs. 6 and 7 give the results, which show that the 8 by 7 beam is a good deal stronger than the 9 by 6 if used in this position.

It must be observed, of course, that these are the breaking weights for beams and it is obvious that the safe load is what is wanted. This is found by dividing the breaking weight by a certain factor, generally four or five for a dead load and eight or ten for a live one.

It must also be remembered that the foregoing formula is for a beam loaded in the center. *If the load is distributed evenly throughout the length of the beam, it will carry just double of what it would if loaded in the center.*

To sum up the matter, the points to carry in one's head are these: First, the figure given in the table for the particular wood. Second, the way of putting down the simple sum or formula, which must be as shown in Fig. 8. Third, divide your result by figure (factor) of safety, say five for dead load and ten for live load. (This gives safe load for center of beam. If load is distributed multiply this by two.)

Thus divested of all formal language this useful little working formula was easily grasped by my two interrogators, and with the hope that it may prove similarly useful to many others, the writer begs to present it for the consideration of the readers of the AMERICAN CARPENTER AND BUILDER.



Superior Inferiors!

[With ample and necessary apologies to William Shakespeare.]

SCENE.—A wilderness of bricks, mortar, mud, tin cans, dead cats, and half-finished houses.

[Enter newly-married young man, seeking a domicile.]

Y. M. (*soliloquizing*)—To buy, or not to buy? That is the question.

Whether 'tis better for a man to suffer
The tender mercies of rack-renting landlords,
Or make a speculating builder smile
By purchasing this edifice of brick.
'Tis cheap. But will it stand?
Ay, there's the rub. It may contain
Such stuff as dreams are made of.

Being new,
It stands four square to all the winds that blow.
But will it let them in?

I hear of plaster
That droppeth like the gentle rain from heaven

Upon the place beneath,
And hits the throned monarch on the crown.
Had we not better rent an extra room
From my maternal parent? I have heard
'Tis better to endure the ills we have
Than fly to others that we know not of.
But soft, who cometh here?

It is the builder.
I'll hide me for the nonce, and stand behind
This scaffold pole. (Does so.)

[Enter Builder. He surveys building.]

Builder—'Tis well. Now that the lower rooms
Are papered, I shall not fear the gale.
But what is this? The back addition wall
Is warping! I must try and push it straight. (Does so.)
What have we here? No doubt this is the parcel
Of mild and mellow joists that I have bought.
The honourable salesman did inform me
They were "inferior sixths," which much alarmed me
Until he did explain that this consignment
Consisted of "superior inferiors,"
Whatever that may mean. At any rate,
I lay this flattering unction to my soul,
They might be worse. The wood is pink and mild
And free of sap. I see a hole or two,
But that is where some prying Peeping Tom
Hath pushed the point of his umbrella in.
Another hath a kink. But there the carman
Had bent it with a rope upon his van.

[Young man emerges from behind scaffold pole, and endeavors to escape.]

Builder (*persuasively*)—Come hither, stranger. Hast thou
been inspecting
The neat, commodious dwellings I have built?
Come, I will sell thee one for what it cost.
Thou'rt looking for a flat—and so am I.
Y. M.—I will not buy thy house. I heard thee speaking
About the timber thou art putting in.
"Inferior sixths!" I would not have believed
That such a quality was ever sold!
Builder—I see thou understandest not the trade
I know of "firsts" that are but little better.
If the house fall to premature decay,
Why, sell it to a friend, and move away.
Didst thou not hear me say the wood thou see'st
Was offered as "superior" inferiors?
Y. M.—I do not understand this subtle grading.
I am no theologian, splitting straws.
If they had been inferior superiors
They might have served. But being, as they are,
Superior inferiors, they are sure
To melt, to rot, dissolve into thin air,
And leave no "wrack" behind.

So fare thee well.
Builder—! ! * * ? ? ! ! [Exit Y. M.]
(Unfit for publication.)

FINIS.



I write you a few lines to let you know how well
I like your magazine. I think it is the best carpenter
book I have had the pleasure of reading.

JACOB R. ARTMAN, Brockburn, Pa.

Landscape Designs

SUGGESTIONS FOR BEAUTIFYING OUR SURROUNDINGS BY MEANS OF STILES AND FOOTPATHS—REFLECTIONS FROM THE OLDER COUNTRIES

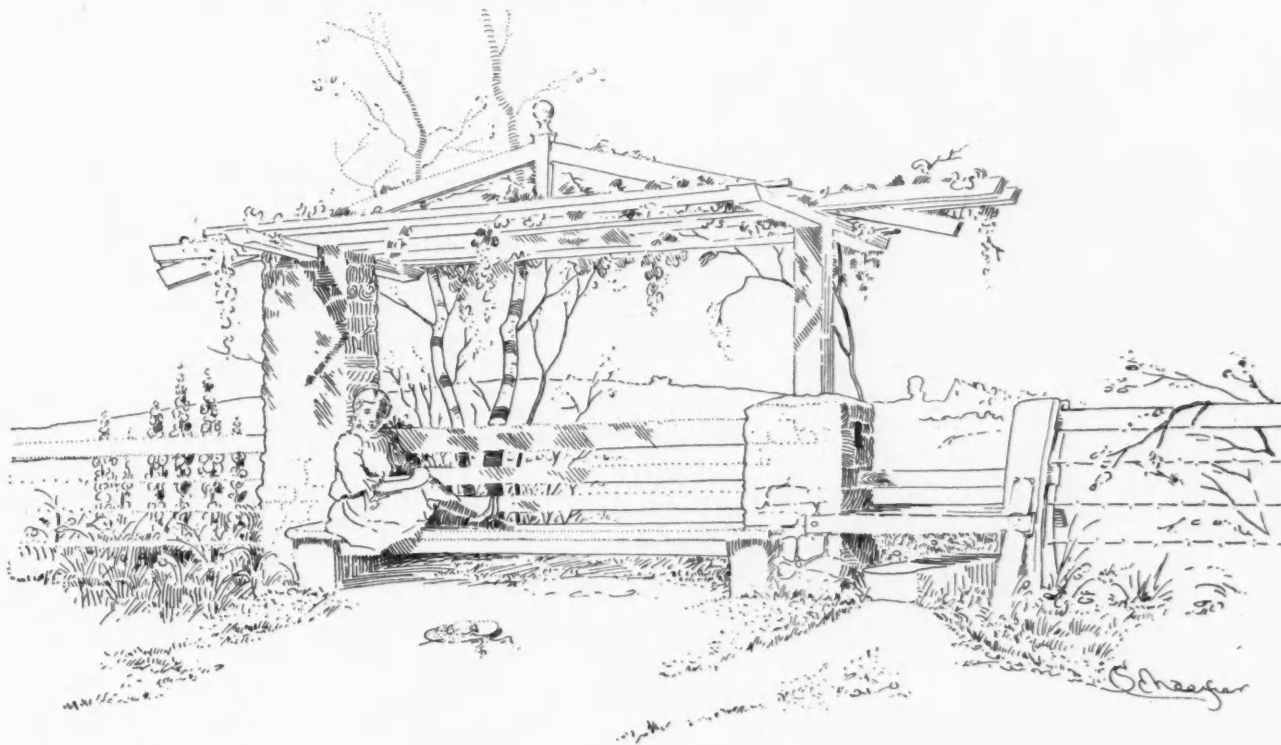
By C. Bryant Schaefer

THERE are many people who seek to extricate their localities from the common-place and aspire to the advantages which greater attractiveness is sure to bring. Few realize how easy of attainment this is.

Great examples requiring expensive outlay are always before those who consider local improvement. Gardens of rare plants, housings for exotics, marble terraces, replicas of foreign classics and monumental achievements crowd upon the recollection. The grand

with which they lift water from the river are still in use.

In going about a work that may attract attention one has to overcome a slight temerity that possesses those in a new employment. But endeavor has its rewards, for soon, here and there, will appear evidences of collaboration. The work speaks and finds response. It is a revelation well worth adding to one's experiences. It alone teaches how workers are truly affiliated.



Stile and Arbor.

productions are made so familiar by the ease of traveling and by voluminous illustration—their progress is noised abroad so widely, that even those living in remote localities have their imaginations fired and then absorbed by distant achievements in which they have little or no substantial return.

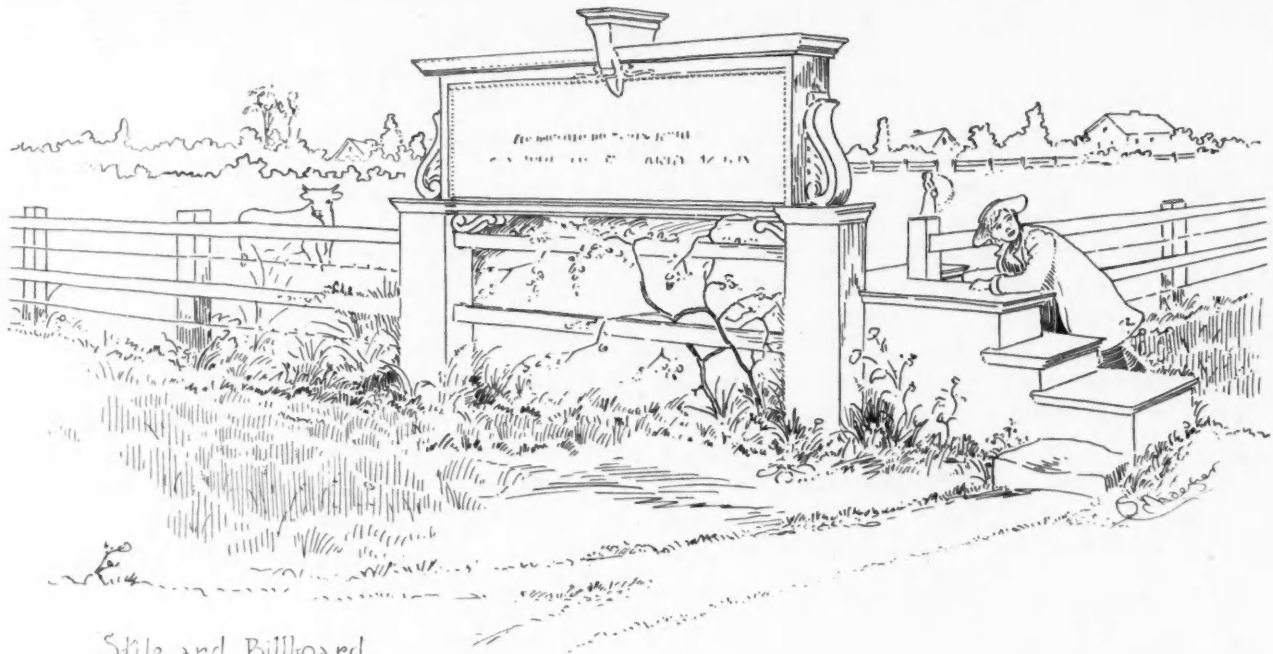
The great works of art fulfill an indispensable mission by awakening an interest in refined pursuits, when the spirit becomes dormant in the appurtenances of every day life. The magnificence of cities and foreign parts awakens the sleeping ambitions. But it is for the individual to choose and develop its own nature and carefully nourish the trifles that constitute the beginnings in accomplishment.

The massive granites of ancient Egypt have to be dug out of the sand, but the buckets and the few sticks

The tasty embellishment on your place has hardly been finished when nature begins to decorate it from her garden of surprises. And so these tasty features grow and expand and add to people's life, as an Arabian tale discloses new meanings, time after time.

An attractive seat brings acquaintances, the stile has its trysts and the little shelter becomes a forum between the work-a-day hours. Circumstances surrounding the community become less barren and the people less dependent on formal events for occasions of intercourse.

Every homely district has the means with which to make a beginning in improvement. Common materials, more often the residue of the land and its labors, are easily available. In the latter case a double labor may be accomplished by transforming the dump piles



Stile and Billboard.

of stone and stumps and nondescript debris into features of beauty and distinction.

Much is written and read, talked and resolved, about ridding vicinities of public places, squares and depot yards, of the unsightly accumulations that clutter and litter up the corners and side places. Cleaning up only makes room for more unsightly stuff, for you may take a little journey round about and find the rubbish renews itself and still holds its rampant sway in most respectable localities. Crumbling ditches, neglected lumber piles, old and useless sheds and careless habitations surround the most enterprising business

places. Indeed, the more enterprise, the more rubbish! In grime and smoke they cluster beside the most worthy efforts. It is always intended to abolish such nuisances, but in the struggle they do not abolish. Ergo, let them remain. As the factory increases its wealth by utilizing the by-products, so it becomes the duty of the landscape artist to transform the refuse into functions of use and beauty.

Are not the loveliest flowers nourished by the grimy soil? Do not their roots delve into the dark, dank depths to astonish the very light with verdure and fragrance? Then we also should digest the eye sores



Stile and Retaining Wall.

and tribulations of the home landscape and evolve works of art and pleasure.

A few hardy seeds judiciously planted will grow up to screen objectionable views. They may even keep the weeds down and bothersome washouts may be changed to slopes of verdure that retain their places, reinforced by a network of clinging roots. They may decorate some of those barbed wire fences or help an old tree keep up its foliage.

No one has suggested making a work of art with that prickly and awry barbed wire, yet it is bound to be. One only has to put aside prejudice in order to

ciate, on the contrary, proves stimulating and invigorating.

Familiar acquaintance was also more favorable for the development of life's prospects. The locations of homesteads and highways were chosen with a view to convenience. Such constituted a true estate. That was the soul of the body politic that secured American independence and animated the organization of government.

Nowadays, especially in the west, the country is divided by section lines, on paper first, and the roads are laid out around square miles. The land is parceled



Stile and Vase.

find a way. How many desirable pathways are obscured by prejudice!

Woodwork is a clumsy affair for vines to twine upon. A slight structural effect with a bit of molding or finial for refinement forms a pleasing adjunct for wire netting overgrown with vines and flowers, and when the broken down fence corners are taken into account, the broken rails and gaps made by pedestrians on the short cut pathways, when these conditions are considered the fence stile, its use and beauty, are evolved.

In order to be sensible as well as ornamental it is necessary to consider the live social structure.

In the eastern states farms and lots were originally developed with a view to supplying all the needs of the occupants. The proprietor and his "hands" formed an independent colony. It was recruited from the well-to-do of the neighborhood as well as from the unprovided. Social good was accomplished, for exclusiveness wears itself out, while change of asso-

into square acres. Lots are often entirely submerged as the case may happen. The land owner drives his team through thick and thin, down into hog wallows or dragging through sand pockets and up over knolls of clay. He drives with a bang and clatter around corners endeavoring to make up for the lost time they entail. He is also a specialist in regard to the crops produced, a truck farmer on a large or small scale. The freight on the siding is loaded up with perishable goods and then stands waiting day after day to be pulled off the switch to the nearest market. Dependent on exchange for most necessities, the market manipulators hold him at a disadvantage. The lightning rod man is past, but the man with wheels forces a steady supply of modern improvements on him that are piled up behind the barn, a junk heap higher than the hay stacks. The weather reports and other matters, upon which he is himself a better judge, come by telephone. If the farmer buys a "gold brick" with his surplus it is not a reflection on his prudence, but an aspersion

*Shelter and Stile.**Landscape Designs.*

on the civilization that has little to offer in comparison with his own sterling opportunities. All these innovations are desirable adjuncts, but can not entirely supplant the original principles.

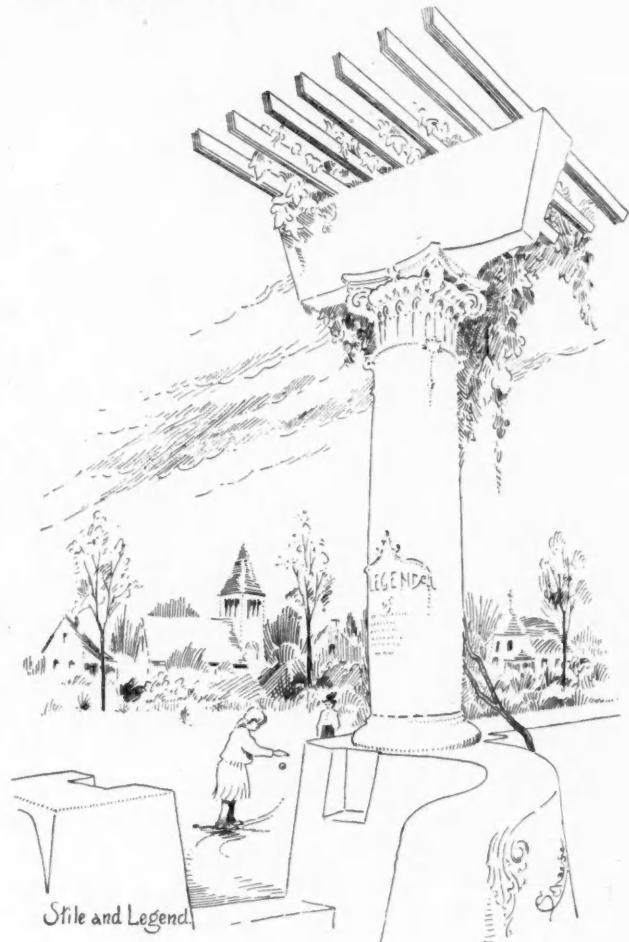
In time to come many highways will be remodeled to connect directly between points. Side lines are sure to be cultivated for home use as the country takes time to adjust itself according to permanent standards. It will be accomplished with touches of art that will surpass expectations.

In the growth of the country, those paths across lots are an indication of the future. Their use should be tolerated, they should be encouraged to grow, made passable and attractive. Spoliators should be discouraged, but at the same time the tractable, timid person should not be driven to sneaking along hedges for fear of being seen on somebody else's land. There is no better protection for a spot than an artistic contrivance which any may enjoy.

Very few people in the country realize all the advantages within their reach. These paths across lots are part of their good fortunes. They are as valuable as cattle, more valuable than the building space or crops they crowd out. They should be cultivated in their own way, and so we have some sketches here with which to illustrate how this may be done. Every bit of their growth brings benefits. The future is sure to come when they, like many other possessions, will have grown into maturity. They may become lanes, and then streets, and add a natural charm to many a building site. They will connect schools and be lined with cottages. And best of all, they are rightly located and establish the individuality of their vicinity because they are an organic growth of the locality and its occupations.

The greatest need in thriving towns is the convenience of foot paths. They were the main highways before the prevalence of wagon traffic. Is the carriage drive in our times to become obsolete with the introduction of railroads and road engines? There is an

excess of wheel roadways and alleys in the platting of towns and suburbs. There are accommodations for all kinds of teaming. Much of it sees but occasional use. The pedestrians, on the contrary, have no especial provision. They have to follow the round about ways that occasion drivers little trouble. It is not necessary to get into every lane with a team, as every teamster seems possessed to do if there is only half a chance. The wide plank approach would preserve a nice walk for the feet and perhaps save the expense of a roomy street devoid of vehicles.

*Stile and Legend.*

In the old countries a useful pathway is often a public adjunct of an estate and a part of its facilities. It may not be officially established, but in the building of fences it is provided for. The stile is part of the improvements and inheritances, an easement.

An arbor seat like the second design forms a most appropriate combination for a fence stile. Some stone and a few pieces of timber are sufficient. It might be devised in rustic work to good advantage.

Nothing proves so convenient as a little shelter on a distant lot, or perhaps at the far end of an estate. If there is a pathway, this may become an important feature by the highway, as shown in the third design. The column and pediment are classic features, something of the sort that can be ordered from the stock at the mill or shop.

Depots, halls and schools are places from which many paths are sure to radiate. Around these places of congregation tasty improvement is sure to win especial appreciation. Instead of some advertising daubed upon a nearby fence rail, announcement in awry letters and unusual abbreviations, would it not be more inviting to finish up something neatly framed, as in our fourth suggestion? And the path over the fence may lead to the store itself.

There is many a nice street that has a bad washout on its course, or a path that leads up an embankment. Common brick answers for material, with the help of some stone slabs and some cement. A scrap-heap collection of all kinds of brick would be better yet, as shown in the fifth sketch. Nature, with its rank growth, will do the rest.

There are often bunches of shrubbery in vacant lots. A little cleaning of the ground and a step over the fence would make them inviting places. There are many short spare moments when a place for out door recreation is especially welcome.

In a new country there is a dearth of the incidents which enrich home life. The pleasant trifles are crowded out or overshadowed by great occasions or their absence. Yet it is in the informal spare moments, when persons are left to their own devices, that they run out in search of diversion. It is then they are subject to most any influence and a desirable objective point is needed, something better than street corners and other ill-fitting perches, some place more accessible than the cottage porch or interior. Therefore much good may come from arranging these tasty spots in town and village landscapes where folks may linger, rest and whet their wits together in the enjoyment of wholesome sunshine or shade. This is desirable for the young, and among the old veterans of domestic life, there is hardly a formal park in which they do not congregate, season after season, unheeded and ill accommodated.

The traveler is led over seas to far away European countries for the enjoyment of romantic scenes: the castles and streams that are celebrated in song and

anecdote. It is considered that such resources are lacking in a new country. Is it not rather because the newcomers are unacquainted with the ideals of native culture? The distorted conceptions that are promulgated regarding primeval traditions are often a travesty. Instead of setting them aside they should be preserved until better understood. The fifth design is of this nature, having a place for an inscription upon the column front.

There is no doubt but what, in ages past, white voyagers were cast upon our shores. Theirs are solitary stories that the future may some day piece together for us. How long it has taken to awaken to the truth that America was of old a land of the Northmen's quest and fortune. Peaceful enterprise is more far-reaching than brazen conquest.

The country is full of beautiful legends that give a charm to any design which they may appropriately grace. Many a spot already bears marks that have weathered unknown ages. Some of the busiest pathways of travel and commerce follow old routes, than which modern perseverance could find no better. So a legend adds to the interest of a design like our sixth.

Many native trails are distinguished by carefully made sand hills, different kinds of earth being used and sometimes shells. Various shapes and figures were laid out, the symbolism of which was of a purely distinguishing nature. While their value may not be comprehended at present, they were nevertheless the turnstiles of those days when the land was a net work of paths made by runners on foot. Their preservation is of incalculable value to the future generations, who will better understand the romances of America's past.

One of these ancient trail marks is located in the midst of populous Chicago. In ages long ago, when the waters of Lake Michigan washed upon a shore farther inland than now, this mound was a stile of forest. And today, true to its nature, it lies cheek by jowl alongside a roaring elevated railway, while the noises of a busy thoroughfare also hum the course of traffic by on Wellington avenue from morn 'til night. How few know its traditions or its lesson in precedents!

Neither is the poetry of life all a matter of the past. There is evidence of that in the artistic taste displayed in every house and its surroundings. So there are many people living whose careers have been touched by the ideal. Those who are serenely conscious of such climaxes may pick up the thread from which fate weaves their experiences and pursue their life in beautiful ways. All the works of art, modern or primeval, are for the awakening of this insight. Their footsteps will lead through marble halls and their journeys will extend through the sunshine of cold climates into the shades of tropic zones. This status discloses a concourse of talent that is inimitable.



Eight-Room School House

SHOWING SOME FEATURES WHICH ARE UNUSUAL — PERSPECTIVE AND FLOOR PLANS SHOWING GENERAL APPEARANCE AND INTERIOR ARRANGEMENT

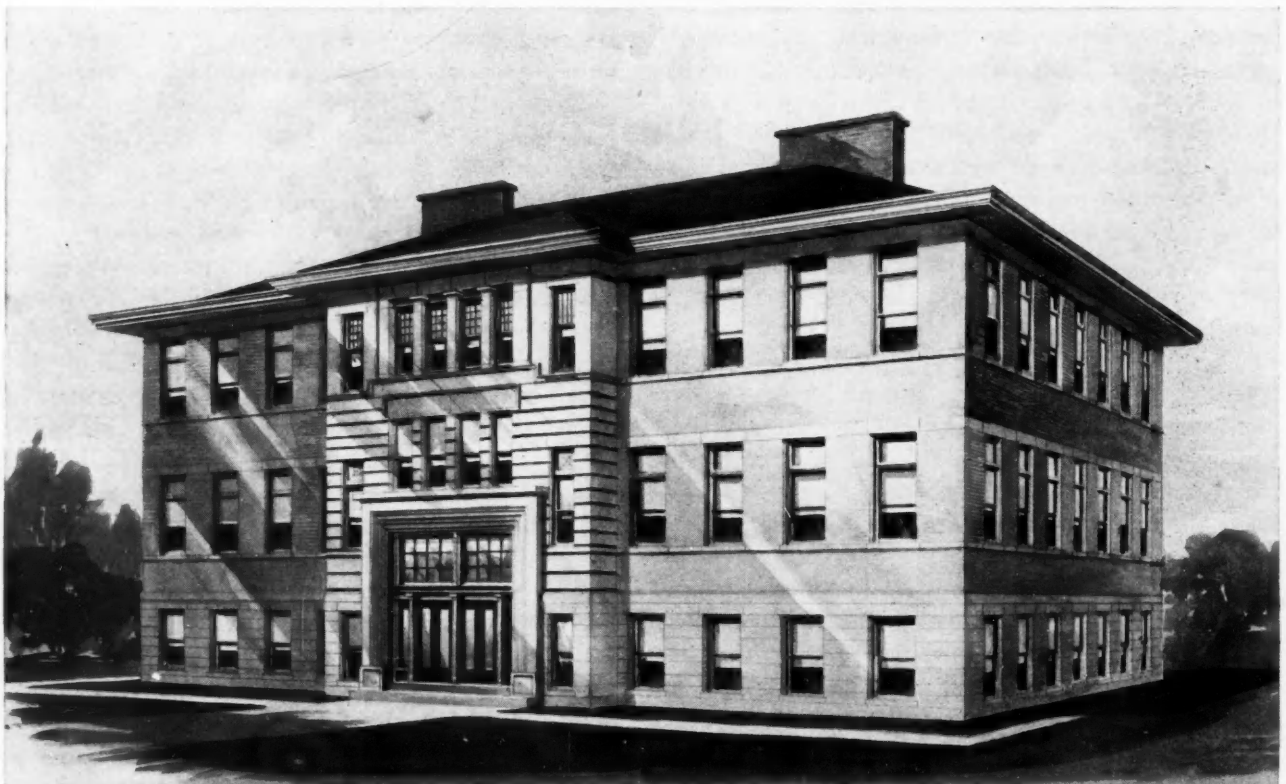
WE ARE illustrating the perspective and floor plans of an eight-room school house designed by G. W. Ashby. One of the unusual features of this design is the basement, which has a twelve foot ceiling in the clear, and the first and second story ceilings being fourteen feet. A school house of this kind is especially adapted for the warmer climates. Another unusual feature is the square splayed brick

The basement can also be fitted up into class rooms and such studies as manual training and domestic science can be taught here.



Tar for Mortar Coloring

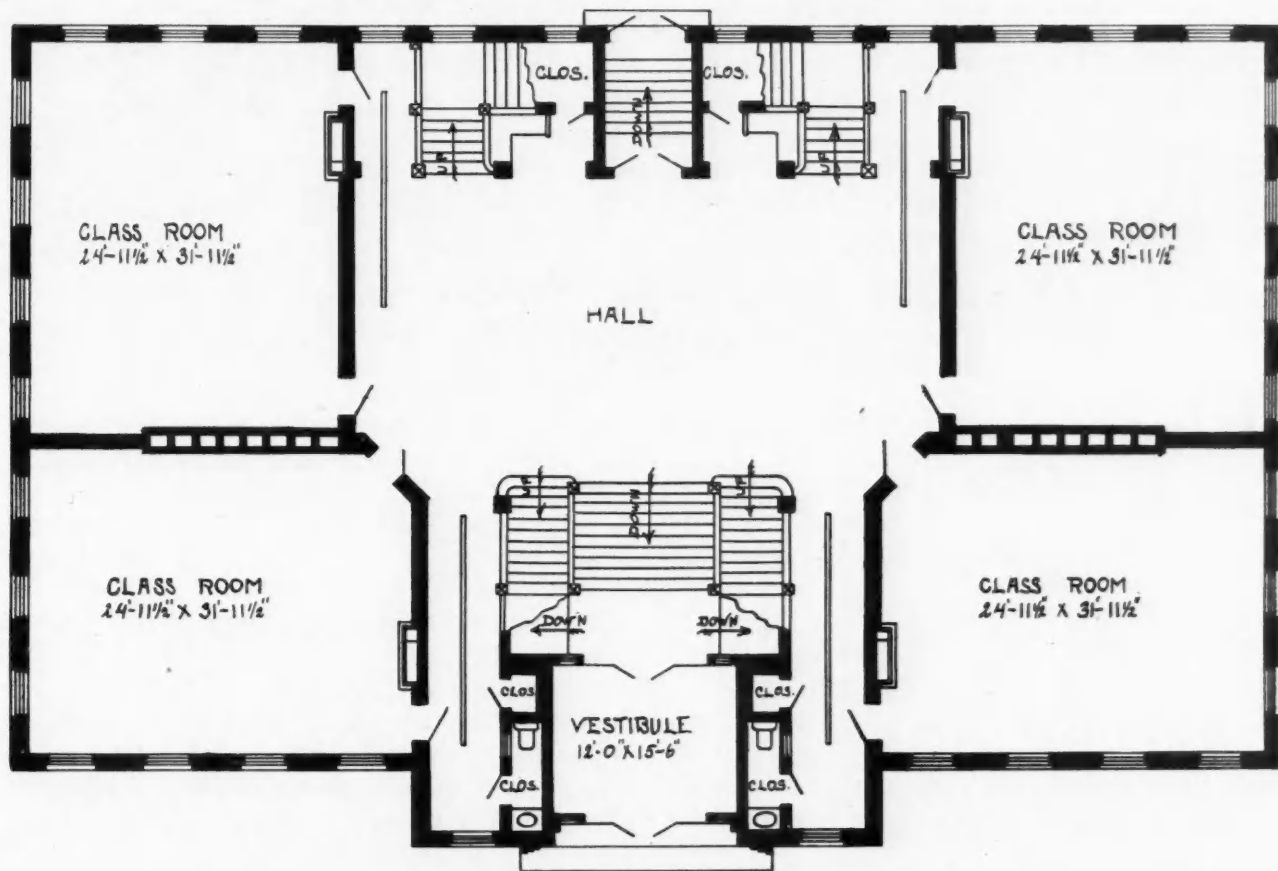
Tar is already a source of a greater variety of commercial articles than any other material known to man, but a mason in East Palestine, O., reports another use.



entrance in place of the usual round arch. The soffit of the opening is carried on a channel with an angle iron bolted on the bottom to form a shelf or seat. This adds to the appearance of the building, as it does away with the stereotyped entrances which we are so accustomed to.

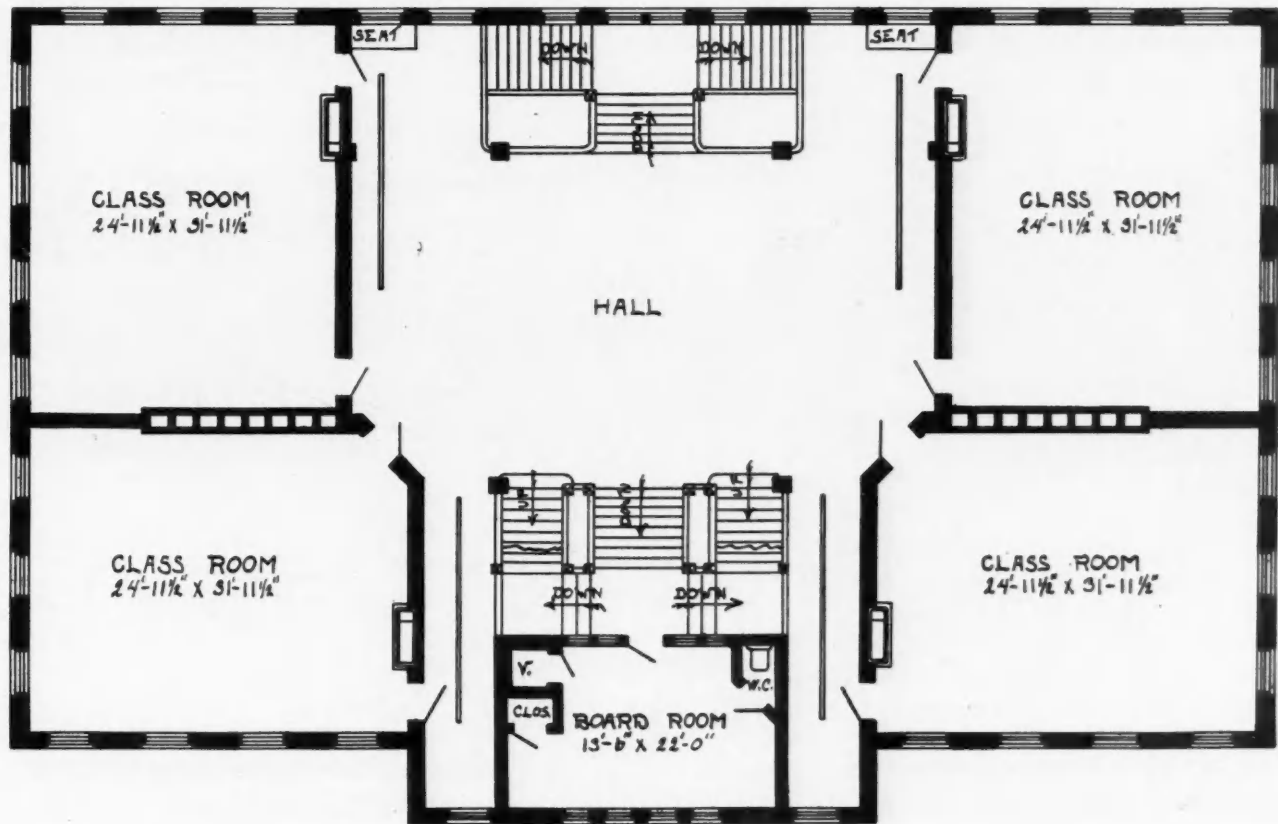
The interior arrangement is very good, the first and second floor being both divided into four class rooms each. There is a large hallway on each floor and both a front and rear stairway, which is an excellent feature, not only to avoid confusion, but also a safeguard in case of fire.

In erecting a number of brick houses he ran short of black mortar color and was unable to replenish his supply in the time at his disposal. Accordingly he tried a little tar, using a material which had been partially refined, and had no difficulty in getting the right color for his mortar for pointing up or beading it between the bricks. Fearing defects from his workmanship, the builder watched his work very carefully. After a lapse of several years he still finds that the color is as strong as ever, and the work shows a remarkable appearance of newness, whereas the other buildings where the usual mortar color was used will

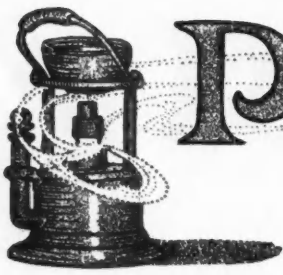


MAIN FLOOR PLAN

need repairing and further pointing up before long. vent the washing out of the color, as is the case with
 Probably the waterproof characteristics of tar pre- ordinary mortar color.



SECOND FLOOR PLAN



PLUMBING

W^M R. MARSHALL

Various Types of Water Closets

GIVING A COMPLETE DESCRIPTION OF THE DIFFERENT TYPES OF FIXTURES — GOOD AND BAD POINTS OF EACH

THERE is probably no more important fixture installed in the residence than the water closet and it is the purpose of this article to describe the different types of fixtures, and to point out the good and bad points of each.

The hopper, Fig. 1, is known as a tall round flush-

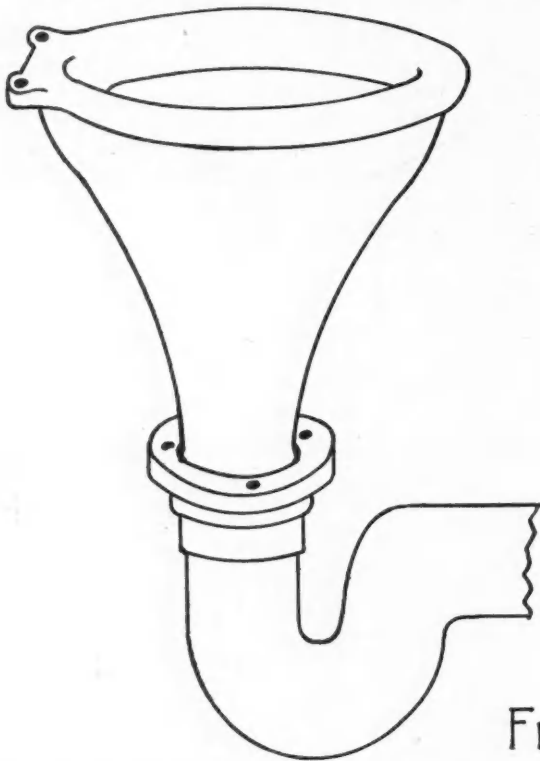


FIG. 1.

ing rim, and is without a trap; it is placed over a trap in the floor. The large fouling area in this fixture, the impossibility to secure a sufficient flush by means consistent with closet installation, to thoroughly cleanse the hopper and the trap, have long ago condemned it as a sanitary fixture, and it is generally prohibited wherever a sanitary law is in existence.

Fig. 2 is known as an offset washout. This closet is also without trap and is installed over a trap in the floor. This closet is a hopper closet with a pan and its only advantage over a straight hopper, if it has any, is that the pan, and the water retained in the pan, make it possible to flush the solids en masse; the long fouling space between the trap and the pan is the most objectionable feature and the difficulty of flushing the long outlet clean.

Fig. 3 is known in trade parlance as a short hopper and trap. The shortening of the hopper bowl lessened the fouling space and brought water seal closer to the seat. The difficulty of maintaining a tight joint between the earthen bowl and trap and the unsightly appearance lead to the washout closet as shown in Fig. 4. This type is made with both front and back outlet, the front washout type being the most popular—the one shown is a back outlet washout. The objectional features are the shallowness of water retained in the bowl and the fouling space marked A and B; the liability of the solids being flushed in the trap but not out of it, in which case the offence impregnates the room, having no provision in this construction to prevent it; then again, the large surface of the closet, exposed, makes it a more difficult fixture to thoroughly cleanse by flushing, than those of more modern construction.

The next improvement made is shown in Fig. 5, known as a combined hopper and trap. This closet corrected the faults of the washout type, inasmuch as it eliminated the fouling space spoken of previously.



FIG. 2

The objection found in this closet was the difficulty in constructing it so that the solids could be flushed easily and surely with one flush, paper was liable to become caught on projection A, and so retard the out-

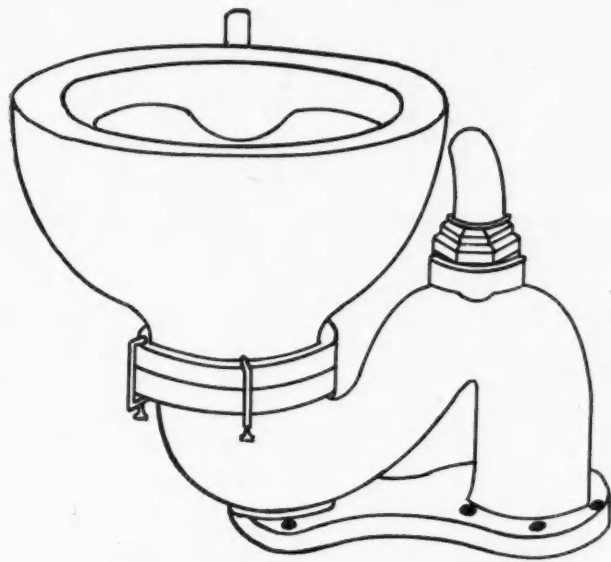


FIG. 3.

ward flow that a second or third flush was necessary to thoroughly empty the bowl. This has been remedied in some makes and this type of closet, with this objection overcome, is largely used today.

The closet shown in Fig. 6 overcomes the defect of the combined hopper and trap, and is known as a syphon acting wash down closet, the outlet leg C being longer than leg D. When the closet is flushed they act as a syphon until the water falls below lip E, the wash down jet F forces a jet of water down the back of the bowl and into the trap, which helps to start the syphonic action, while the combined hopper and

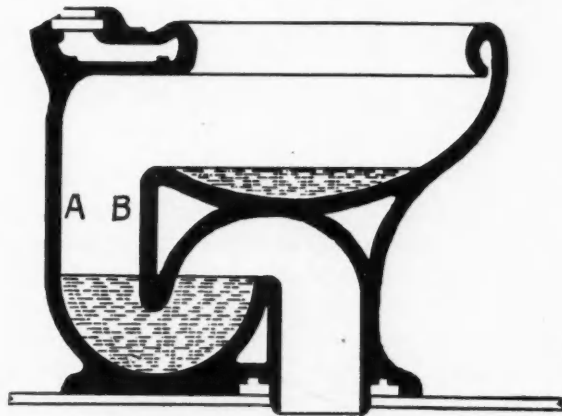


FIG. 4.

trap type has only the restricted flush of water through the flushing run ports or opening in the run to thoroughly scour the bowl and force the contents of the closet out of the trap and into the soil pipe. Fig. 7 is the latest and best closet on the market—the syphon jet type; it is a larger closet than the syphon acting washdown closet, carries a larger water seal, has a stronger syphonic act, due to the jet, which operates as follows: a separate water leg is connected at the top of the bowl at the point where the water enters

the bowls and runs down the side of the bowl—(this leg or water channel is perceptible on the side of some types of syphon jets while in others it is not, closets of the latter type are called concealed syphons—the only advantage in appearance and the elimination of all unnecessary crevices or projections which tend to collect dust)—to the bottom of the trap of the closet, entering at point x; when the closet is flushed the jet of water running down this leg is forced through the small opening at x in a small but forcible jet which discharges into the outlet leg, driving the water in A into B, filling outlet leg C. This operation tends to

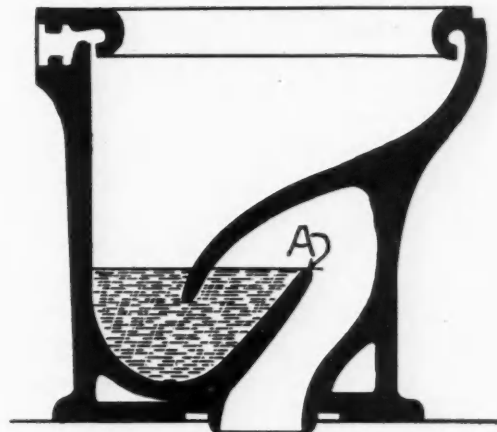


FIG. 5.
Hopper and Trap

create a quick syphonic action which sucks out the contents of the bowl and the water discharged through the ports in the flushing rim of the closets, scours the bowl and keeps it clean. This type of closet if properly constructed is practically noiseless. There are a great many different styles made, but in principle they do not differ materially. A syphon jet closet requires more water to flush it than either the washout or syphon acting closet and should always be fitted with a larger tank. The syphon acting closet and the syphon jet closet can be used with a low down tank; when this is done the flush opening into the closet and the

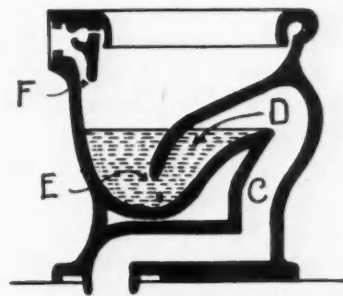


FIG. 6.
*Syphon Acting Washdown
Rear Outlet*

connecting pipe should be 2 inches internal diameter; as a general proposition it takes a better closet to operate successfully on a low down tank than it does on a high tank, as the force of the flush is greatly diminished. In selecting a closet, it is well to see

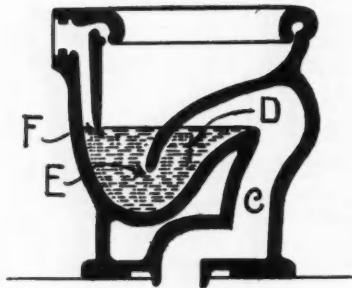


FIG. 6.
*Siphon Acting Washdown
Center Outlet.*

them in operation and pains should be taken to select a closet that has a quick and forcible syphonic action.

A good test to ascertain if the flush is sufficient to empty the bowl and make an entire change of water in the bowl and trap is to pour a little ink into the closet. If one flush is sufficient to discharge all of the colored water and replace it with clear water, it

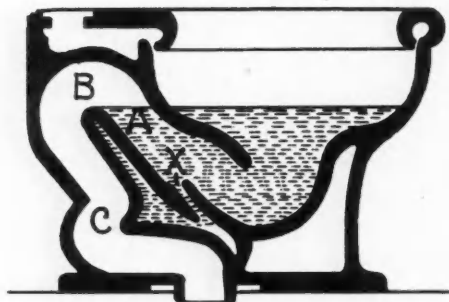


FIG. 7.
Siphon Jet Closet.

is reasonably safe to assume that under ordinary circumstances the closet will perform the functions intended. A closet also should be subjected to a paper test by filling the bowl with paper and flushing it to see that it empties quickly and thoroughly without any come back.

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How McGinness Fooled the Boss

Casey—Ye're a har-rá worruker, McGinness. How many hods o' morthar have yez carried up that laddher th' day?

McGinness—Whist, man—I'm foolin' th' boss. I've carried this same hodful up an' down all day, an' he thinks I'm worrukin!



The Century Cement Machine Company of Rochester, N. Y., report sales of the Hercules Concrete Block Machine to the city of New York, and two sales to contractors in India and China. Mr. A. T. Bradley, of the company, is strongly advocating a coarse wet mixture for backing, and finds that his judgment is backed by the experience of contractors who do large work.

The Pullman Manufacturing Company have absorbed the entire sash balance end of the business of both Anstice & Co. and N. R. Streeter & Co., of Rochester, N. Y. The latter two firms made and marketed the "Sensible" spring sash balance. This makes the third sash balance business absorbed by the Pullman Company during the past three years. The transfer includes patents, machinery, patterns, tools, dies, jigs, stock on hand, good will, etc., etc.

On May 1, the Clinton Wire Cloth Company, Clinton, Mass., removed its New York office from 33 Park Place to 261 Broadway. At the same time, the Chicago office moved from 237 Lake street to 30 and 32 River street. For over half a century this concern has been manufacturing wire cloth of every description, embracing woven wire fence, electrically welded wire fabrics for concrete construction, wire lath, hexagonal netting, perforated metals, etc., during which period these products have been the standard in their line.

The Open-Hearth Steel Works, Rolling Mills and Blackplate Plant at Cumberland, Md., of N. & G. Taylor Company, of Philadelphia, are a good example of a plant designed entirely for a special line of work—the manufacture of tinplates of the highest grade. This old established firm, now the largest independent manufacturers of tin and terne plate of all kinds, has been quietly improving and enlarging these works, and perfecting the processes of manufacture, to obtain products suitable for a variety of special purposes. They still retain their old organization as a private firm. The experience of this company as American manufacturers of tinplate dates back to the establishment of the industry in this country. The Cumberland Works were acquired seven years ago, to provide the facilities for obtaining special grades of blackplate. The experience gained in these years is at the disposal of those users of special tinplates who may have found difficulty in securing a satisfactory quality.

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Labor is the ornament of the citizen.—Schiller.

Pneumatic Water Supply for Country Homes

ADVANTAGES OF NEW SYSTEM IN SUPPLYING WATER FROM ANY SOURCE OF SUPPLY—MOTIVE POWER NECESSARY TO CONVEY WATER WHEREVER DESIRED

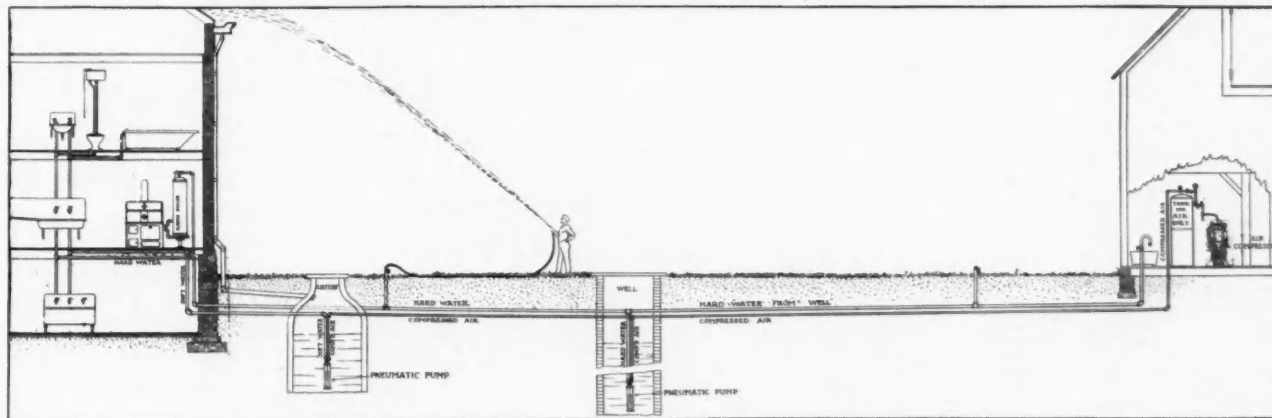
By Thomas O. Perry

THIS is a new water supply system recently placed on the market, having been in actual service for about two years, and is the final result of many years of experiment. It is an ideal system for country and suburban places for four principal reasons:

1. Any motive power, no matter where the motor may be located, can be utilized to pump water from a well or other source of supply, however distant the well may be from the motor. The motor, which may be a windmill on a barn or hill, a gasoline engine under a shed, or an electric motor in a basement, is used to compress air, which is conveyed through a small pipe to the pump in the well near the house or elsewhere, or the pump may be in a distant spring, lake or river. A motor already installed anywhere for other purposes can be used at the same time to compress air for raising water, without in any way

are stored in a tank under pressure. As the tank in this system stores air only, frost can not affect it, and it may be placed out of doors, or anywhere to suit convenience.

4. In the facility which this system affords for economical application of motive power, great advantage is claimed in many cases, especially where the power required is small, as is generally the case in pumping water for country places. For example: Where ordinary hand pumps are used, the pistons seldom exceed three inches in diameter, with a stroke of about six inches. This would give a discharge of 42 cubic inches per stroke. At 40 strokes per minute, the corresponding discharge would be 1,680 cubic inches, or about $7\frac{1}{4}$ gallons per minute. $7\frac{1}{4}$ gallons weigh, approximately, 60 pounds. If water is elevated 50 feet we have 60 times 50, equals 3,000 foot pounds per minute to represent the useful work



interfering with other work to which the motor may be applied. Distance between motor and pump is no obstacle to the perfect working of the system.

2. With this system, two or more pumps in widely different locations may be operated by one motor. One of the pumps may raise hard water and the other may raise soft water. Neighbors with separate wells could divide the cost of one power plant, which would furnish compressed air to operate all of the pumps so as to supply each house from its own well. The pump itself, or apparatus which is placed in the well, is very small, weighing only from 15 to 20 pounds, for ordinary domestic use.

3. By using a storage tank for compressed air, water reservoirs may be entirely dispensed with. Water is forced into the upper stories of houses without the need of elevated tanks, and without storing water in tanks of any kind. Fresh water is forced directly from the well to the faucets. This feature especially distinguishes this system from other pneumatic systems, in which both water and air

performed in operating such a pump as stated. Now, a horse power is 33,000 foot pounds per minute—so it would require to operate an ordinary hand pump, in our supposed case, less than one-tenth of one horse power, *provided such a pump could be operated without any waste of power.*

If water were raised 100 feet, instead of 50 feet, the power required would still be less than one-fifth of one horse power, *not counting waste.* But, how about the waste of power? Do we not often hear it said that two or even three horse power engines are nearly stalled in operating such ordinary hand pumps? The truth is that almost any amount of power may be wasted in doing a very small amount of useful work on account of the conditions being unfavorable for applying power above a certain limit. Generally speaking, it is folly to attempt applying even one horse power to an ordinary hand pump. Yet no other kind of pump is ordinarily available in country wells.

Furthermore, such a pump as we have named at 40 strokes per minute would exhaust many wells,

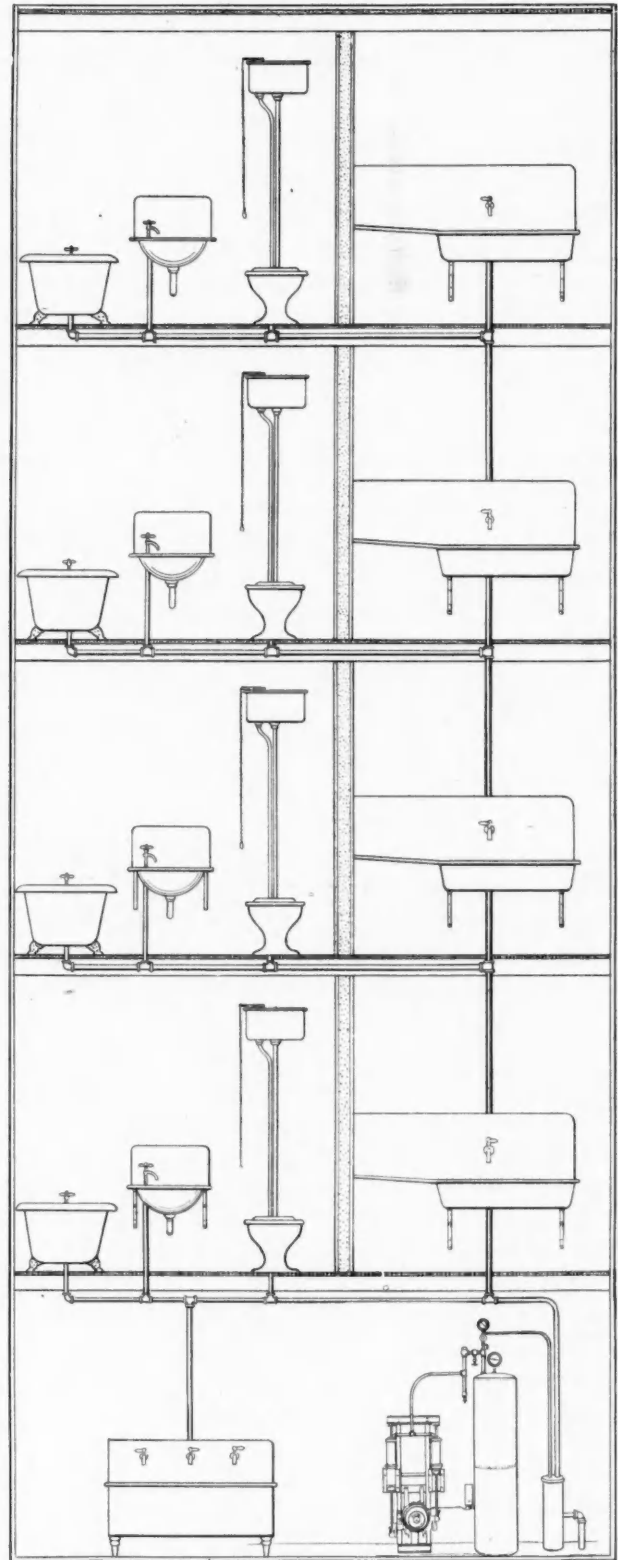
making it impossible to apply usefully even one-fifth of one horse power. In these wells of small capacity, the pump must be worked slowly, and much time is required. The power of most available engines can not be applied without enormous waste, to say nothing about the inconvenience attending the operation of a motor for so many hours.

Let us take, as another illustration, the case of a well that will supply only two gallons, or 16.69 pounds, of water per minute. Such a well is capable of yielding 1,440 gallons, or more than 45 barrels, in twenty-four hours, if a continuous flow of water can be maintained. If the water is elevated 100 feet, we have 16.69 times 100, equals 1,669 foot pounds per minute, to represent the work required of a motor for operating the pump, *not counting waste*.

1,669 foot pounds per minute amounts to only about one-twentieth of one horse power. But, as a large amount of waste work is unavoidable in the operation of any kind of pump, it is well to provide in all cases twice the amount of motive power called for by the actual useful work to be performed. With such liberal allowance provided for waste, the power applied to raise two gallons of water per minute, to an elevation of 100 feet, still needs to be only about one-tenth of one horse power. But, if a common lift pump is used, the power must be applied every minute of the twenty-four hours to get the full capacity of the well. And if a one or two horse power motor is applied, as is usually done, the time of its operation can not be abridged, nor will the useful result be any greater. Only the waste work is multiplied by enlarging the motor. The desirable end to be attained is to be able to economically use the power of a one horse power engine only one-tenth of the whole time, instead of wastefully using such an engine all the time. This is what is accomplished by this pneumatic system. The engine may work one hour and rest ten hours. In one hour a one horse power engine may store up enough compressed air to keep the pump in continuous operation for many hours. In this way the motor has plenty of time to cool off, recuperate and receive any attention of which it may be in need.

So far as the pneumatic pump is concerned, it can make no difference whether its need of compressed air is supplied by the motor in one hour or ten. The compressed air acts directly against the water in the chambers of the pump. There is no piston working

in the well; consequently, the pump is proof against injury by abrasion or by grit in the water. It is impossible to overstrain the pump, or to subject it to violence. No especial fastening is necessary to hold it



in place. Neither is any exact placement or aligning necessary. There is no pump rod to couple inside the water pipe and no packing box to leak, or make friction and trouble.

Ordinary sizes of these pumps are made almost entirely of brass, and contain no material subject to corrosion. There is practically no wear and tear except that due to the flow of air and water. It is not claimed that no parts of these pumps will ever need to be replaced, but repairs will be confined to minor inexpensive parts, which can be easily renewed. All the main parts are practically indestructible.

Any one can install these pumps who understands coupling ordinary water or gas pipe. Special flange couplings are used in the well, clamped together by ordinary carriage bolts, so that after the pump is once installed, it can be easily removed and replaced by any one, no other tool being required but an ordinary wrench. The pump is so light one man can handle it without the aid of ropes or tackle.

More briefly stated, this pneumatic system possesses the following peculiar advantages:

The motor may be located anywhere to suit taste or convenience. Any motor already located may be used without alteration. The pump operates perfectly at any distance from the motor. Two or more pumps may be operated by one motor. Storage of water may be avoided by storing air. One tank charge of air delivers two or three tank volumes of water.

Upper stories are supplied without elevated tanks.

The air tank needs no protection from frost. One air tank suffices for both hard and soft water. Tank room for air only is required—none for water. Fresh water is driven directly from the well or spring to the faucets. Air compression is accomplished without shock or violence. The working of the pump is perfectly smooth and quiet. The pump is light and easy to handle. A common wrench only is required for detaching and replacing the pump. Water is elevated by direct air pressure, with no piston in the well. Grit in the water can not injure the pump. No special fastening or alignment of the pump or pipes is necessary. The pump will work while the motor rests. It's all the same with the pneumatic pump whether the air may be compressed by one horse power in one hour or by one-tenth of one horse power in ten hours. However, considerations of economy and convenience obviously favor the use of greater power for shorter periods of time. Intermittent applications of considerable power, with long intervals of rest, are especially feasible with the pneumatic pump operated by compressed air stored in a tank. Air supply is unlimited everywhere, so that any amount of power may be used to store compressed air. Water supply is often very limited, and pumps necessarily small can not be forced beyond their own capacity, nor beyond that of the well.

California's Construction Material

GREAT VARIETY OF BUILDING MATERIAL FOUND WITHIN THE STATE—WHAT IS BEING DONE TO DEVELOP THE BUILDING MATERIAL INDUSTRY

By Clarence E. Edwards

SINCE the big fire which swept over San Francisco there has been much controversy over the question of building material for the reconstruction of the city, and in the discussion of such an important subject many eastern architects and builders have joined. The surprising part of this discussion is the fact that nearly all of the outside, and many of the California men, have expressed the opinion that this state is lacking in structural materials. While it is not the intention of this article to criticize these opinions, it is evident that they are based on either a misconception of the true condition or unfamiliarity with the subject.

It may be stated that outside of structural iron and steel there is not a single substance which is necessary in the construction of the finest buildings that is not produced in California. In a paper read before the semi-annual meeting of the Counties Committee of the California Promotion Committee, held at Napa, Cal., Lewis E. Aubury, state mineralogist, showed present conditions very plainly, and the substance of this article is based upon his paper, so the facts stated herein may be taken as official.

Eminent engineers the world over have time and again expressed themselves as being of the opinion that building stones found in any section are best

suiting for construction in that particular section, being especially adapted to weathering conditions, etc. Experience has demonstrated the truth of this statement as far as California is concerned, where, in case of sandstone from Arizona and Utah, it is found that they do not compare with the local product when subjected to the coast climate. Sandstone of the best quality has been quarried principally in the counties of Colusa, Los Angeles, San Luis Obispo, Santa Barbara, Santa Clara, Ventura and Yolo, and although many good deposits are found in other counties, lack of demand has restrained the owners from developing them, except superficially. As to quantity, quality, convenience to transportation and size to be obtained, there could be no objection found. The extent and development of this industry in the past twelve years in California can be shown by the official figures of production, which show that in 1893 California produced but \$26,314 worth, and in 1904, the last year in which figures are obtainable, sandstone of a total value of \$567,181 was produced.

In support of the statement concerning the merits of California sandstone as compared to the imported when affected by earthquake or fire, the best demonstration is offered in the many monuments of California sandstone to be found in the burned district of

the city, and which remain practically unscathed. The comparison applies equally well to granite, particularly when used for foundations. California granite when subjected to shock and intense heat in the recent catastrophe showed its superiority.

The principal areas in which granite is quarried lie in the Sierra Nevada range, of which it forms the core. The largest producing quarries are found in Placer, Madera, Nevada, Fresno, Riverside, San Diego, Sacramento, San Luis Obispo, Santa Cruz, Solano, Trinity, Tulare and Tuolumne counties. As illustrating the growth of this industry, the official figures show that in 1893 the production of granite and rubble amounted in value to \$531,322; in 1904 the value of the product amounted to \$1,836,433. The constantly increasing demand for granite and the large territory in which desirable granite is to be found in California, offer an inviting field for the investor.

One of the principal and most important articles which will be used in the reconstruction of San Francisco is Portland cement. Given an equal age California Portland cement has demonstrated its equality, and in many cases superiority, which with its lower price makes it worthy of the consideration of builders. When subjected to tests which are very severe, of government engineers, they have demonstrated the superiority of the local product, and the engineers have highly endorsed California cement, and already, in some of the largest government contracts ever given on the coast, California cement has been specified. The list of counties which are and can be producers of cement is so great that the limited extent of this article will not permit their being named. The official records show that in 1891, 5,000 barrels were produced, valued at \$15,000. In 1904 this was increased to 969,538 barrels, valued at \$1,539,807.

For all the uses to which marble is applied, California can more than supply the necessities. Marble is quarried in Amador, Inyo, Riverside, San Bernardino and Tuolumne counties and has had a slow but steady growth. In 1887 there was quarried \$5,000 worth and this increased in 1905 to \$94,208 worth. From the pure white to the verde antique, with all the intermediate colors, it can be found and quarried to any commercial size. There are many deposits of fine marble located in different parts of the state which are open to the investor.

One of the lessons of the recent fire is that if buildings are to be made fireproof they must have slate roofs. Comparatively few slate roofs have been placed on San Francisco buildings, but those which have them demonstrate their unquestionable superiority over all others. California contains many deposits of the best quality of roofing slates and many quarries could be opened which would supply all the needs of San Francisco. At present, owing to the limited demand, but one county is producing any quantity. The output of this county, El Dorado, for 1905, was valued at

\$50,000. A quarry in Shasta county has begun operations within the past sixty days.

Terra cotta, tiling and other clay products which enter largely into construction, are manufactured mainly in the counties of Placer, Alameda and San Francisco. The different classes of clay manufactured compare favorably with any imported. California is well supplied with high and low grade clays in such abundance as to meet all requirements. Good brick clays are found in all counties of the state, but at present the main product comes from twenty-eight counties.

With the exception of a small quantity manufactured within the state, all the glass used in construction in California is imported from Indiana and Pennsylvania. California has within her borders sufficient raw material for the manufacture of glass to supply the world. Two elements are necessary for the manufacture of glass—soda and glass sand—and they are both here in any quantity. At present there is but one soda plant in operation in the state, and that manufactures in comparatively limited quantities. This soda is made from the water of Owens lake, in Inyo county, and exists in inexhaustible quantities. There are thousands of acres of soda crust on the deserts of the southern part of the state which could be used for the manufacture of plate, window and bottle glass. These deposits are available and convenient for railroad transportation. Of suitable sand there is also an abundance in the state. With cheap fuel oil, glass can be manufactured here more economically than in the east.

Asbestos, one of the best fireproofing materials, can also be found in California. While much of it will not compare favorably with the Canadian for special uses, it is sufficiently good to answer for all the purposes to which it is applied.

Volcanic tufa, which is the lightest and most easily worked of building stones, is to be found in abundance in California. It is practically a fireproof material. It can be sawed into any desirable sized blocks, and the longer it is exposed to the air the harder it gets. It can be obtained in a variety of colors, and its durability has been demonstrated in many parts of the state in public and private buildings.



The Hardest Wood

Recent tests of the hardwoods of western Australia have revealed the extraordinary properties of yate, believed to be the strongest of all known woods. Its average tensile strength is 24,000 pounds to the square inch, equaling that of cast iron. Many specimens are much stronger, and one was tested up to 17½ tons to the square inch, which is equal to the tensile strength of wrought iron. The sawn timber of yate is probably the strongest in the world. The tree grows to a maximum height of 100 feet, and a diameter of two and a half or even three feet.

RESIDENCES



Artistic House Designs

SHOWING SOME FEATURES WHICH ARE UNUSUAL — PERSPECTIVES, ELEVATIONS AND FLOOR PLANS SHOWN —
COLOR SCHEMES SUGGESTED

A DESIGN of a frame cottage, which has many attractive features and is well worth considering, is shown herewith. It was designed for Mrs. M. J. Manuel at San Jose, Cal. The foundation wall is constructed of concrete and the basement wall

ators, instead that in place of ice, there is a circulation of air which keeps the temperature down. A suggestion for a color scheme of this house would be to have the body of the house dark brown, the trimming white and the roof moss green. The interior arrangement



above grade is of rough cast plaster. From the water table to the second story windows, the exterior is covered with siding, while in the gables shingles are used. The north elevation shows the large chimney, which is built of galvanized iron above the dotted line shown in the drawing. The galvanized iron is pressed in the form of bricks and is used to avoid any serious damage in case of earthquake shocks.

Another feature shown in the north elevation is the cooler. This cooler is very similar to our refriger-

shows many features which are worthy of comment, especially the dining and living rooms. Both of these rooms have heavy beam ceilings, and in the dining room the wainscoting is 5½ feet high with a cup rail on top, and is paneled with narrow thin oak strips. The paneling is formed with stained burlaps. The details give an idea of the interior finish and it will be noticed that the entire interior is finished square, producing a very artistic effect.

On the north side of the living room is a large open



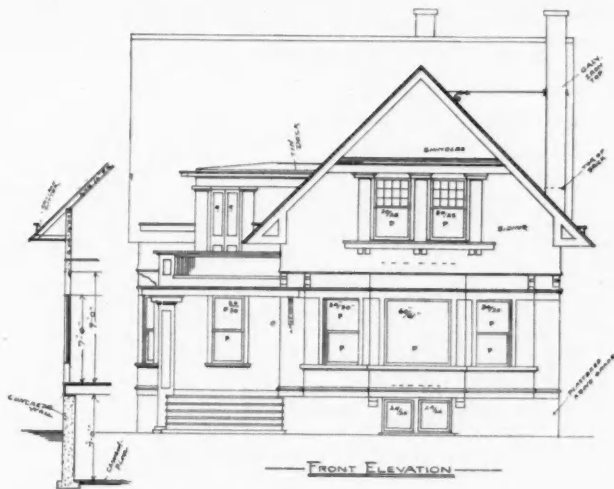
— NORTH ELEVATION —

fire place, on either side of which are book cases. There is a large cased opening between the living room and the reception hall and there is a sliding door between the reception hall and the dining room. The

details also give an excellent idea of the construction of the sideboard, which is located at the west end of the dining room. This detail also shows the arrangement of the plate rail and burlap.



— SIDE ELEVATION —

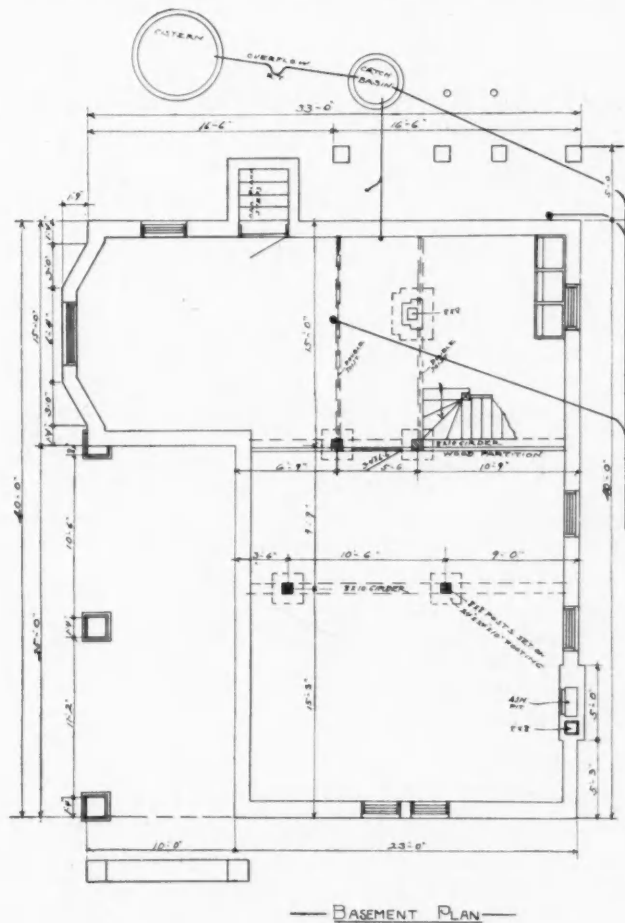


The second floor is divided into four good sized bedrooms and a bath room. Each bedroom is equipped with a good sized closet, and they all enter directly into the hall.

Design for a Country House

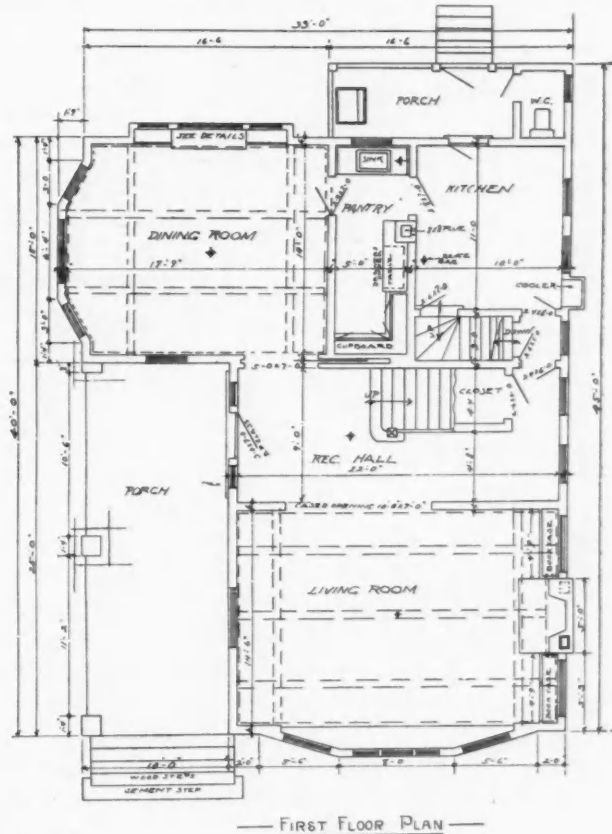
The design shown on page 389 was designed by A. Raymond Ellis, at Hartford, Conn. The house is well arranged, very convenient and inexpensive. The

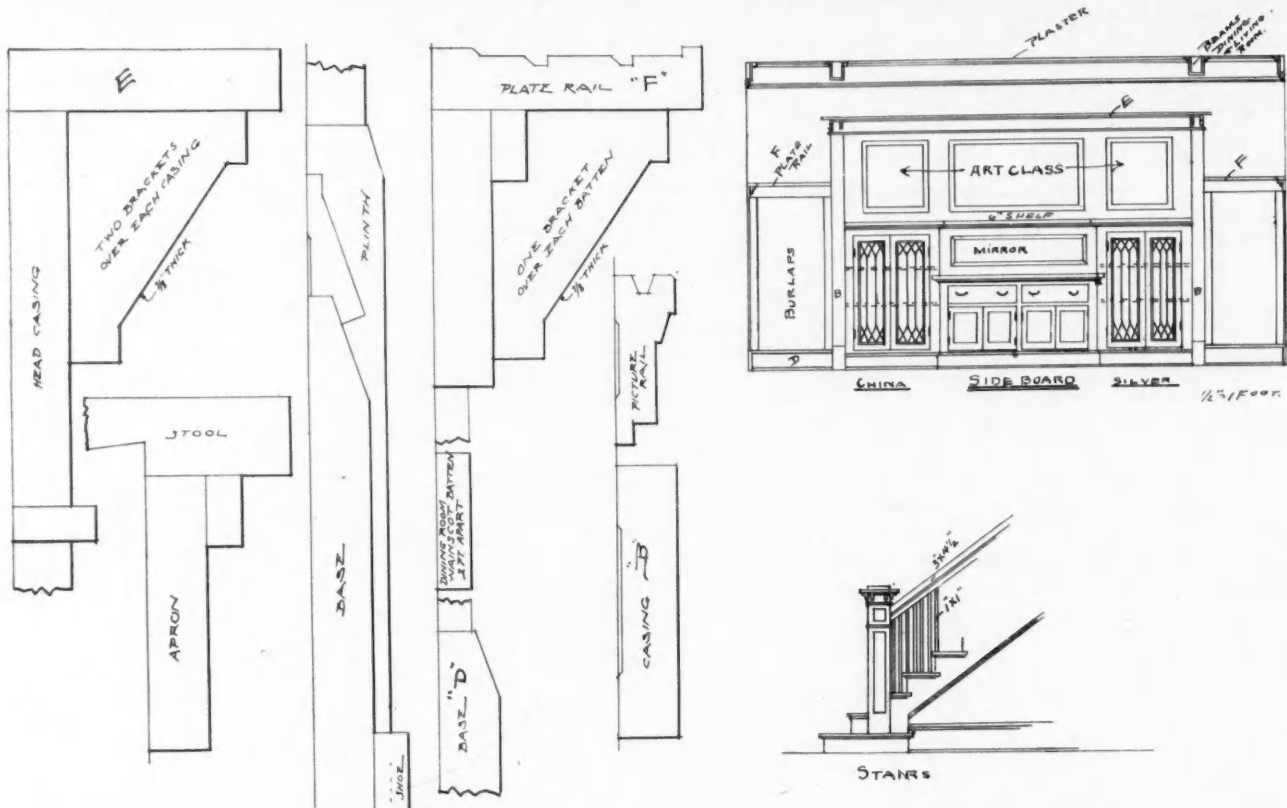
red and all the exterior trims a dark brown, with the window sash drawn in white for effect. The entrance porch, covered, is nearly fifteen feet square and gives ample protection from the sun in the summer, while in the evening the connecting terrace gives additional



design is a type of modern English with rough cast plaster of an old ivory tone, giving a strong contrast between that and the vertical batons of the half timber, which is a dark brown. The roof is a Venetian

space for the chairs of a small party. The small nook built into the living room from the terrace, while it may be encroaching on valuable space, is a cozy spot during the summer months and at the same time gives a chance for seclusion inside; in fact, privacy in suburban life is an essential neglected.

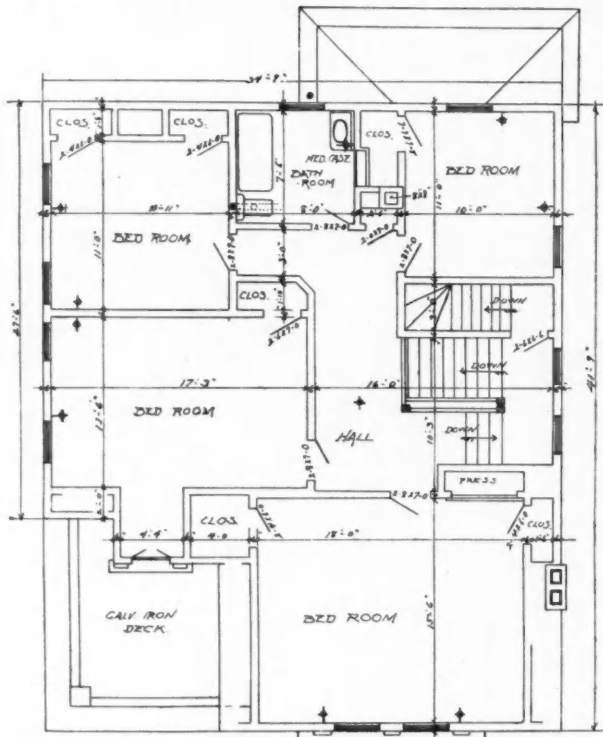




The living room and stair hall combined, with its dark beams, if properly furnished, can be made quite English, and this part should be decidedly characteristic, for it is here that the friends and acquaintances

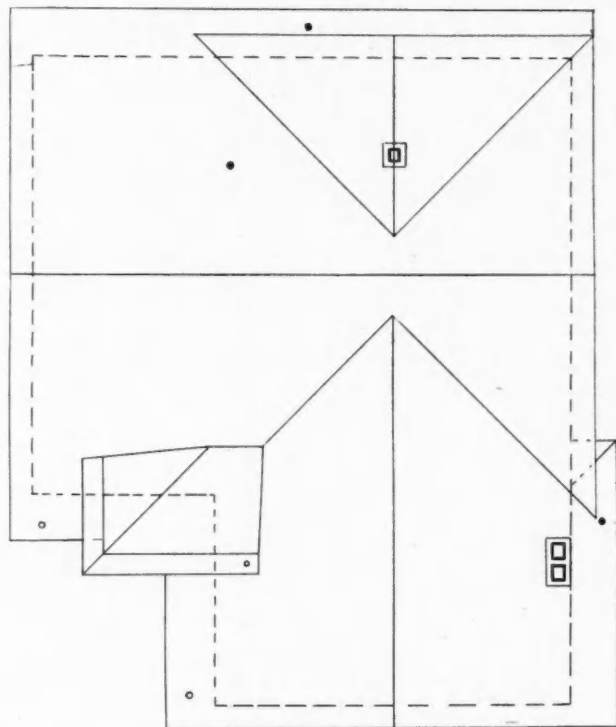
foot six wainscot a paper of terra cotta colored ground with a stenciled design of deeper color adds warmth to the color scheme. A few choice rugs of Oriental design and sturdy furniture of mission style will make an admirable room, not expensive, but expensive enough to be in keeping with the whole scheme.

The dining room, screened from the living room by heavy draperies, can be treated similarly to the liv-

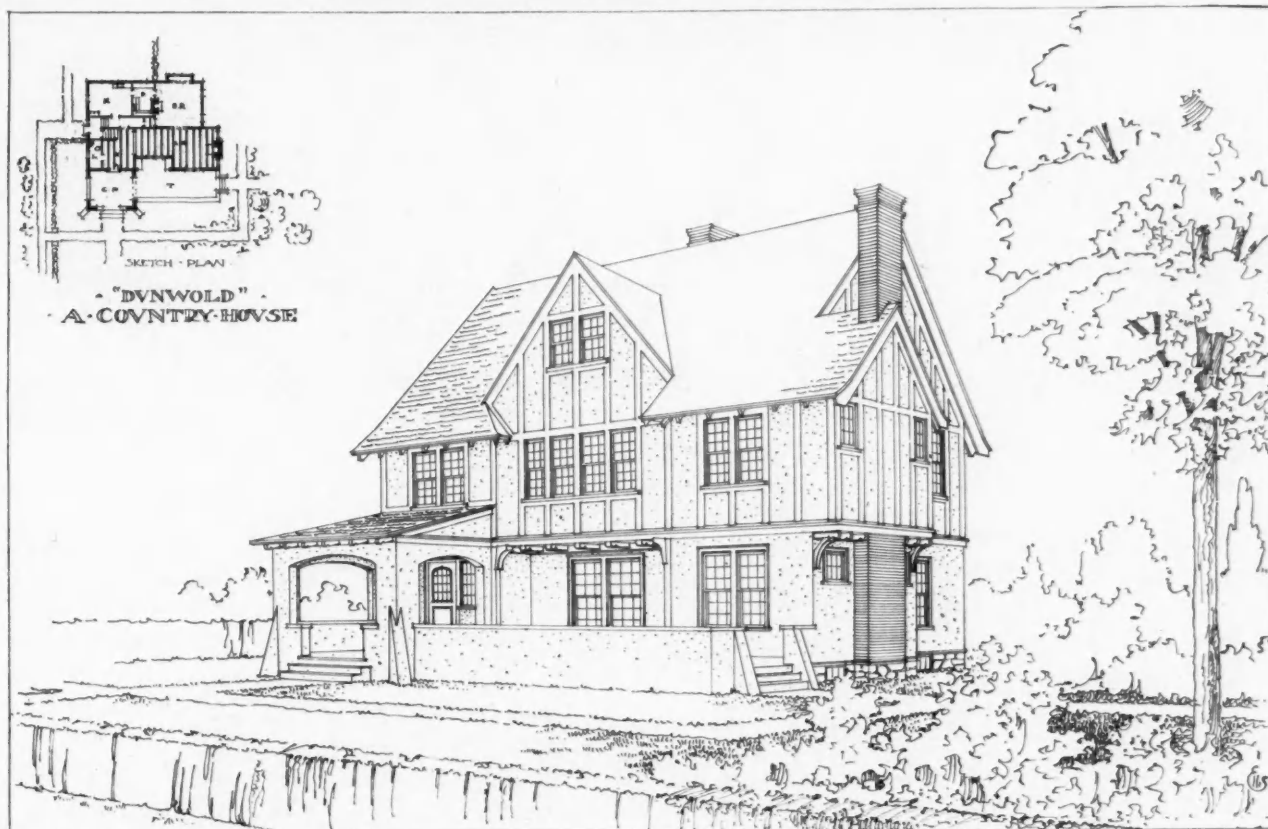


— SECOND FLOOR PLAN —

are usually received, and hospitality cordially extended in such a room makes many pleasant hours. The fireplace is large and built of dull red brick with a heavy mantel shelf supported on brackets. Above the four



— ROOF PLAN —



ing room, or in another style; but I would prefer the same treatment in color scheme, as the rooms are so closely connected. Through the spacious serving closet the kitchen is reached, commodious, airy and containing the usual modern equipment.

Circassian Walnut and Quartered Oak

Circassian walnut is so near the price of quartered oak, it is equally important to buyer and manufacturer to give this most elegant and refined material an increased amount of attention. Of course it is better to make or buy quartered oak goods that are made right than any Circassian walnut abortions that are not up to a high standard of design and workmanship. People who buy Circassian walnut will not tolerate gingerbread any more than buyers of mahogany, and imposing size is not all there is to it.

Circassian walnut furniture of elegant, tasteful design, well made, should be highly saleable, and much more of it would be used if it was pushed to a greater extent. There are many manufacturers who, if they would get this material into their line—and get it in right—would reap benefits therefrom. In buying oak furniture, buyers go at things differently than when buying mahogany and Circassian walnut. There are details which, if neglected, will be fatal to the sale of goods of the latter two woods. The Circassian walnut is especially adapted to furniture of the French period styles, and, in the finest productions, is the top of the market. But chamber furniture of this material does not need to be made after the ultra-fashion of the few top-notch houses, and made prohibitive in price. Designs can be readily adapted when fixing selling prices that will represent a height of refinement, and yet be within the limits of thousands of the tasteful consumers of furniture. But cut out tremendous heft and cut out gingerbread.



The second floor has four available chambers and a general bath room, while in the attic one room is finished as an extra chamber for a servant, leaving room for storage of trunks and chance to finish off another room in the future. Economy of space is an important factor in a house of this type and I believe not an inch of space is wasted.

PRACTICAL CARPENTRY

Geometrical Stairway Construction

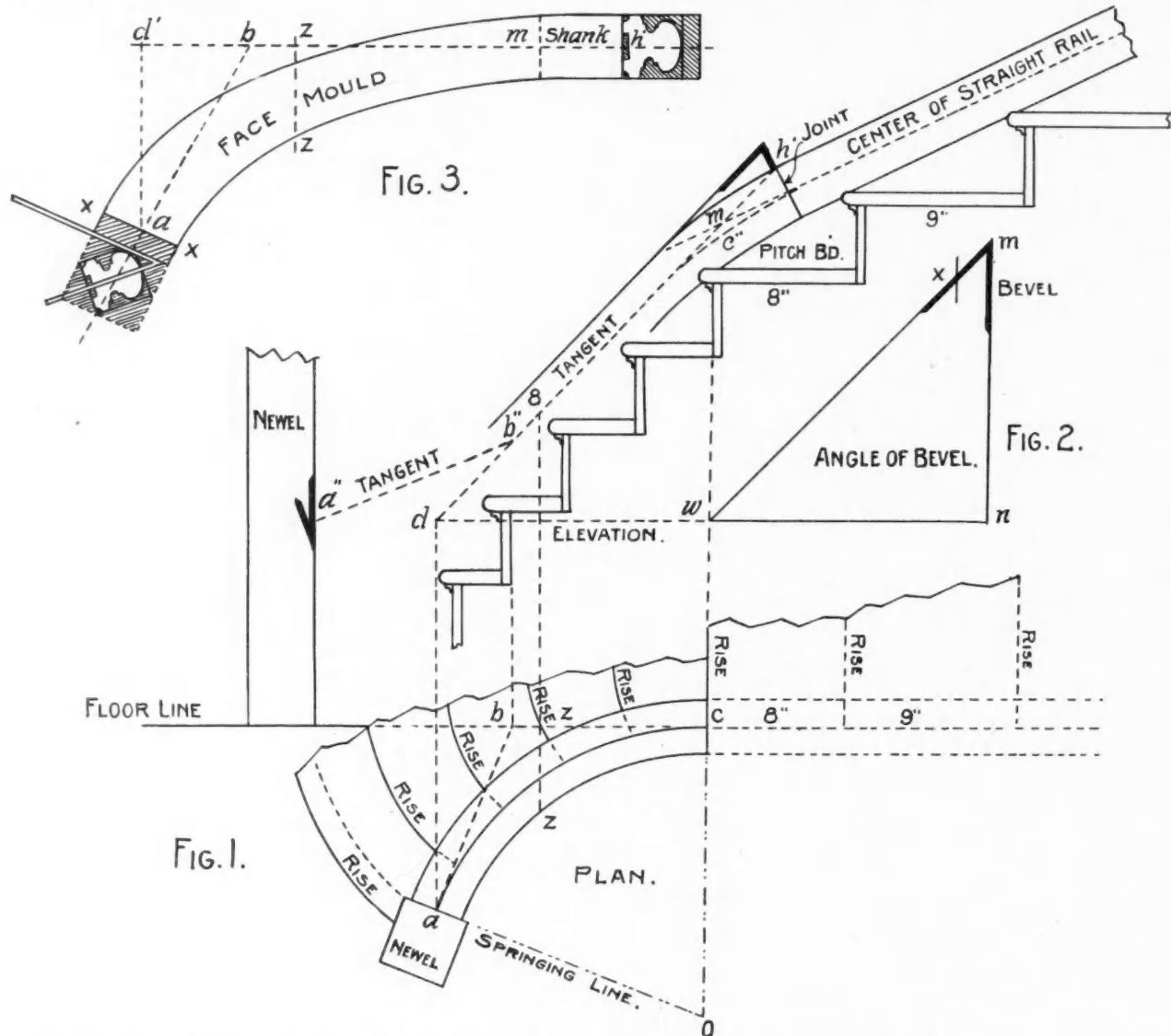
A METHOD OF TREATMENT FOR A STRETCH-OUT RAIL AT THE BOTTOM OF A STAIRWAY—THE CURVE CONTAINING SIX RISERS

By Morris Williams

IN FIG. 1 is shown the plan and elevation of the bottom part of a stairway, having what is called a stretchout curve less than a quadrant; the angle between the plan tangents being acute, as shown at a b and b c respectively.

Let a c be the radius of the plan central line of the rail, and continue the line o c to c".

The distance between c and c" will have to be equal to the total height of 6 risers, which are contained in the stretchout curve, and shown marked on the plan



The method of treatment, as here illustrated, is very simple both in respect to drawing the face mold and finding the bevel to square the wreath.

central line of rail from a to c.

From c" towards the right draw two or three steps of the flight adjoining, to ascertain the pitch line.

Upon and above the nosing of these steps draw lines to represent the thickness of the straight rail of the flight. The center line of this rail will intersect the vertical line c'' in m , a little above c'' .

This point relatively to the wreath piece that is to span over the winders in the stretchout curve; will be a fixed point from which the pitch of the upper tangent will have to start downwards, as shown from m to d .

From d a line is drawn to a in the plan, and from b in the plan another line is drawn to cut the pitch line of the upper tangent in b'' . From this point the pitch of the lower tangent is drawn, as shown from b'' to a'' .

We are now ready to draw the face mold, but as the width of the mold at the end a'' is determined by the bevel that will have to be found to square the wreath, we will first find this bevel.

In Fig. 2 it is shown to be the upper angle of a triangle, the base of which, as shown from w to m , is made equal to the radius of the central line of the plan rail, as from o to c . The altitude $n m$ is made equal to the distance shown in Fig. 1 from w to m ; that is: the total height of the two tangents; or, in other words, the total fall of the wreath over and above the winders.

The angle at m in Fig. 2 therefore will be the bevel that is to be applied to the end a'' of the wreath, as shown applied in Fig. 3 at the end a of the face mold. The end m of the wreath will need no bevel and that because the pitch line of the upper tangent intersects at d a line drawn from a in the plan.

The short line x in Fig. 2 is placed at a distance from the line $n m$ equal to one-half the width of the straight rail; and the distance along the long edge of the bevel, as from m to x , will determine the width of the mold by applying it on both sides of a , as shown in Fig. 3 (at $a x$ and $a x$ respectively).

The mold, as it is shown in Fig. 3, is formed as follows: The line d, b, z, m is made to correspond with the pitch line of the upper tangent, as shown at

d, b'', z, m in Fig. 1. From d a line is dropped to a and $a b$ connected. This last line is to be equal in length to the bottom tangent, as shown from b'' to a'' in Fig. 1. Therefore, in Fig. 3, it represents the bottom tangent, and relatively to the upper tangent shown in this figure from b to m it determines the angle between the tangents required on the face mold to square the joints at each end.

The curve of the mold is described by finding three points on both inside and outside. At each end the points are already known; at the end a they are indicated at x and x ; and at the end m the width is equal to the width of the straight rail, owing to not having to apply a bevel to this end. The two other points anywhere between the two ends are found by dropping a line, as from z to z , and make it equal to the line shown at z, z in the plan of Fig. 1.

Having thus found three points on both the inside and outside of the mold, the curves may be drawn by bending a lath to touch the same and scribing along its edge from one end to the other.

At the end a of the mold the springing bevel is shown applied.

The stock is held parallel with the joint, and the bevel directed towards the inside.

At the end m a section of the rail is shown to be parallel with the joint and face of plank, indicating the non-necessity of a spring bevel at this end.

We will now return to Fig. 1, where two other bevels are shown, one at the end a'' of the bottom tangent where it intersects the newel, and the other at h , the point where the wreath and the straight rail are jointed together.

None of these bevels are known as spring bevels.

They are to be applied to the sides of the wreath after it is squared, ready for molding—the one at a'' so that the joint will fit against the side of the newel, and the one at h'' to square the end of the wreath to butt with the square end of the straight rail.

At this end also is shown an easement worked in the wreath to align with the straight rail.

How to Cut Rafters

GIVING BOTH THE RIGHT AND WRONG METHOD OF DOING THE WORK — SHOWING WHERE MOST ERRORS OCCUR

By I. P. Hicks

THERE are some carpenters who are not experts at roof framing, and we have seen mechanics who were good at the ordinary run of work, and yet could not lay out a rafter properly. Many will cut the rafters a little short, which we will explain, and show just where most of the carpenters make their mistake.

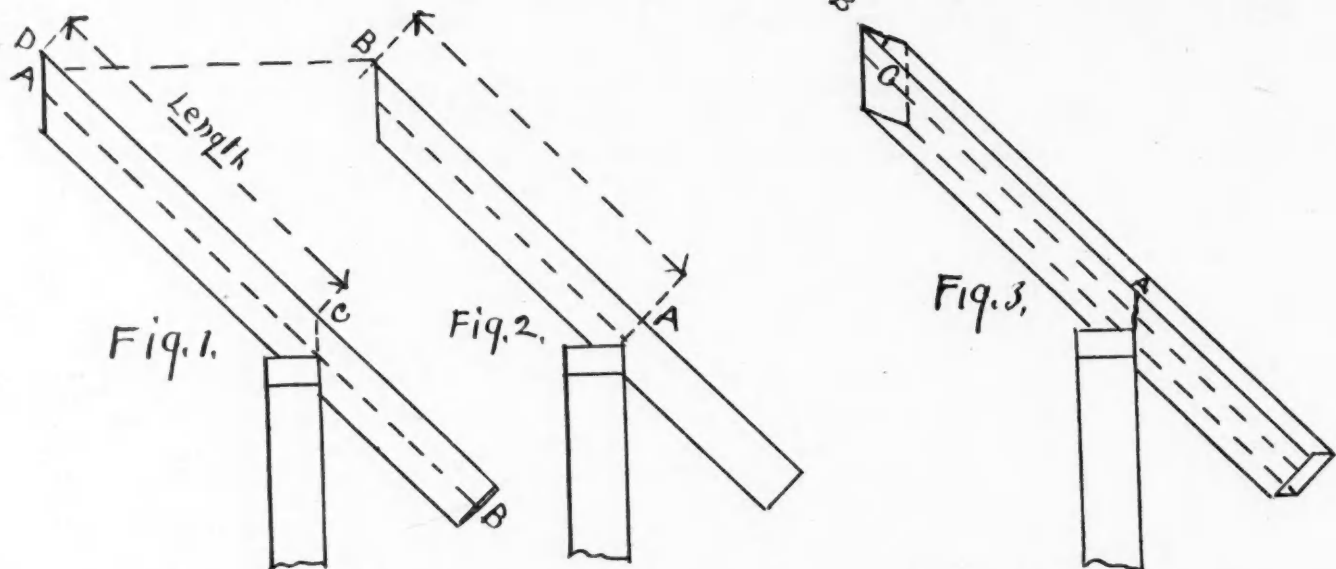
Referring to Fig. 1, the dotted line, $A B$, represents what we call the working line in laying out a rafter of this kind, where the end of rafter projects over the plate to support the cornice. Of course, most me-

chanics will want to measure, or lay off, the length of a rafter on the back, which is all right if you start from the right point to lay off the length. To lay off the length right, draw a plumb line from corner of wall plate to top of rafter, as at C ; then from this point lay off the length of rafter, as $C D$, and make the plumb cut at D .

Fig. 2 shows where many a carpenter makes an error, instead of plumbing up from the wall plate line, they square out to back of rafter, as shown by A , and lay off the length as $A B$ in Fig. 2. Now, a

horizontal line drawn from the top of this rafter to Fig. 1 shows that the rafter, as laid out in Fig. 2, is too short.

On roofs of ordinary pitch, this mistake will make the rafters from one to one and a half inches short,



and will cause the joints to be open at the bottom, something that is often seen in framing rafters.

Fig. 3 represents a jack rafter which cuts on a bevel across the back. This kind of a rafter is more or less difficult for the average workman to tell just where to measure to in laying off the length. The easiest way is on the top of rafter to the long corner, measuring from a plumb line drawn from the wall plate line, as A; then A to B will be the length. This will make the rafter just a little short, because the working line is in the center of the thickness of the rafter, as shown by dotted line at C, but as jack rafters cut against hips or valleys, the thickness of the hip or valley will make up for the amount of shortness and even the matter up, so that if jacks are cut by this method they will be found to fill the bill exactly.



Planning the Home

"In selecting an architect several things are to be considered," writes Charles Edward Hooper in the *May Woman's Home Companion*. "The ordinary individual will perhaps have formed some ideas of what he wishes before consulting an architect. You may see some completed structure which you will consider desirable. In this case it is most natural that you should take your troubles to the author of this example. Keep the estimated cost of the structure down to below the limit of your purse; the final cost is very apt to exceed the contract in certain extras which you may have overlooked.

"The architect's fee is usually three and one-half per cent of the contract price for the drawings and one and one-half per cent for supervision, plus traveling

expenses from his office to the work in question. From this it may readily be seen that there is not a fortune in it for the professional man. Understanding this, it is best that you have a fairly good grasp on what you desire, and avoid as much as possible the extra

work occasioned by drawing and redrawing the plan.

"The first drawings made by the architect are termed sketches, and are usually drawn to a scale of one-eighth inch to the foot, just half the ordinary working scale. These are merely to show the scheme of design, and are more easily changed than the more precise drawings. If the architect fails to suit you with these preliminary sketches, and you wish to sever the business connection at this point, he is entitled to a fee of one per cent of the calculated cost of the house. If, however, the sketches are accepted and working drawings completed, he receives the three and one-half per cent already referred to.

"The drawings furnished by the architect are usually one-quarter-scale plans and elevation and framing plans; also full-size detail of cornices, window trim, etc.; in fact, whatever requires further explanation than is given by the scale drawings.

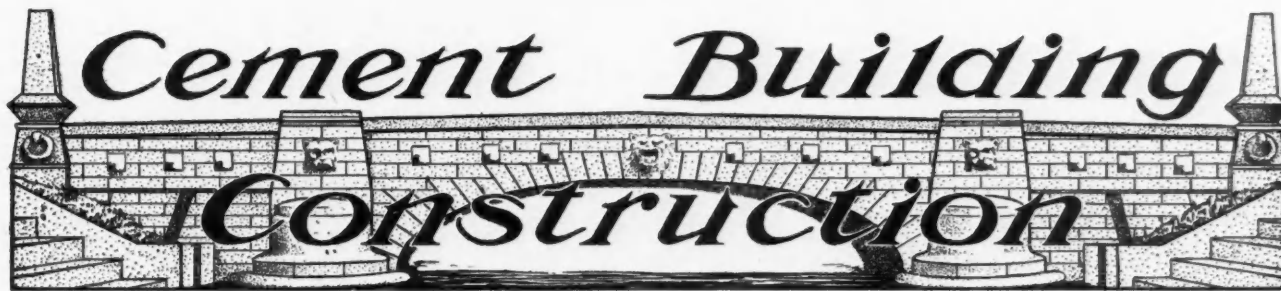
"It is not customary to make a contract with the architect, as he is consulted in the same manner as the doctor or lawyer.

"The relations between the architect, builder and owner, are these:

"The contractor is engaged by the owner to perform a certain piece of work, the architect acting as the agent of the latter, thus the owner should, to be official, address the contractor through the medium of the architect. The condition of the work is vouchsafed for by this agent, and all payments should be made direct to the contractor upon certificate of the architect."



Learning is pleasurable, but doing is the height of enjoyment.—*Novalis*.



Concrete Block Ordinance

COMPLETE DISCUSSION OF THE ORDINANCE PERTAINING TO HOLLOW CONCRETE BLOCKS IN MEMPHIS, TENN.—
WHY NOT PRACTICAL

By Fred W. Hagloch

LOCAL discussion and legal steps to annul the hollow concrete block ordinance of Memphis, Tenn., which was framed for the purpose of governing the use of concrete block construction in that city, has led to requests for outside opinions, and as there are a number of builders considering the advisability of forming a code for the enactment of their cities I quote the vital points of the code in question, with such comments as may prove beneficial.

The charges that the Memphis ordinance was formed for the purpose of putting the small hollow block maker out of business I cannot sustain, but that it will accomplish such results, if fully enforced, is plainly evident. That the code, with few exceptions, was the product of an adherent of concrete is plainly shown, as the general object to elevate the quality of concrete blocks presents itself in numerous paragraphs, but that the author sadly lacked experience is equally as well shown by the code itself, the code being my sole informant, as I refused additional evidence offered me.

That the ordinance, if executed to its full extent, practically excludes the use of hollow concrete blocks from use in Memphis construction, can readily be seen by the following paragraph:

"The composition of cement and sand blocks shall be as follows: One part Portland cement and not more than four parts clean, coarse, sharp sand."

The ordinance provides for an absorption test by immersing the face of the block 48 hours in half inch water, the block being weighed before and after the absorption, which is governed by the following clauses:

"The percentage of absorption must not average higher than fifteen per cent, and in no case exceed twenty per cent."

The facts are, this ordinance specifies a composition of the most porous nature possible, barring the use of fine sharp sand, which would reduce the voids and increase the strength, and following with a test that would tend to have the concrete dense (less porous) and strong.

Some years ago I specified a composition for a filter wall, to be placed in a cistern so that the water entered

on one side of the wall and was compelled to pass through the concrete before reaching the reservoir from which it was used, and the composition was almost identical with that specified for building blocks above. The facts are, one part fine sand and two per cent clay dust could be added to the above composition without any additional cement and the strength of same would be increased and the percentage of absorption reduced, but the word "clean" bars the clay dust, and coarse sharp sand having a greater percentage of voids than any other material of same nature, except crushed slag, the concrete made of above composition must be very porous, and can not pass the test this same code specifies.

Therefore, should the building commissioner compel the hollow block makers to comply with every detail of the ordinance in a fair and impartial manner, I can safely say that no concrete blocks are being used in the construction of buildings in his city.

This is simply an example of theory without practical experience, for judging the author by the code he produced, I see him as a well educated and very painstaking student, with a fancy for high quality cement products, hoping that his code would be a step to a higher elevation for the concrete block industry of his city, but that he never had the practical experience of making concrete blocks or concrete construction of any kind was the means of his producing a code that if fully enforced can be summed up in the following brief sentence: The use of hollow concrete blocks in building construction is prohibited within the bounds of this ordinance. Which is far indeed from the original intent of its author.

Section eight does not harmonize with the ordinance and I cannot help but consider it one of those short but positive clauses slipped into an act by a competitive influence, as follows:

"The use of hollow concrete blocks in party walls is entirely prohibited." The fact that this same ordinance provides for a fire test of 1,700 degrees, which is higher than average common brick will endure, and that it is a proven fact that eight-inch hollow concrete block walls have withstood fires that nine-inch common

brick walls laid in lime mortar failed to withstand, besides the principal and nearly always the only object of a party wall is to prevent the spreading of fire, makes this section ridiculous. Had the fire test been omitted, it might have been conceded that the author did not consider concrete as fireproof, but the severity of a 1,700 degree test makes such views impossible, and plainly marks this clause as out of place and inconsistent with the other requirements. That the brick and terra cotta interests were not asleep when this ordinance was enacted, this clause gives almost unmistakable evidence.

The freezing test, consisting of placing the concrete in 15 and 150 degrees Fahrenheit, alternately, ten successive times, is severe for even a northern climate, but as it is only a test of the cement (sand and aggregates not being affected) which the code specifies by using the "Standard specifications for cement by the American Society for testing materials," I consider this only as an additional safeguard against the use of inferior or damaged cements.

The compression test of 1,000 pounds per square inch of wall area, with no deduction for hollow spaces, and a limit of eight tons per superficial foot, and that only when blocks are made solid, is very unusual, and the following example, considering that the hollow block tested contains 33 per cent air (hollow) space, the code limit, is perhaps using a very rare occurrence, but nevertheless possible.

A solid block having a half more concrete than a hollow block, must carry a half more load, as the concrete is tested to 1,000 pounds per square inch, or 144,000 pounds per square foot of wall area; hence, a solid block must have a half greater capacity as it contains a half more solid area, or 216,000 pounds, which is 108 tons; yet this block or wall is limited to eight tons having a hundred tons more capacity per square foot of wall, or thirteen times greater than the load limit, the usual requirements being four times the load limit in compression strains. If such severe requirements govern all other building materials used in the city, then Memphis can endure a San Francisco earth-

quake with little or no damage resulting therefrom; but such is not possible, even in its concrete requirements, as will be seen in its clause governing reinforced caps and lintels, as follows. "The reinforcing metal or steel rib in any form shall not be less than one pound per square foot of the depth and lineal foot of span." Under this clause a lintel one foot deep and twenty feet span would be accepted with but twenty pounds of metal, which is about two-ninths of one per cent of the volume of concrete in said lintel. The safe requirements would be not less than eight pounds per foot in spans less than ten feet and much more in longer spans, besides the length of span and depth of lintel should conform with a uniform rule not greater in length of span than fourteen times the depth of lintel or cap.

The allowance of eight inch hollow concrete block walls to be substituted for nine inch brick walls, and heavier walls in proportion, is consistent and more favorable than the average code of other cities, but the limit of air spaces to 20 to 33 per cent is severe, but considering the test of 1,000 pounds per square inch with no deduction for such spaces makes the limit necessary. The fact that the tests are of an expensive nature and required no less than three times per year of the block maker who wishes to conduct his business continuously, and allowing the building commissioner to designate one particular testing laboratory, with no fixed price for such tests, offers the opportunity of placing building work into the political channel, and would enable some future building commissioner to receive a compensation from the testing laboratory for all tests made for builders for the city, and if he wished, could regulate the expense of tests until they would be greater than the profits. I doubt if this code is legal until the city conduct the required laboratory for making the tests at a fixed price open to all.

In the next issue we will give a brief complete building code, covering all materials, and suitable for cities of less than 100,000 inhabitants, in fact, it contains all the essentials required in any code, briefly and plainly stated in few words.

Artistic Church Design

SHOWING THE PERSPECTIVE AND FLOOR PLAN OF A CHURCH FOR A SMALL COMMUNITY — GOOD ARRANGEMENT OF THE INTERIOR

WE ARE herewith showing the perspective and floor plan of a church designed by G. W. Ashby. It has a concrete foundation, paving brick exterior and trimmed with cut stone. The roof is of slate. There is a basement under the entire church which is divided into boiler and fuel room, toilet rooms, kitchen, pantry and dining room. Here church suppers can be given, thus avoiding the trouble and annoyance of having them in the different private homes.

The main floor is divided into the auditorium, which will seat 200; the Sunday school room, which will

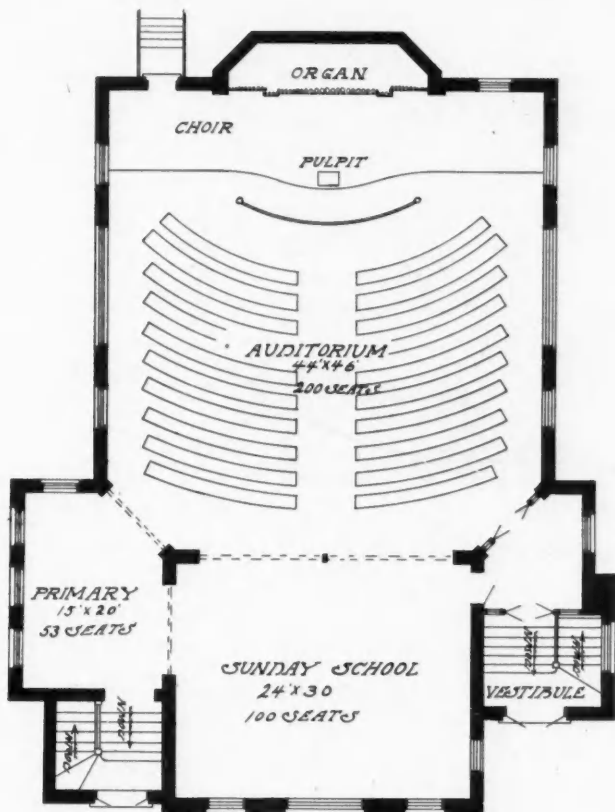
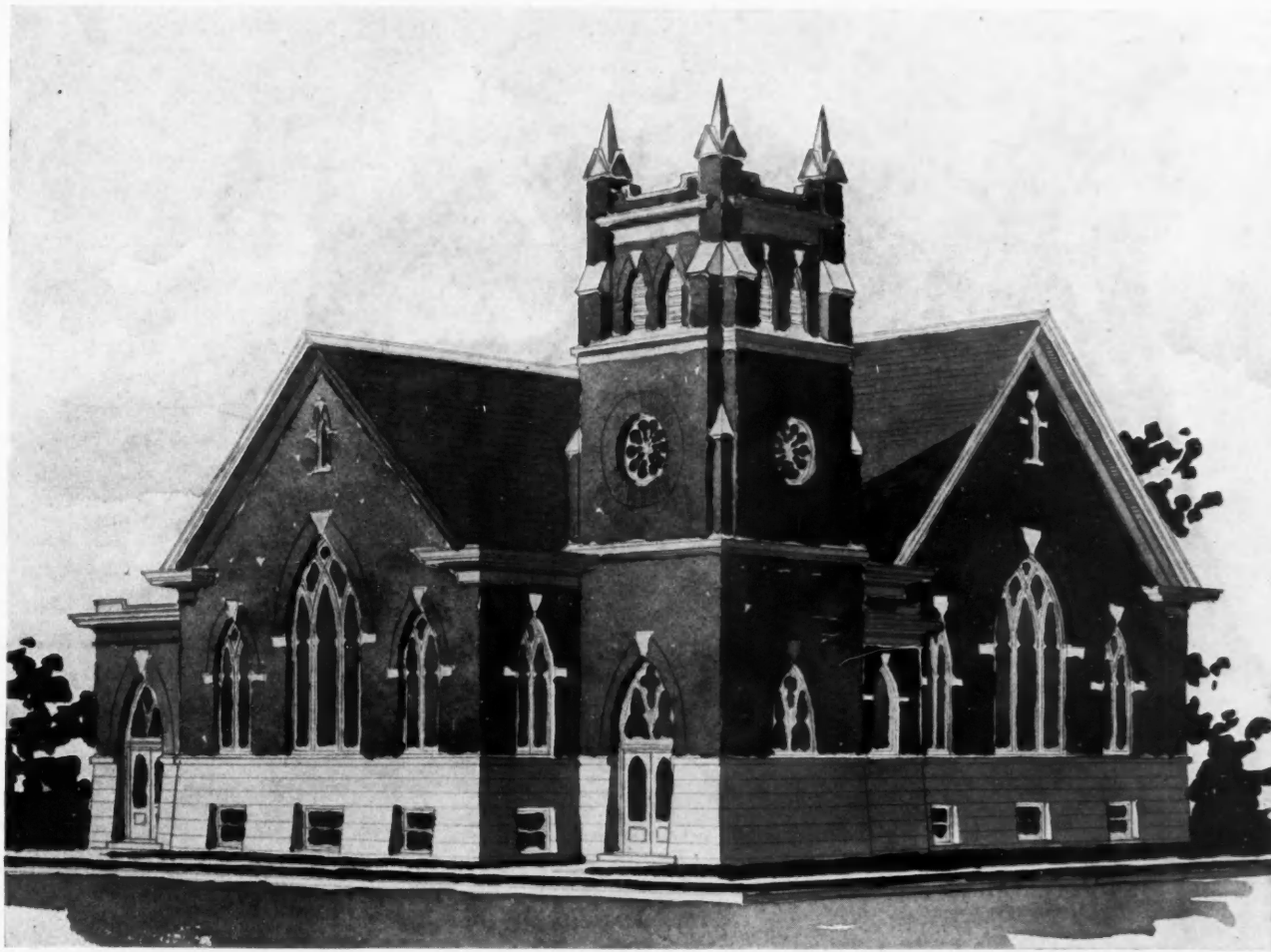
seat 100, and the primary room, which will seat 53. The arrangement of the pulpit, choir and organ is as good as could be had.

The seats are arranged in a semi-circle, thus making it easier for the preacher and congregation, as they will be more closely grouped around him.



Surface Finish for Concrete Work

Exposed concrete surfaces frequently present a patchy appearance. This may be the result of lack of care in placing the concrete next the mold, or it may



FLOOR PLAN.

be due to variations in the purity of the sand or in the amount of water used in mixing. On mortar-faced work this lack of uniformity is less noticeable. The uses of slag sand may be advantageous, and a small amount of lamp black in the facing mortar also tends to uniformity in appearance.

The addition of coloring matter to cement and concrete is not at present widely practiced, and consequently experience has not been sufficient to indicate just what colors may be used without detriment to the work. Lamp black has been most commonly employed, giving different shades of grey, according to the amount used. In any large work where the use of coloring matter is desirable and there is not time to institute thorough tests, the advice of cement chemists should be sought. The dry mineral colors mixed in proportion of two to two per cent of the cement, give shade approaching the color used. Bright colors are difficult to obtain and would not be in keeping with a masonry structure except in architecture.

In some cases it may be sufficient to color the surface of the work by painting. Ordinary oil paints are sometimes applied after washing the surface of the wall with very dilute sulphuric acid, one part acid to 100 parts water, but the permanence of such a finish seems very questionable.

Simplicity in Interior Finishing

MORE ECONOMICAL AND MORE TASTEFUL—FINISH OF DIFFERENT ROOMS DESCRIBED, TOGETHER WITH THE COLOR SCHEME USED

By Ira S. Griffith

TO PLAN a home is one thing, to execute that plan is another thing. With unlimited means at one's disposal to meet the problem at hand, ordinarily, the greatest limitation in the execution of the plan will disappear.

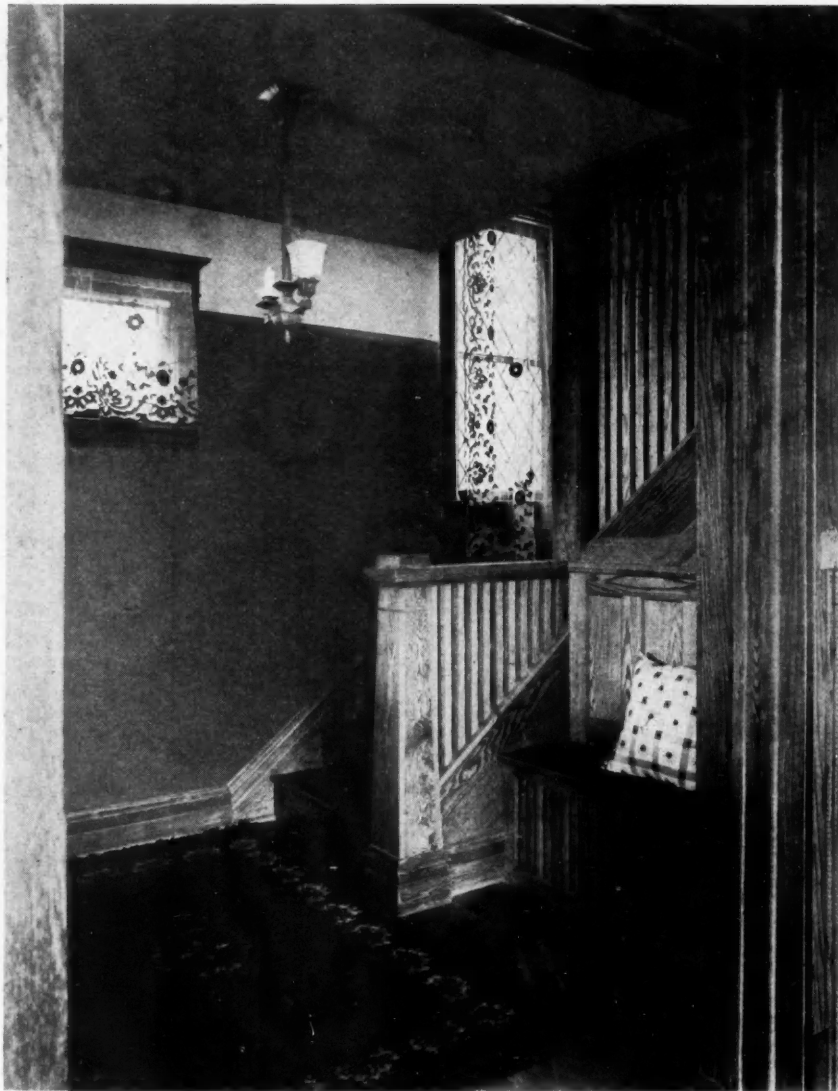
Mr. Wilder, in an excellent cartoon in the January, 1906, number of the AMERICAN CARPENTER AND BUILDER, illustrates the situation. Those who saw it will not forget it. The first picture shows a house drawn according to the owner's taste—a pretentious residence with a tower. The second and third pictures show the process of elimination by which the final plan, one which fits the owner's pocketbook, is drawn.

Probably, one would be safe in saying that most people build just a little more pretentious a home than the purse warrants at that particular time. This is no great fault, providing the margin is not too great to be overcome without great sacrifice. In justice to the builder, arrangements should be made to meet all bills promptly. If the plan will not permit this, then the process of elimination should be carried farther.

Fig. 1 shows an entrance hall to a home whose owner had plans, the carrying out of which, necessitated changes. In making these changes he learned that not only is there economy in simplicity, but that, after all, simplicity is more to be desired, the effects

produced being more pleasing to himself and to his friends. In place of a stair with spiral balusters and Ionic columns, was executed this stair of simple but effective design; the plain square posts being easily made, as were the square balusters. The "repeat" of the harp-like effect in the lower railing is not only pleasing to look upon but it serves a second purpose in that it allows the light from the leaded window at the landing unobstructed entrance to the hall.

The hall seat at the side of the stair furnishes a convenient place upon which to sit when putting on rubbers, and does away with the ungainly efforts to maintain an equilibrium while balancing on one foot. The panel below the seat is made of seven-eighths inch square pieces set seven-eighths inch between. This panel serves as the plate for the inside cold-air return to the furnace. The



View of Entrance Hall

coat closet which adjoins the hall furnishes a place in which to keep rubbers, otherwise the seat might have been hinged for that purpose and the cold-air return placed in the floor.

Fig. 2 shows the living room of the same home. Here the economy of simplicity is again shown. Instead of the two rooms, as we used to build, parlor and sitting room, is the one large room. True, there are some seeming disadvantages in this arrangement, as indicated by the question of a mother of a mar-

riageable daughter, "Where will Beatrice entertain her company if we do not plan a parlor?" May we not call it a "seeming" disadvantage, for was not the younger brother always on hand, even in the days of the parlor.

The ceiling of so large a room would be difficult to treat decoratively, so the space has been broken into panels by oaken beams. The beams being used for decorative purposes only, are hollow, and one side of the beam is carried around the wall at the ceiling

every line of the simple design represented honest construction, while in the other the supposed hand carved caps were of composition and that the decorative features were likely to peel. The mantel of simple design and straight lines was purchased with a feeling that, after all, there is economy in simplicity.

In passing, it might be well to call attention to the carpenter made furniture, the table, Morris chair, seat, stool and book-rack, as these afford another excellent proof of the economy of simplicity.



Sewing Room

line, completing the panel and adding a place for picture hooks.

The mantel is of simple design finished in dark brown Flemish and is waxed. This color is relieved by touches of red and blue, which appear in the armorial shields.

In the purchase of the mantel the owner received what he believed was the first set-back to his preconceived idea that in simplicity is economy, for he found that the hand-wrought mantel of simple design and finish was just as expensive as the highly polished mantel with fluted columns, Ionic caps and beveled mirror. Upon investigation, however, he found that

The gas and electric fixtures are in keeping with the carpenter made furniture. Square tubing is used, and all the joints are mitered. The electric lamps are enclosed in square cornered, frosted bulbs, which soften and diffuse the light.

The observation windows form a bay and give light and ventilation from the south, the west and the southwest.

Fig. 3 shows the dining room as it appears upon entering it from the living room. The triple window is on the south and the double window on the east, so that the day is begun in the freshness of the morning sunshine.



Dining Room

The built-in china closet, the sideboard or buffet, with its beveled mirror and its added space for china above, the movable serving table, are features. There is no lack of space for linen, china or silver in this cottage.

A plate rail extends around the entire room. Below this rail the walls are paneled with oak strips, the intervening space being filled with art burlap.

The finish in this, as in the other rooms described, is of plain red oak. Both floors and standing finish are filled with a dark brown filler, given a thin coat of shellac, then waxed and rubbed to a dull gloss. Finishing the woodwork in the different rooms with the same color simplifies the problem of furnishings and decoration somewhat.

The walls of all the rooms are covered with oil fresco. A coat of hard oil and turpentine, mixed half-and-half, is first applied to kill the suction of the plaster, after which two coats of the desired color of lead thinned with turpentine are added. A flat finish with just a suggestion of gloss is the result, and the walls were then ready for stenciling.

The dining room is done in blue, a delft blue for the panels, and lighter color and tints above. The

window hangings in the dining room are of Japanese design, the colors forming a dominant harmony. The living room is finished in greens and the hall in reds. All colors are greyed to a softness by a liberal addition of lamp-black to the first colors.

All casement windows swing outward. This insures their turning the water. The screen problem is solved by placing them inside. The windows are regulated by a lever under the sill, so that the screen need not be opened.

Again the economy of simplicity is shown in the leaded glass used. Owing to the simplicity of the designs and the fact that plain double strength glass was used, the effects obtained cost but little more than the plain window would have cost. The lines are restful to the eye.

Windows of such design never grow old and the effect is more pleasant the oftener one looks at them. Nothing is more painful than a window with lines which carry the interest around and around, never ending anywhere, or one with colors which startle at first glance and are forever forcing themselves upon one's attention.

Fig. 4 shows a bed room, the interest in which lies

in the sun-bay. These windows open to the southwest—the direction from which the prevailing summer winds come. The room is flooded with light and sunshine. The grouping of the windows leaves the wall space free and allows the bed to be placed out of the draughts. Simple hand-made hangings are used at the windows and the hard wood floor is covered with rugs.

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Sound-Proof Building Plates

These bricks or plates are made from a mixture of gypsum, with sawdust, coke-dust, or ashes. The following, according to the *Bautechnische Zeitschrift*, is another effective but more expensive method. An acid or acid salt from a second salt is mixed with the gypsum mass by stirring; the action of the acid forces out the carbonic or hydrochloric acid from this second salt, and these gases in escaping produce pores in the plates. With careful work, the pores in the mass may be distributed so evenly and in such great number that the plates made from it are very light, conduct sound badly, and can be easily nailed. The same result, according to the *Allgemeine Chemikerzeitung*, may be obtained in a much simpler manner by adding small quantities of carbonates to the gypsum mass.

These carbonates and the gypsum suffer mutual decomposition, resulting in the liberation of carbonic acid. The gas escapes slowly and steadily, while the gypsum sets and hardens, acquiring an entirely porous texture without losing any of its durability. Thus at the expense of very little material the plates, while retaining their strength, become lighter. The bicarbonates of the alkalies—sodium carbonate or ammonium bicarbonate—are the best salts to use for the purpose. The effect may be increased by adding sawdust, cokedust or ashes. For example, 20 parts by weight of sawdust may be mixed with 40 parts by weight of gypsum, and 40 parts by weight of water, in which 1 part by weight of sodium bicarbonate or ammonium carbonate has been dissolved, added to the mixture. The pulp is poured into molds, and can then be left to harden without further attention.

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Fills Long Felt Want

The AMERICAN CARPENTER AND BUILDER is a periodical I consider that has filled a long felt want among the building tradesmen. I myself would feel as though I had lost something and knew not what.

GEO. W. HAYDON, Pierre, S. D.



View of Bed Room

FARM BUILDINGS

HENRY H. NIEMANN

Farm House and Concrete Barn

PERSPECTIVE AND FLOOR PLANS OF A FARM HOUSE HAVING NUMEROUS DESIRABLE FEATURES—CONCRETE BLOCK BARN FOR A RESIDENCE DISTRICT

THIS farm house was designed for a small dairy farm and contains the creamery and ice house, as well as the living apartments of the household, and for a small dairy it is very convenient.

The rear of the house has a double porch, one to the kitchen and the other to a hall which leads to the

dining room, which is 13 by 15 feet in size, and has pleasant windows and fireplace. The living room, being opposite the hall from the dining room, is of the same size, and being well protected by the porch and ice house makes it a cool room in summer and a warm room in winter.



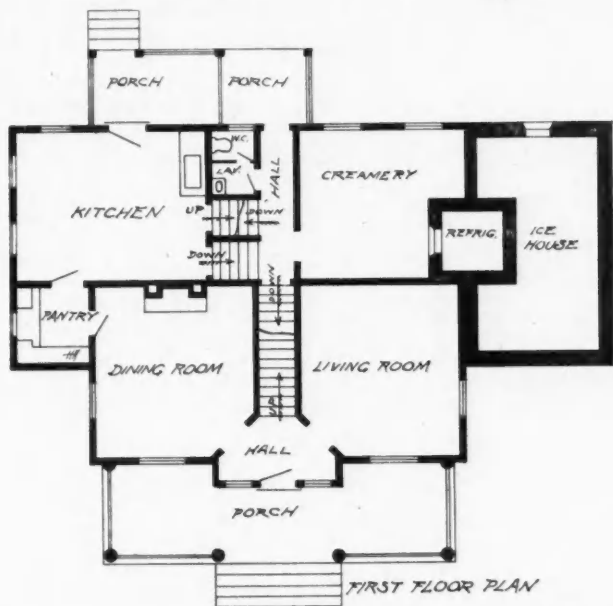
creamery, to the wash room and toilet room and two stairways to the basement, one going to the laundry and the other to the furnace room and vegetable cellar. This hall and the creamery being only one step above the outside grade level makes it very convenient for handling milk cans as well as laundry from the basement.

The kitchen is 12 by 16 feet, which gives plenty of wall room for the range, kitchen tables, cabinets, cupboards, sink and the numerous appliances required in the farm kitchen. The large pantry connects with the

The second floor contains four bed rooms, all having large closets; the bath room, which is directly over the toilet room of first floor; a large light hallway and stairway, leading to the third story, which contains three bed rooms, closets and hallway. The building is of frame construction, with stone basement and shingle roof.

The ice storage room runs up from the ground level to the ceiling of the second story, and is constructed of matched flooring with air spaces, building paper and hair felt.

We herewith illustrate a small barn for the accommodation of three horses and two vehicles for suburban or city use, which is very compact in arrangement, and also very convenient. It is designed with



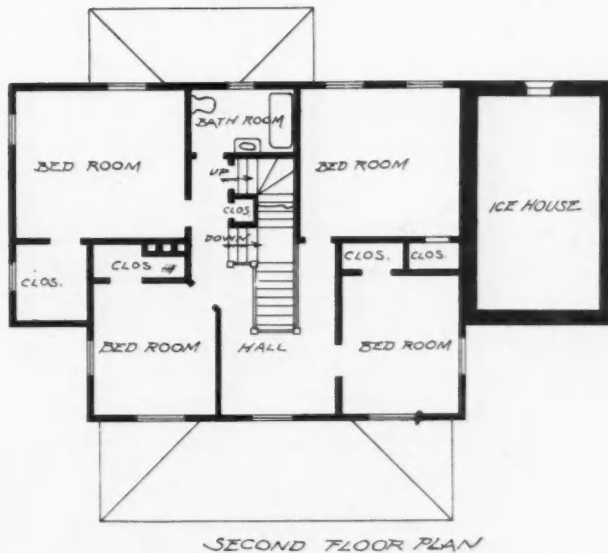
the view of placing the building next to the alley, with a driveway from the alley to the front of lot, bordering on the right hand side of the barn. This end of the barn contains large sliding doors to the vehicle room, as illustrated in the end elevation. The opposite end of the barn, containing the stalls, has a door to the alley, to the walk leading to the house, and one from the box stall into the barn yard. This gives convenient access to the barn from all sides, and the door from the box stall direct to the barn yard is also very valuable in case of fire, as the animal can be led out of the stall direct into the open, without first going through other parts of the burning building.

The elevations show this building constructed out of cement blocks, as these are becoming quite popular for barns built within city limits where the risk of fire is greater. If built in a location requiring a building with some architectural suggestion on the exterior as well as in its construction, the ugly appearance of the

cement block can be overcome by casting the blocks in the rough, and after laid, plaster the entire exterior surface with a cement plaster with either a "rough cast" or smooth finish. Such a building, with a stained shingle roof and well painted wood work, would not be objectionable in the best residence district. On the other hand, if it is desired for service only, this building can be built at a very reasonable price, and the side walls being 16 feet in height a 2-inch by 4-inch by 16-foot studding could be used in place of cement block if so desired.

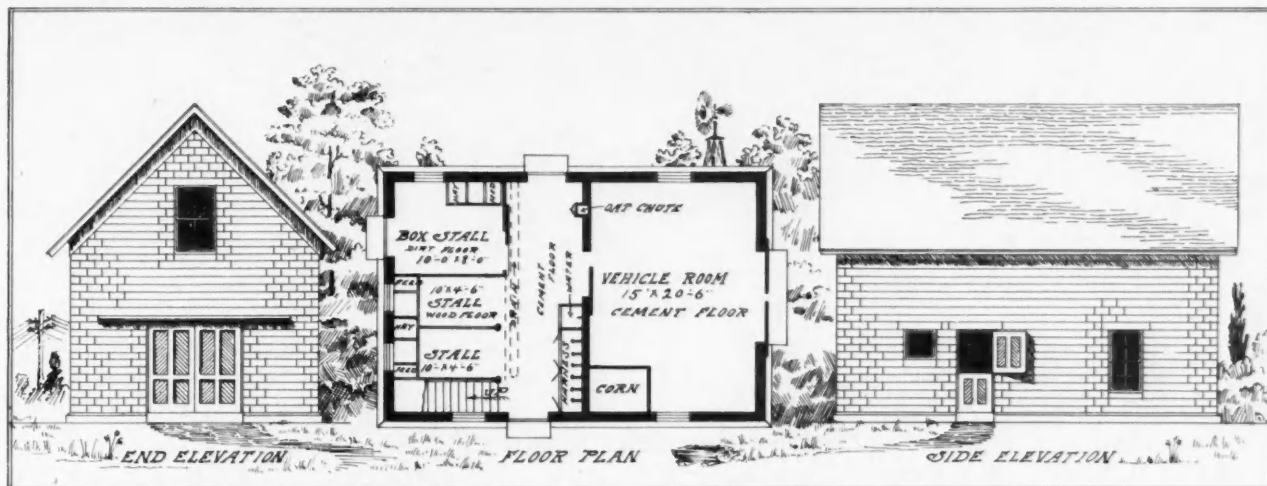
Handed Him a Hot Shot

Said the speaker at a lawyer's dinner: "We lawyers couldn't do better than to resolve in the new year to be gentler in our cross-examinations. Rudeness in cross-examination never pays. This is a truth that I once saw proved in a damage suit. In this suit a cross-examining lawyer shouted at a witness in over-



alls: 'You there, in the overalls, how much are you paid for telling untruths?'

"'Less than you are,' the witness retorted, 'or you'd be in overalls, too.'"



Manual Training



Ira S. Griffith

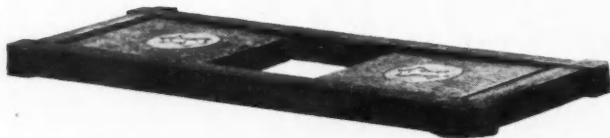
Something The Boys Can Make

COMPLETE DESCRIPTION AND PLAN OF CONSTRUCTING A BOOK-RACK—SIZE OF STOCK TO USE AND MANNER OF FINISHING THE SAME

THERE are always a few books which one wishes to have near at hand. The book-rack offers an excellent place in which to keep them.

There are many ways in which to make the book-rack. Some are made with hinged ends, some with keyed-tenons, some are dovetailed, some are grooved, etc. The fact that most any problem in joint-making can be worked out in the book-rack probably appeals to the teacher of manual training. The book-rack shown in the photograph is made with the cross-lap joint. Its advantage over others is in its lightness and cheapness, as well as its compactness when folded.

For the rough stock, cut out two pieces one inch by one inch by sixteen inches; two pieces of the same



width and thickness with a length of six and one-half inches. These pieces are for the framework of the base. For the ends cut two pieces of three-quarter inch stock to a width of four and one-quarter inches and a length of five and one-half inches. It will be found convenient to plane the two end pieces to width and thickness before cutting, providing the stock will cut to advantage in so doing. About six inches of one-quarter inch dowel will be needed.

Where there are several pieces of the same width and thickness, time is saved by planing a working-face and joint-edge on each piece before any gauging is done. All of the pieces may then be gauged at the same time.

It will be necessary to use the winding-sticks on the working-faces as well as the straight-edge, unless the eye is so practiced it can detect the inaccuracies by sighting. On such a narrow surface a keen eye will be required.

Having gauged, plane to the gauge lines carefully.

Do not square the ends, for pointing them makes this operation unnecessary.

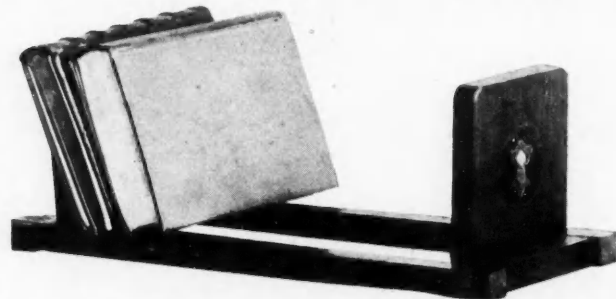
Place the two long pieces side by side and square light pencil lines across at points fifteen and one-quarter inches apart. Carry these lines entirely around the pieces, making sure to keep the beam of the try-square against the working-face or joint-edge.

Set the bevel-square so that its blade will make an angle of sixty degrees with the edge of the piece and mark the slopes on opposite sides, at the ends; saw and plane to these lines. This gives the ends of the pieces the shape of a gabled roof. Next, plane off the "gables," testing with the bevel-square as the planing proceeds.

Lay off and cut the two shorter pieces similarly with a distance of six and one-eighth inches between the lines.

The next step is the laying out and cutting of the gains which form the lap joints. Carefulness in this will insure success if the directions are followed. There is a reason for every direction, and every direction is based on the experience of many men for many years.

Place the two long pieces side by side, so that one set of face marks shall be in and the other set down, with the ends of the pieces even one with the other.



Measure from the slope at each end a distance of one and one-sixteenth inches and square knife lines across. Do not use a pencil, for pencil lines are not accurate enough.

Place the shorter pieces so that their face marks shall be in and up. Even the ends and measure and mark knife lines at points one and one-sixteenth inches from the slope.

Now lay the pieces in the positions they are to occupy relative to one another with the faces either in or up, and number with similar numbers the two ends which make a joint, Fig. 2.

The next step is to get a second knife line across at each end of each piece to show the length of opening.

It will be observed that the lines farthest from the ends were located first. This was done to insure hav-

ing the inside of the frame a perfect rectangle, allowing whatever variation the slight differences of thickness might cause to come between the pieces and the ends of the pieces they crossed.

If the different pieces have been squared up as accurately as a good mechanic would square them, the

If the parts have been properly numbered, Fig. 2, each piece may be fitted so that it shall have but one position, and good joints may be secured though the pieces may vary slightly in size.

Now, carry these lines down on each side of each piece with knife and square.

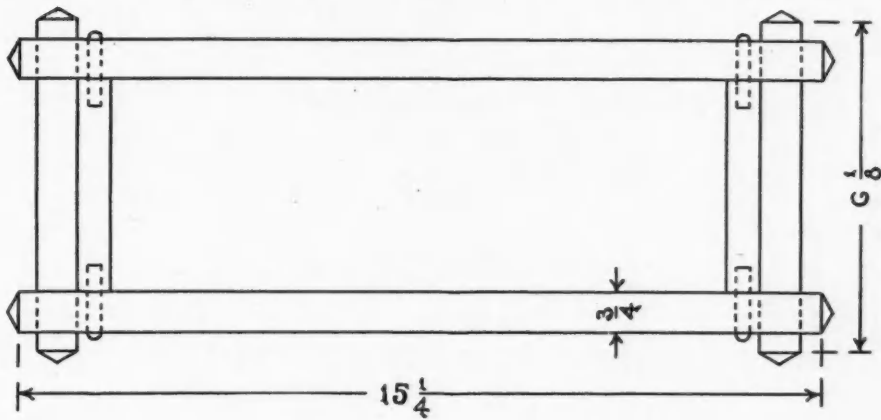
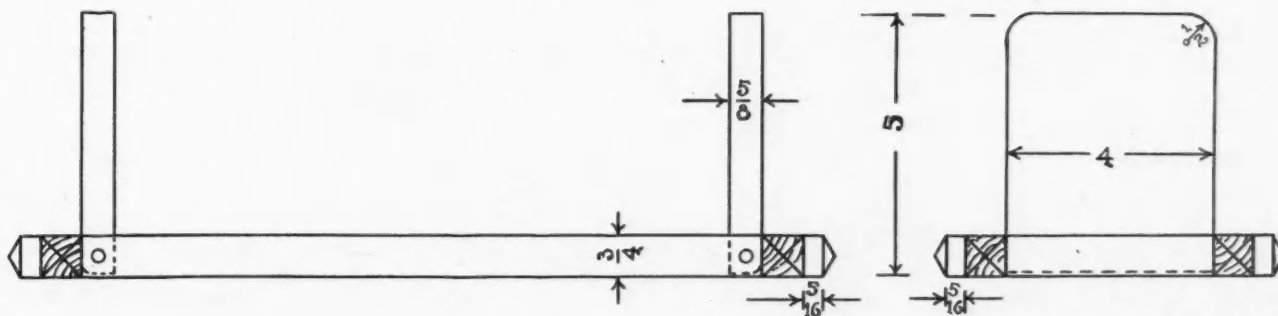


FIG. 1.



proper length of opening may be measured and marked with knife and try-square.

If, however, they have been squared as the average boy will be able to square them, another method of marking will give better results. Indeed, the second method is safer even for the practiced mechanic. Begin at some one corner and place one of the pieces

Set the gauge to three-eighths of an inch, or to one-half of the thickness of the pieces, should they measure more or less than three-quarters of an inch, gauge on each side of each piece between the knife marks just made. The gauge block must, positively, be kept against the faces marked up, Fig. 2; otherwise, unless the gauge should mark the middle of each piece exactly, the surfaces would not be on the same level. Care should be taken to keep the gauge mark wholly between the knife marks, otherwise the marks will appear as ugly scratches when the finish is put on.

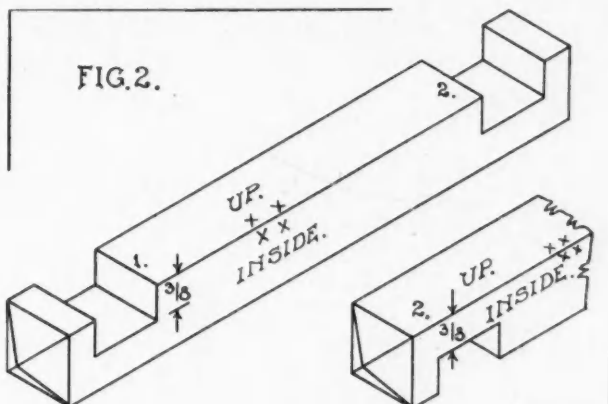


FIG. 2.

Fig. 3 shows the steps to be taken in cutting the gains. With the back-saw cut a kerf so close to the knife-line that no wood shall remain between line and kerf. Of course the kerf must be kept upon the part which is to be chiseled. No. 1, Fig. 3, shows the two kerfs. In sawing, begin at the far edge, pressing the thumb of the left hand against the saw blade to assist in guiding it, at the same time grasp the piece with the left hand to steady it. Let the thumb rest upon the piece of wood and do not allow it to move. Begin with short strokes, gradually increasing their length. The first stroke should be a backward one. Gradually lower the handle so that the saw may move in a horizontal position, sliding the thumb across the piece as the kerf lengthens.

upon its corresponding part so that the inside edge of one shall lie along the knife mark on the other and with the knife point mark the size of the opening. Do not mark along the piece, but merely make a point, afterward squaring the line across at this point with knife and try-square.

No. 2, Fig. 3, shows the manner of chiseling. Keep the flat side of the chisel toward the gauge line. Cut out a little at a time. Hold the chisel in a horizontal position and swing the handle to the right or left as required by the grain of the wood. When near to the gauge line, cut but half way across and finish from

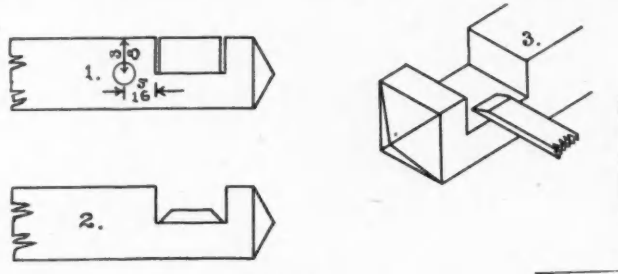


FIG. 3.

the other side. All cutting should be done across the grain; that is, horizontally when the piece lies in the vise as in Fig. 3.

Through each end of each side piece there should be bored a one-quarter inch hole, No. 1, Fig. 3. Its center will be five-sixteenths of an inch from the side of the gain and three-eighths of an inch from the upper surface. Locating and boring these holes must be done with the greatest of accuracy to insure the proper folding of the uprights.

These pieces may be cleaned now and put together. The sandpapering must be very lightly done, else the pieces will cease to fit snugly. A touch of glue in

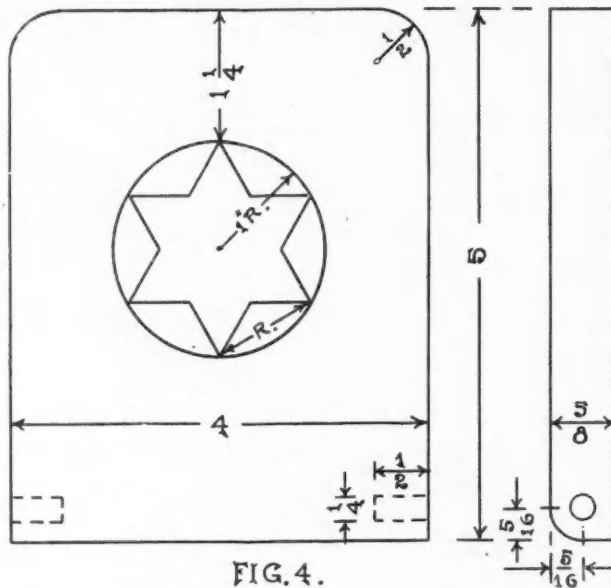


FIG. 4.

each joint will be sufficient. The parts may then be fastened with a hand clamp at each corner. If hand clamps are not available, small brads driven from the under side will hold the parts together.

Square the two end pieces so that each shall measure five-eighths by four by five inches, the five inches being measured along the grain.

With a one-half inch radius mark curves on the top corners, Fig. 4. On short curves like these, the wood rasp worked along the grain serves better than the

spoke-shave. The chisel should be used to remove most of the wood.

On the lower end gauge with pencil lines five-sixteenths of an inch each way from an edge; that is, on the face and on the end. The rasp or plane may be used to round this, Fig. 4.

Five-sixteenths of an inch from the face and the same distance from the lower end, center and bore, on each edge, one-quarter inch holes to a depth of one-half an inch.

Sandpaper these end pieces. A design may now be placed thereon. In Fig. 4 is shown a six-point star in a circle. This design is easily made and, when the space between the star and the circle is stippled, makes a neat appearance.

Two and one-quarter inches from the top along the middle gives the center of the circle. A one inch radius should be used. The points of the star are located by beginning at either top or bottom of the circle and "stepping off" the circle with the one inch radius. With a straight-edge, every "other" point is connected to form the sides of the star.

The stippling looks best on hardwood such as oak or walnut. The tool can be made by filing the end of a common cut nail into four prongs. The outline can best be cut with a narrow chisel or with a veining tool. If the chisel is used a very slight vertical cut carried along the line serves the purpose.

Make four dowels of one-quarter inch diameter and somewhat longer than is necessary to fill the holes.

Apply whatever stain is to be used to the parts before assembling. There are various good stains upon the market which, on a small piece such as this, can be applied successfully by the amateur. A very thin coat of shellac applied when the stain has become dry will brighten the colors.

All that remains is to put the ends in place, insert the dowels, round the ends as shown in Fig. 1, and stain them. Experience has shown—and a final caution seems advisable—that only the most accurate marking and boring for the four dowels will give satisfactory results.

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Sudden Demand for Doors

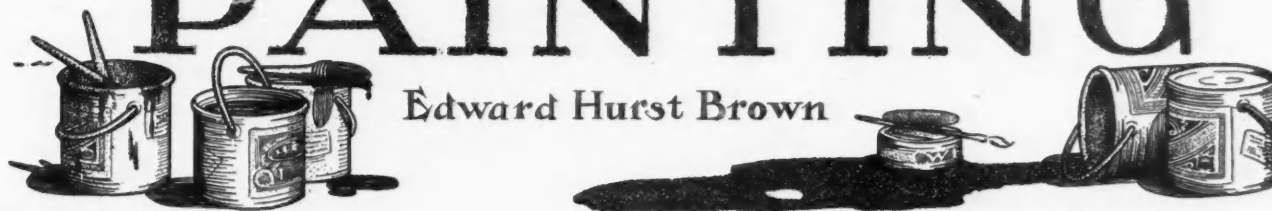
At an annual series of races "for all comers," the sun was blazing down on a field of hot, excited horses and men, all waiting for a tall, raw-boned beast to yield to the importunities of the starter and get into line. The patience of the starter was nearly exhausted. "Bring up that horse!" he shouted. "Bring him up!"

The rider of the refractory beast, a youthful Irishman, yelled back: "I can't! This here infernal plug's a cab horse, and he won't start till he hears the doors shut, an' I ain't got no door!"

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Fear of being found out is responsible for many a man's respectability.

PAINTING



Edward Hurst Brown

Painting the New House

SOME SEASONABLE SUGGESTIONS FOR PAINTING NEW HOUSES — BEST TIME TO PAINT AND METHOD OF DOING IT

AT THIS season of the year a good many new houses are being started, or are under way, and at the risk of repeating some things that may have been said in previous issues of the AMERICAN CARPENTER AND BUILDER, we think it well to give some seasonable advice in regard to painting new houses; materials and methods to be employed and the best time for doing the work.

One of the first questions, naturally, that comes up is the kind of material that is to be used. Right here it is well to state that if there is any necessity for economy, it should not be exercised on the first coat. It is just as bad to use cheap or inferior material for the priming or foundation coat as it would be to attempt to build a substantial house on a foundation wall of poor stone or crumbling brick, laid up in mortar that lacks all adhesive properties. In the first place, the priming, or foundation coat, must be made of an elastic material that will expand and contract with the wood surface to which the paint is applied and that will not have a tendency to crack or scale away from the surface. It must be made from a pigment that has been ground so fine that the particles will enter into the pores of the wood and get a grip there, in the same manner that plaster is held to the laths upon which it is spread, by entering between them and clinching behind them. Mixed paint, being composed largely of zinc white, which has a tendency to dry to a hard and somewhat brittle paint film, should not be used as a priming, because it is not sufficiently elastic, and will perish by cracking away from the surface, leaving the bare wood exposed. Neither is ochre a safe paint to use for priming. It is true that large quantities of cheap ochres are sold under the name of "priming ochres," but they almost invariably fail to give satisfaction. As a rule, these are made from an inferior grade of native ochre, and to still further cheapen them, are largely adulterated with barytes. This latter material possesses little or no pigment value, but is used because of its cheapness, its weight and its non-absorbent properties, which make it possible to mix a large quantity of paint containing a good percentage of barytes, with a very small proportion of oil. With oil at six and a half cents a pound and barytes costing one and a half cents, the economy

to the manufacturer in using a large proportion of barytes in any paint sold by weight is at once apparent. Even were the ochre pure, its value as a primary paint is very small because, like all clays, it is an absorbent of moisture, and after the oil begins to perish by oxidation, the ochre takes up moisture, which softens and destroys the paint film. On houses originally primed with ochre, after a second or third painting, there is often exhibited a marked tendency in the upper coatings to peel off down to the old ochre priming; and the only way this can be corrected is by burning off all the old paint and starting afresh. Mineral brown, which is an oxide of iron paint capable of being ground very fine, would make an excellent priming coat, but for the fact that its color is objectionable for use under light tints, since it takes so many coats to cover it well enough to hide the strong dark reddish brown of this pigment. Its wearing qualities are seen upon freight cars, barns and other structures where this pigment is extensively employed.

The ideal priming paint is pure white lead ground in linseed oil, and thinned with linseed oil, with enough turpentine to cause a greater penetration into the pores of the wood and sufficient japan drier to cause the oil to dry or oxidize within a reasonable length of time — so as to avoid the danger from sudden showers. Where the lumber is soft and spongy a little or no turpentine is needed, but where the lumber is hard or close grained, about four to five gallons of raw linseed oil, one gallon of turpentine, and from one-half pint to one pint of the best quality of japan driers (according to the weather conditions) will be about the proper proportion for mixing one hundred pounds of white lead priming. The lead should be emptied into a large tub and broken up as thoroughly as possible by means of a wooden paddle, with a portion of the linseed oil. The keg from which the lead was taken should be scraped out as much as possible and thoroughly rinsed out with the turpentine before the latter is added to the paint. This avoids any wasted lead. The balance of the oil and the driers are then added, and the whole mass is thoroughly stirred to incorporate the ingredients. It is advisable to add about one-eighth to one-quarter of a pound of pure

lamp black in oil to the partially broken up lead, before putting in the balance of the oil, in order to bring the mass to a lead color. This will cover up discolorations in the wood and make it possible to produce a better job with two or three coats of paint than if pure white were used for priming. If warm colors are to be used, about a quarter of a pound of umber may be used instead of the lamp black.

When to Paint

Many carpenters insist that the painter shall prime the woodwork as soon as it is erected. They seem to think that this is necessary in order to prevent the wood from splitting. As a matter of fact, much better results are obtained by allowing the work to stand for some time before it is primed. No harm whatever can come to the house if a brush is not touched to it until after the plastering has been finished, and it will be a benefit, rather than otherwise, for the moisture from the damp plaster will have a tendency to cause blistering of the paint. But far more important is the fact that very little lumber on the market today is thoroughly seasoned. In the old days of rafted lumber, the sap acids were soaked out of the wood, and painting might be done at once. Now the lumber, if seasoned at all, is merely kiln dried, and these acids are left in the wood, to be liberated by the moisture from the plaster. The acids affect the paint destructively and the paint perishes prematurely. Far better to wait until the rain has had a chance to beat upon the lumber and soak the sap acids out of it. The boards may become discolored, but the paint will hide the darkened wood and will cling to it much longer.

No painting should be done while the surface is damp from rain or dew, but the boards should be perfectly dry. Neglect of this will cause peeling or blistering. Sufficient time should be allowed between coats of paint to permit the under coats to become thoroughly dry and hard before applying the subsequent coats. At least a week should be allowed, if possible.

The Number of Coats

For economy's sake, many persons specify two coats of paint. This is really not sufficient for new work. Three coats of paint, put on fairly stout and well brushed out to form a thin coating, will far outlast the same quantity of paint applied to the surface in two heavy coats, and will afford a greater measure of protection. But as the labor cost will be fifty per cent greater for the three coats than for two, and as labor forms the larger part of the cost of painting, many persons insist upon two coat work. The use of a lead colored priming coat, made from white lead tinted with lamp black, as mentioned above, will enable very fair work to be done with two coats, better by far than if both coats are of the same color.

The question of what shall be used for the final coat will depend very much upon the ability of the painter

to mix colors. The old fashioned painter, who served a four years' apprenticeship, and learned his trade from A to Z, not only was taught how to spread paint and how to adapt his paint to the nature of the surface to be coated and to the weather conditions, but he was taught how to produce different shades and tints by the combination of the various colors that are usually employed in house painting. Although color manufacturers offer a large number of different colors, the house painter, as a rule, employs only a few of them to obtain the results that he desires, in addition to the white base—which is usually white lead, although some house painters add from ten to twenty-five per cent of zinc white on the finishing coat. The tinting colors mostly used are lamp black, burnt and raw umber, burnt and raw sienna, Indian red, Venetian red, ochre, chrome yellow and chrome green. Tuscan red and bronze green are used in the pure color, thinned with linseed oil and japan drier, for painting sash and blinds. From these colors, the experienced painter can produce almost any shade he desires, and will ordinarily prefer to mix his paint himself, because he can do this at a lower cost than he can buy mixed paints of good quality, and he has the additional advantage of being able to modify his paint to suit the occasion.

In many places it is difficult to obtain painters who have served an old fashioned apprenticeship and learned the art of color mixing, and in these localities the use of mixed paints necessarily prevails. A mixture of pure white lead and linseed oil, when kept for any length of time in a can, will grow "fatty" and unfit for use. Hence, all mixed paints are made with a zinc white base. Some of them contain white lead (lead carbonate) or sublimed lead (oxy-sulphate of lead), while other makes contain no white lead at all. Paint manufacturers have given very careful study to the problem of producing a paint which will remain for a long time in good condition in a sealed package; which will cover well and wear well, and which will possess the merit of being ready for use when opened and stirred to thoroughly incorporate the pigment that may have settled at the bottom of the can with the liquid or vehicle. Many of the high class mixed paints on the market will undoubtedly give good satisfaction when used over a priming coat of white lead—but to obtain the best results, they should not be used as a first coat on the bare wood. Their only disadvantage is their tendency to perish by cracking or peeling, making them more difficult and expensive to repaint than a paint which perishes by chalking or powdering. Some of the mixed paints, however, very nearly approach the ideal, and are very satisfactory in every way. But it must be understood that these paints command a good price. Cheap paints are dear at any price, because they are almost invariably overloaded with cheap extenders of doubtful pigment value, while the linseed oil and turpentine, which they should con-

tain, are frequently replaced by water and benzine. But given a good grade of mixed paint and a careful painter, who will use plenty of "elbow grease" and brush the paint out well, there is no reason at all why satisfactory results cannot be obtained.

One thing must not be forgotten. There are certain shades, which, for some little understood reason, are deficient in covering power, and which should not be chosen for two coat work. Among these are the tints of lemon yellow, and ivory white of a certain tone. While a light buff made with ochre will cover perfectly, a tint of lemon chrome yellow of about the

same depth will be very unsatisfactory. These are things which experience must, in a measure, determine.

In applying the paint, the round or oval "six-naught" or "pound" brush is much to be preferred to the flat or wall brush. It is true that the latter has largely displaced the former, because the work can be done with more speed, but the bristles of the "pound" brush are more elastic, force the paint into the wood better and spread it out in a thinner and more even film, hence this form of brush should always be used by the painter who desires to give satisfaction to his customer and earn a reputation.

Suggestions for Wall Decorations

SOME NOVEL IDEAS THAT CAN BE CARRIED OUT INEXPENSIVELY—PROPER COLOR SCHEMES FOR THE VARIOUS ROOMS

By Sidney Phillips

PEOPLE have gotten tired of the commonplace wall papers that used to satisfy them, and those who read the magazines and keep posted on the trend of popular taste are looking for individuality. They want the walls of their houses, which are the background against which their furniture and household goods must stand out, to be artistic, not too

hangings or decorations go a long way towards selling the house, and a well decorated house will have its selling price increased many times the additional cost of the good decorations over cheap wall papers. And it must be borne in mind that good taste, originality, careful color selection and refinement count for more than actual money cost, when appealing to educated people. In the smaller towns, where the modern art spirit has been slower in its development, there are still many people whose idea of elegance is confined to the more ornate gilt and embossed papers, that are termed "parlor papers" by the trade, but this is largely because no builder or decorator has yet had the opportunity to strike out along original lines, or what is more to the point, has not made the opportunity for himself. For in most cases, people only need to be shown these newer decorations to at once recognize their superiority to the old-fashioned, commonplace side wall, ceiling and frieze combinations that have so long held the prominent places in the wall paper sample books.

Novel and artistic results are possible with wall papers alone, and they need not be of the most expensive character. Many good quality flat papers—that is, wall papers printed in flat colors without metal, mica or embossing of any kind, are very artistic in their design, and are capable of original treatments by cutting out the figures and mounting or pasting them against a ground of plain paper. A floral vine paper, for example, may be used for the lower part of a bedroom wall, and about two feet below the ceiling may be cut out to form irregular spray effects, of varying lengths, which are pasted against the plain frieze paper, of the same shade as the background of the floral. Some of these floral sprays may run out upon the ceiling, giving the appearance of a leafy bower. This is but one of the many effects that can be produced by cutting out the pattern of one paper and overlapping it upon another. The cutting requires neatness and care and a small pair of sharp pointed scissors.

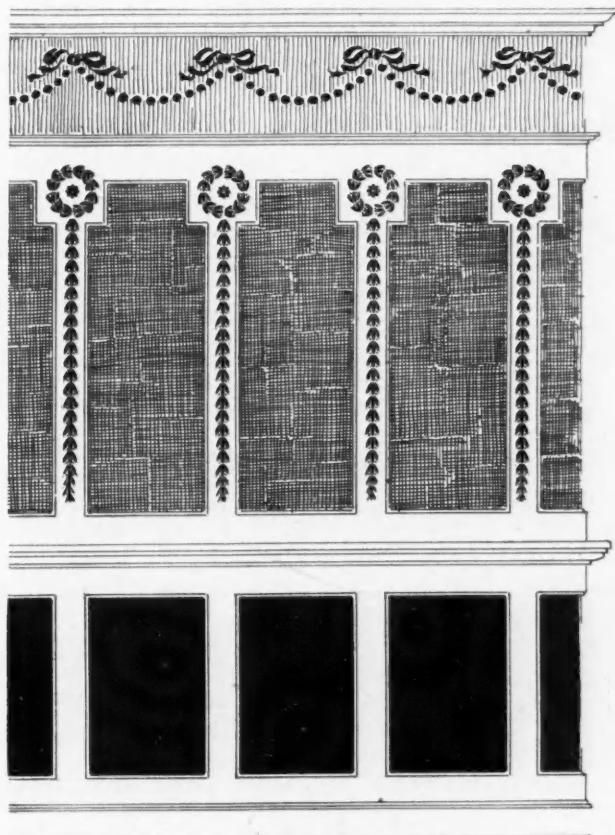


Fig. 1

garish and, if it be possible, the decoration must be expressive of themselves. Speculative builders, who erect the better class of houses in the suburbs of our Eastern cities, find that attractive and artistic wall

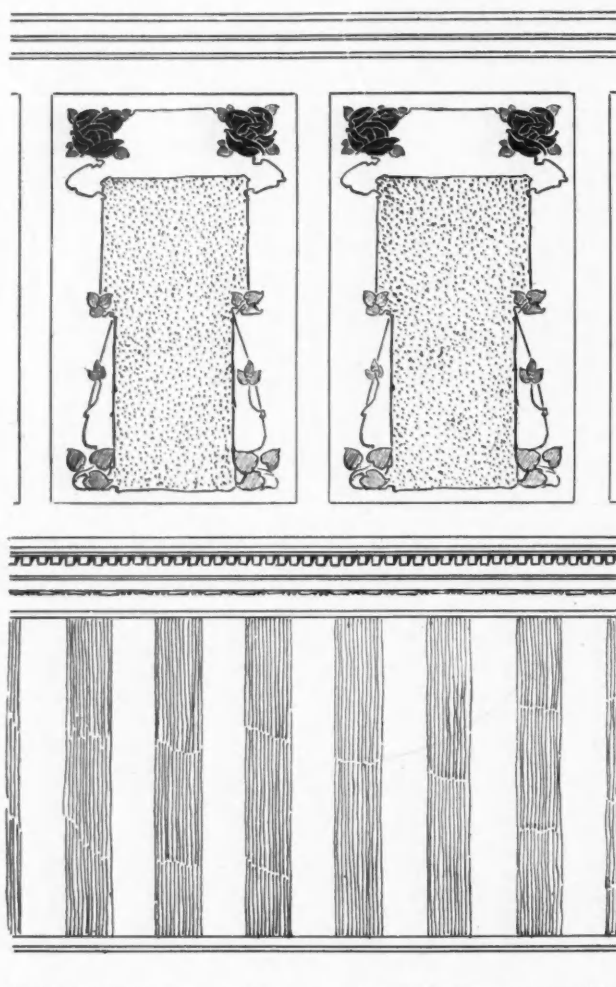


Fig. 2

It is work that can well be done by the woman of the household, leaving the application of the cut out paper to the skilled paper hanger—for it requires a thoroughly competent mechanic to do work of this character, or indeed any kind of paper hanging that is out of the ordinary run and which needs more than the usual care. Even a plain upper-third treatment, where a figured paper is used above a plain or cloth effect paper for the lower portion, separating the two sections of the wall by a molding, is much more difficult to hang than a side wall and frieze, for in the latter case, the frieze being hung after the ceiling and side walls, covers up the rough edges and can be used to disguise any unevenness or lack of level in the ceiling, while in the two-thirds treatment, each breadth of paper in the upper third must be carefully hung and trued up by means of a plumb bob, if good workmanship is expected.

Panel effects are being largely employed in the better class of work, and for this many of the wall paper manufacturers have prepared special "binders," or papers intended to be cut into narrow strips, to be used instead of moldings around panels of wall paper. Some of these are dainty ribbon and floral effects that are very suitable for use with bed room floral papers for the panels and silk moire papers for the stiling.

Again, there are narrow borders having a pattern resembling large square headed upholstery nails, or else resembling bands of leather with large circular headed studs. Other panel papers are more or less architectural in their character, and some of them permit the decorator to build up in paper, capitals, arches and other architectural forms. Where this treatment is flat, without shade, and essentially decorative in design, it is very useful as a decoration, especially in vestibules, or in more or less public rooms, such as restaurants, halls, lodge rooms and the like. But where the mouldings and columns are shaded and an attempt made to imitate the real thing, they had better be avoided. One wall paper manufacturer, last season, put out an architectural cornice effect, with modillions or brackets in perspective at regular intervals. Looking down one side of the room, the effect might be all right, but when the paper came to be hung on the opposite side of the room, the absurd effect was produced of a cornice with the perspective lines run-

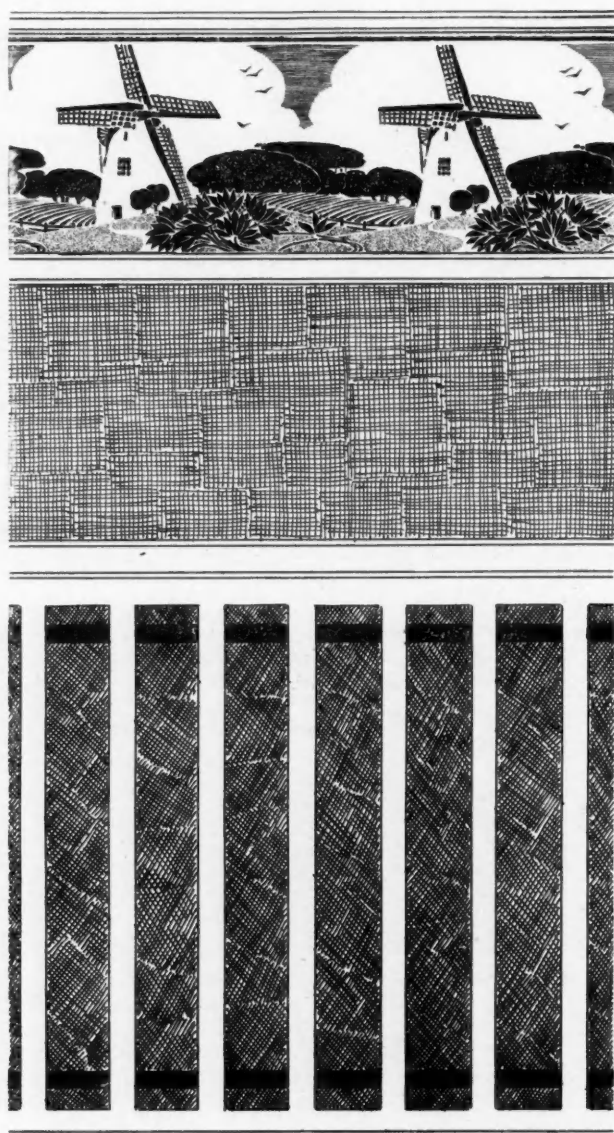


Fig. 3

ning away from the spectator on one side of the room and running toward him on the other side, if he chanced to be standing at either end of the room. Where the slight extra expense is not an object, the use of real moldings for the cornice and for surrounding the panels is much better in many ways. One of the most important is the fact that it breaks the monotony of the wall surface and makes it more interesting, since it introduces the element of light and shade.

Where the expense is not prohibitory, for of course they cost more than ordinary wall paper, or even many of the more expensive grades, the use of woven fabrics such as burlaps, buckram, decorator's canvas or grass cloth, all of which come prepared for pasting to the wall, will produce much more artistic effects than are possible with the use of wall paper alone. These materials can also be used in combination with wall papers, especially with the ornamental or pictorial frieze patterns.

When panels are employed, the range of fabrics is unlimited, for any of the upholstery stuffs, either plain or figured, may be employed. In this case, the fabric is tacked to the wall round the edges of the panel, the tacks being covered with the molding, which is afterward applied. Cretonnes are especially adapted for bed room treatments since they come in the floral patterns that are usually regarded as particularly appropriate for bed chambers, and when so used, the same material is frequently employed for window and door hangings. In other rooms the plain colored fabrics, such as come prepared for the use of the paper hanger, are more serviceable, since they give more agreeable backgrounds for all kinds of furniture or for pictures. When used in combination with the high class pictorial papers, or with stencil work, the highest class of decorations can be produced. Burlaps and buckrams not only come in many colors suitable for the various purposes of the decorator, but they also come prepared for painting upon, so that in this case the decorator becomes the complete master of the whole scheme, which he can alter to suit himself, while at the same time he retains the peculiar charm of the fiber of the fabric.

In order to illustrate some of the possibilities of these treatments we show some examples of what can be accomplished. In Fig. 1 we have a novel paneled treatment, in which the decoration is stencilled on the stiling. The frieze is a grass cloth background, on which the pattern shown may be stencilled, or a similar pattern may be obtained in plastic relief—a form of plaster ornament, in low relief, made with a muslin background, which can be cut out and pasted or glued to the wall the same as wall paper. In the case of the heavier relief ornament, this method of fastening can be reinforced by the use of a few sprigs or thin wire nails, driven through the material into the wall timbers. In the example shown, bow knots and strings

of pearls are used. These latter come fastened to a thread, so that they are about two inches apart, and they may be draped by fastening the string by means of a tack at each end, and after the proper position is ascertained, each one can be separately fastened to the wall. These plaster ornaments, after being placed in position, can be painted any color desired. The long irregular panels are filled with a dyed burlap, while the dado may be either of leatherole or some other material resembling stamped leather. For a color scheme, we may suggest a deep, rich red for the base, the main panels to be green, while the frieze is a greenish gray. The woodwork is painted white, either in flat tones or enameled and rubbed to a dull surface. The stencilling or ornaments in the frieze may be in dark green, copper bronze or old ivory—the latter being particularly adapted for relief work. The stencilling on the stiles can be either in gold, in red or in pale green. Such a treatment as this is well adapted for a hall, a dining room or a room of a semi-public character.

A dainty treatment suitable for the summer cottage is shown in Fig. 2. Here the dado is a broad striped effect, either in burlap, lincrusta or some similar relief material. The panels in the upper wall show a delicate floral treatment, which may be in natural colors, with the central portion of each panel tinted a slightly darker shade than the border or painted of a contrasting color, light tones of course being employed. The roses may be pink, red or yellow, with green leaves and stems, on an ivory, pale green or buff ground, with the central portion of the panel a pale pink. The woodwork in this example may be either white or natural oak or some one of the mission colorings.

An excellent dining room, hall, billiard room or den is shown in Fig. 3. Here we have a high dado, whose height is accented by the narrow panels of dark burlap, with a darker band of color at the top and bottom. The central wall is of plain burlap, making a good background for pictures, while for the frieze we may use either a pictorial wall paper frieze or can use the English stencil effect that we have shown. To execute this, several stencils are required, but it can be done entirely without handwork, and yet give the effect of a very handsome piece of painted decoration.

The three illustrations are, of course, capable of many different modifications, both as to color treatment and proportion, and in addition they will suggest many other ideas that are modern and original and will appeal to those people who want something that is refined, artistic and out of the commonplace in the decoration of their houses.



We would not think of doing without the AMERICAN CARPENTER AND BUILDER, the family being quite as much interested in it as Mr. Rowe.

MRS. P. T. ROWE, Harvard, Ill.

Construction of the Richmond Viaduct

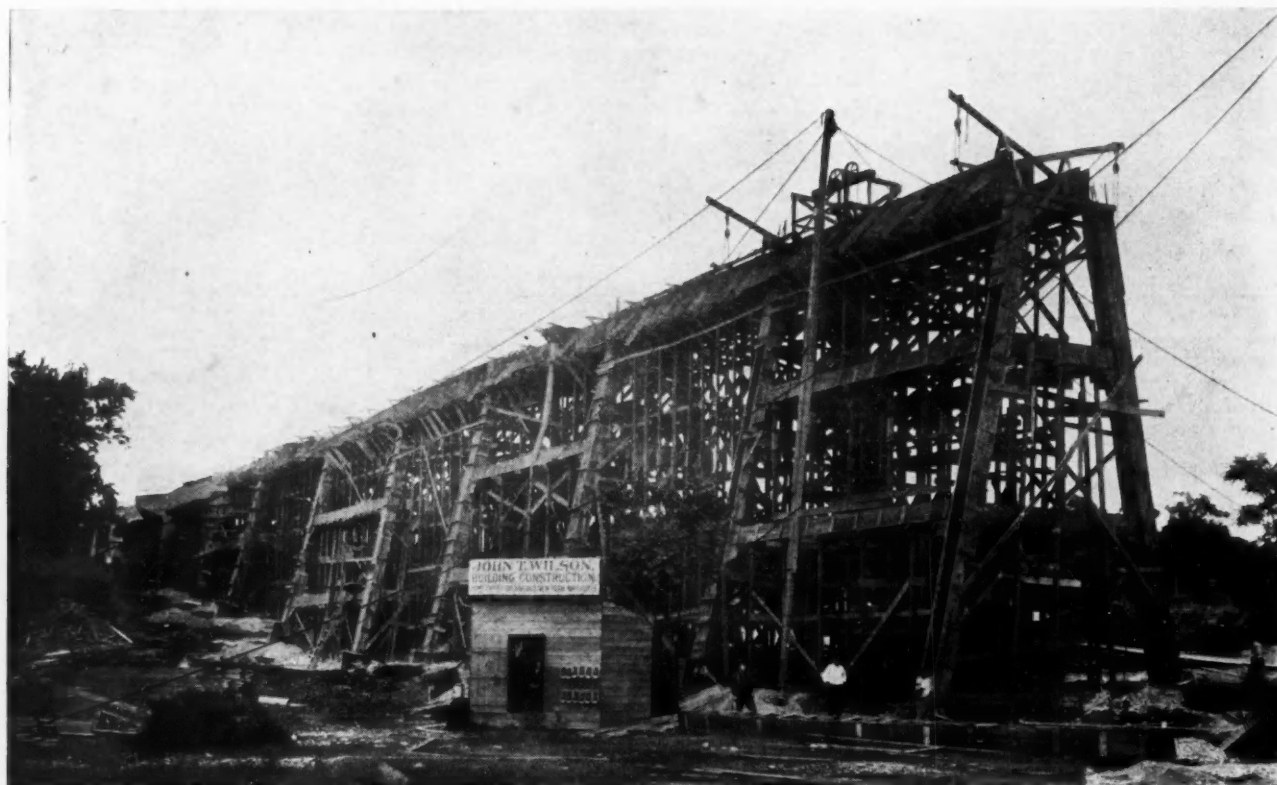
ONE OF THE GREATEST FEATS OF REINFORCED CONCRETE ENGINEERING EVER UNDERTAKEN—MANNER OF CONSTRUCTING THE SAME AND KINDS OF MATERIAL USED

By George J. Seymour

A VERY modern and substantial electric road is being constructed to run through Richmond, Va., the terminal points being kept somewhat of a secret. Except on the viaduct entering Richmond, all grades are less than 1 per cent and long easy curves are used. Twenty-inch cast iron pipe and concrete arches of 4, 6 and 8-foot span take care of the drainage and the crossing of small branches.

height from 18 feet at either end to 70 feet at Bacon Quarter.

On account of the high first cost and cost of maintenance, combined with the difficulty of double tracking, should it become necessary later on, the idea of using a riveted girder viaduct was discarded. It was decided to use a wooden trestle with steel girders spanning the streets only, and some of the lumber



A steel girder bridge on concrete pedestals is used to cross the Chickahominy river and concrete arches of 40 and 60-foot span respectively, the 40-foot arch being full centered, and the 60-foot, five centered, cross two creeks near Lakeside.

The road enters Richmond on the north, a terminal station being arranged for on Broad street, to reach which a valley containing "Bacon Quarter," a small stream, practically an open sewer, had to be crossed. This Bacon Quarter is paralleled by the main line of the Sea Board Air Line railway. Because the southern slope of the valley is solidly built up, streets on which there is much traffic occurring 300 feet apart, it was important that no grade crossings be had, and it was determined that the Broad street station should be an elevated terminal, and that the entire line from an abutment on Sledd street, Henrico county, be elevated. To accomplish this meant the erection of a viaduct over 2,800 feet long and ranging in

was even ordered and delivered, but on account of the great danger of possible destruction by fire and the temporary character of wood, the decision was reconsidered and reinforced concrete finally decided on as being the safest, the most economical and the material best suited to this class of work. Although requests for bids were sent to several prominent reinforced concrete firms, the New York office of the Trussed Concrete Steel Company were the successful ones and furnished all the steel for construction under the Kahn system, Mr. John T. Wilson of Richmond, Va., during the construction work.

The viaduct was designed to carry a train of cars each 54 feet long over all and weighing 150,000 pounds on four wheeled trucks placed 33 feet center to center.

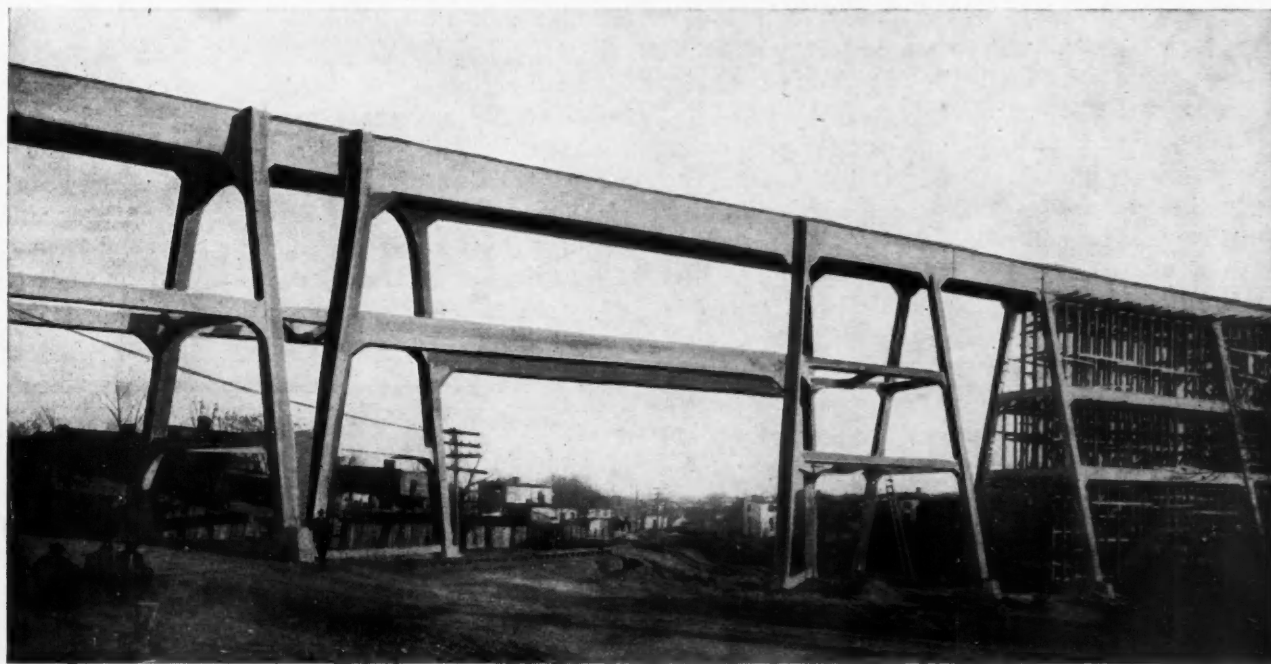
A system of girders of rectangular cross section supported by towers, each tower made with two vertical bents, having two columns 6 feet 9 inches apart

on centers at the top and battered 1 to 6, makes up the design. The columns are of square cross section reinforced with from four to nine steel bars placed for transverse strains only, the concrete taking the compression. The longitudinal struts and transverse braces are all horizontal.

Except at the span across Marshall street, where the city limited the company to a clear headway of 14 feet, the girders are rectangular in cross-section and follow the grade. It became quite a problem how best to span this street owing to the facts that the girders could not be made deep enough to take care of the bending movement and the railway company did not care to get any higher than was absolutely necessary. With girders 60 inches deep, the depth

steel was given a tensile stress of 16,000 pounds, compression 60,000 pounds, and a shear of 10,000 pounds per square inch of cross section. The modulus of elasticity of concrete to steel was taken as 1.12, the percentage of steel being taken to be less than 1.45 per cent. Work on the viaduct, which was begun in May, 1906, was quite slow till the contractor got operations properly systematized, was started at two points, the north end and about the middle, each force working southward. First the footings were put in, having four $\frac{3}{4}$ -inch rods projecting four feet, around which the column was built.

Hard clay or compact gravel form the foundation and were calculated for not over 6,000 pounds of pressure to the square foot. It was thought that the



allowed here, the beam would not contain enough concrete to take the compression stresses, it was found, so a "T" shaped beam was finally decided on. The spans vary in length from 23 feet 6 inches to 67 feet 5 inches center to center of bents the crossings of the Seaboard Air Line Railway, and the streets requiring a clear span taking the longer ones. Expansion joints consisting of a grooved steel plate on top of the bent on which a planed steel plate on the bottom of the girder slides, while a toggle near the girder prevents any tendency to turn the girder, are placed about every 200 feet to take care of expansion.

It became necessary during the construction to put two 7 per cent curves in the viaduct, both in the same direction. The grade on the tangent is plus 1.10 per cent and on curves plus .7763 per cent, there being a total difference in elevation of 25 feet between the two ends of the structure.

The concrete was mixed in the proportion of 1:2:4 and was figured for a compressive stress of 500 pounds and a shear of 50 pounds to the square inch. The

viaduct would in all probability have to be double-tracked sometime, so the footings were made twice as large as they would have been otherwise, the four foot stump of a column girder being left on which the future double track column will rest so that it will be easy to construct an additional girder with proper supports on one side of the viaduct, shift the track so that the new girder and one of the original ones will support it, carrying the traffic on this girder while an additional girder and new track on the other side are being constructed. For fastening the new work to the old, cored holes are provided. Where extra depth was not required to get suitable foundations, the footings were carried to uniform depth of four feet.

Equipment for two concrete gangs, consisting of two No. 2½ Smith concrete mixers, two hoisting engines, elevators, buckets and so forth, were supplied by the contractor at first, but later one mixer was taken away to other work because it was found that while one force was erecting forms, the other was putting in concrete.

After the forms were erected to make them monolithic, the columns up to the bottom of the girders, and contiguous struts, were poured at one operation, the girders and floor being next put in, in the same manner. Owing to the difficulty of properly ramming and working the concrete around the Kahn reinforcing bars, the attempt at pouring the columns from the top was abandoned, the column forms being then built U-shaped and the fourth side built up in sections as the concrete was poured.

Dumping buckets of three cubic feet capacity, built for this express purpose, were used for dumping into the column forms, a traveling single boom derrick seated on top of the viaduct, and a hoisting engine, lifting the buckets. From the wheelbarrows the struts were poured, through a 10 inch hinged galvanized iron pipe, from the top of the structure. The concrete for the girders and floor was carried in wheelbarrows which were hoisted by double-gauge towers to the top and wheel on runways to position.

At the end of a week the forms for the sides of the girders were removed, the column forms and those supporting the falsework of the girders being left for thirty days or more where not needed. The forms were of two inch lumber dressed on one side. As much as possible the lumber was cleaned and used over again. Falsework consisting of 4 by 4 inch pieces, three feet on centers along the viaduct and resting on planking placed on the ground and leveled to the top and wheeled on runways to position.

At street crossings underneath the heavier girder forms the falsework consisted of 6 by 6 inch lumber, the struts being supported by 4 by 4 inch pieces placed at such distances as suited the weight carried. Approximately 456,000 feet B. M., or about 16,500 feet B. M. of lumber to each 100 cubic feet of concrete was used, owing principally to the great height and length of the structure.

At Clay street, where a double track street car line was crossed, and at the crossing of the Seaboard Air Line Railway, where the weight of the girders was considerably in excess of fifty tons each, special provision had to be made to carry the great weight, and yet the forms were erected and the concrete poured without delaying either a train or a street car.

Atlas Portland cement, tested according to the specifications of the American Society of Civil Engineers, was used, the stone being granite crushed to pass through a one-inch ring and thoroughly screened. The sand was obtained by dredging in the Appomatox river at Petersburg.

As tests made on mortar showed that in aggregates made from Petersburg sand and granite screenings, the granite screenings possessed from 20 to 50 per cent more tensile strength than sand aggregates, the former were used in about 80 per cent of the work. The mixture in the footings was one of cement, three of sand and six of stone, except that in wet pits

near Bacon Quarter Branch more cement was added. The rest of the work was made of a 1:2:4 mixture. The concrete was made quite wet and thoroughly worked around the reinforcing bars with spades and rammers, no concrete being used that had stood even fifteen minutes. The porous places in the concrete were filled up with a 1:2 mortar after the forms were removed, and a cement grout applied with a brush.

Six by twelve inch heart pine stringers are laid under the tracks and placed over the girders on each side. Oak cross ties, 8 by 8 inches by 9 feet, are spaced 12 inches on centers. A $\frac{3}{4}$ inch bolt is imbedded nine inches in the concrete every five feet and goes up through the stringer and tie, while half-way between there is a bolt through the stringer only. The holes in the stringers were 2 inches in diameter, later filled up with a 1:3 mortar, which was to facilitate the placing of the stringers and prevent the bolts from rusting off where they come out of the girder.

Besides the inspection furnished by the railway company the Trussed Concrete Steel Company kept a supervising superintendent on the job. They guarantee the strength of the design, and the fact that the Clay street girder, weighing 54 tons, and having a span 65 feet 5 inches, sagged only $\frac{1}{8}$ of an inch when the shoring was removed indicates that the work will stand any tests that will be made.



They Who Go Down the Stream

I set up here upon the hill an' watch the drive start down to mill,

Fer Nelson, Murph, Baptiste an' Bill the rollway now are breakin';

There ain't a piece down there below a-rollin' in the mud an' snow

Thet someway, somehow, I don't know, er had a hand in makin'.

There ain't a piece but what I've seen it standin' with its top o' green,

Not one but what I watched it lean an' fall to earth a-crashin';

I seen it on the skidway lay, an' then I seen it hauled away, An', in the river now today, I hear it fall a-splashin'.

It's kind of foolish, I admit, but, while I set a-watchin' it, I git a sort o' gloomy fit, like when a look you're takin' At some good pardner square an' true who, like the log, is leavin' you—

Who's driftin' from life's rollway, too, another Hand is breakin'.

An' yet I know the log set free, no more imprisoned in the tree,

Before another drive will be of some one's home a rafter; An', while my pardner slips away, I know he'll drift to brighter day—

A place where ev'ry heart is gay an' ev'ry thought is laughter. —American Lumberman.



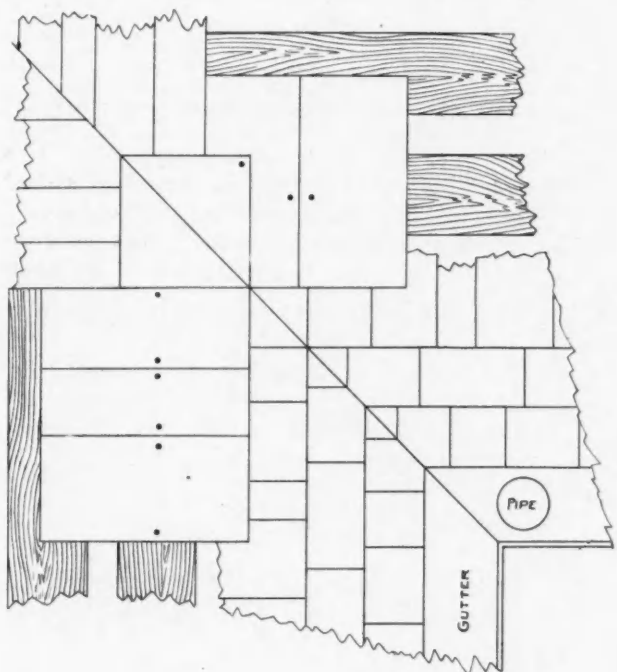
The tensile strength of a grindstone is considerably reduced when the stone is wet.

Correspondence



Shingling the Valley

To the Editor: Pembroke, Me.
 I saw in one number of the AMERICAN CARPENTER AND BUILDER, a number of ways of shingling a valley, and thought I would give you a sketch showing the way I was taught to do it. Some say, do not nail too low down in the zinc. I only put one nail in each flashing to hold it in place. The



flashings are cut nine inches square and one is put under every course of shingles. Make a pattern of the valley shingle, then saw them in pairs, lapping one course one way and one the other, to hold them down and keep them from warping. Shingles less than eight or nine inches wide should have the points carried out, because a valley collects the snow and in melting backs up over the flashing if the points are not carried out. I never shingle an open valley with long strips of zinc for the flashing. I hope this may help some brother chips to make a tight valley. W. H. REA.

Protecting a Show Window from Frost

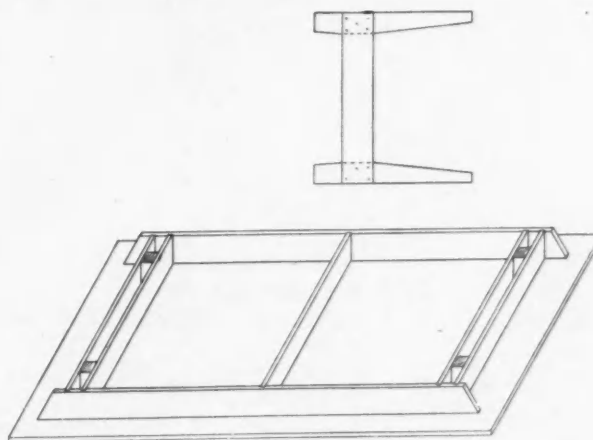
To the Editor: Brook, Ind.
 How would you plan a show window for a store front so as to secure most protection against frosting of the glass?
 D. C. WORRALL.

Answer: The best way we know of is to enclose the show window space separate from the store room by making light insulated partition with say 5/8 inch matched and beaded ceiling

of two thicknesses and leaving a hollow space between, which should also be lined with paper. The show window space should be roofed over at the transom bar with roof constructed same as above described, and all joinings should be made as near air tight as possible. No hot air or steam pipes should open into or be in close proximity to the show window space. The object is to keep the temperature in the enclosure as near that on the outside as possible, and if this is done, the frost will not collect on the glass. Ventilation can be had from the outside, but it is not best to take it in direct to the show window space on account of the dust. A better way is to take it in below the floor into a separate chamber, and then through the floor, using a fine wire gauze at the openings. Of course this arrangement shuts off the view to the interior part of the store, but the drawing card of the up-to-date merchant is his show window, and the bigger showing he makes, the greater is his trade. Then again, the store front really makes a better showing from the outside, and by using prism lights above the transom bar, gives really a better light than can be secured with the all open front, as is in general use. A. W. WOODS.

How to Build a Table

To the Editor: Wasco, Ill.
 Recently I made several tables for a Ladies' Aid Society. They wanted them made cheap and so that the legs could be removed and stored away in a small space. Am sending a drawing of same. If you think it worth while, you might publish it in the AMERICAN CARPENTER AND BUILDER. The top is of common flooring. The frame work is of 1 by 6 inch pieces, dadoed four inches from each end to receive two

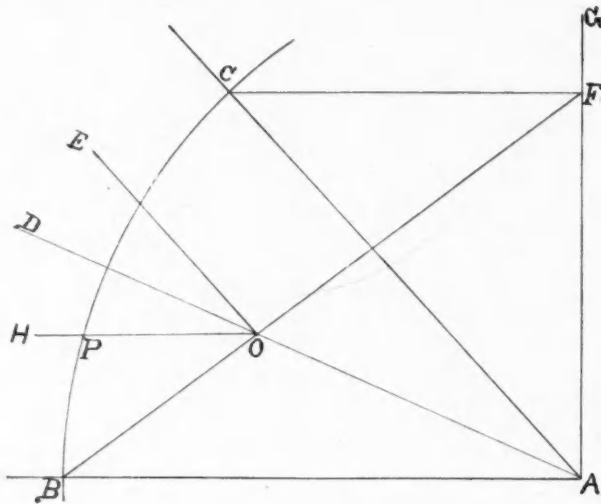


pieces set far enough apart to receive the legs. The legs are made of 2 by 6 inch, ripped slanting. I put the frame together first, then the top. Put 1/4 inch temporary blocks in the socket under the legs, then set the legs in place with the bevel edge on the inside; then set in blocks between the end pieces and

crowd them against the legs and nail through the end pieces. The cross pieces were then nailed on each side of the legs. The temporary blocks spoken of above are then removed and the table is completed. Why would not this make a good portable work-bench?
C. W. MILLEN.

To Trisect an Angle

To the Editor: Dayton, Ohio.
In the diagram, let C A B, be any angle not greater than 90 degrees, and let it be required to trisect this angle by a geometrical construction, from the vertex A draw A C, perpendicular to either leg of the angle, in this case A G is perpendicular to B A. With A as a center and any convenient radius, describe an arc cutting both legs of the angle



as at B and C. Bisect the angle, and draw the bisector D A. Draw C F perpendicular to G A, and join B F, this line cuts the bisector D A, in O. Through O draw O H parallel to B A, it cuts the subtended arc B P C, in P the required point, B P equal one-third B C. Draw E O, parallel to C A, then angle E O H equals angle C A B. Try it, take any angle from zero to 90 degrees inclusive. C. F. W.

Waterproofing Compound

To the Editor: Santa Fé, Mo.
If coal tar is placed under ground where there could be no wash away with it, would it rot? And is there anything I could mix with it to keep it from being so brittle, especially in cold weather?
Please answer in your next issue. E. F. QUISENBERRY.
Answer: Mix linseed oil and Germantown lamp black to the consistency of paint and you will have the most durable waterproof paint for concrete, stone, brick and composition roofing that I have found for waterproofing underground walls. It has stood two years' test without a sign of disintegrating.
FRED W. HAGLOCH.

What Determines the Pitch

To the Editor: Cleveland, O.
Will you please inform me, through your valuable paper, what is a full pitch roof, a one-half pitch, a one-third pitch, a fourth pitch, etc. I have had so many different ideas, I would like very much to hear from an authority on the subject.
GEO. H. WOOD.
Answer: This is a simple question, yet,—there seems to

be a wide difference of opinion as to what designates the incline given the roof. Custom has long since settled upon the rise given the roof in proportion to the span; thus, a

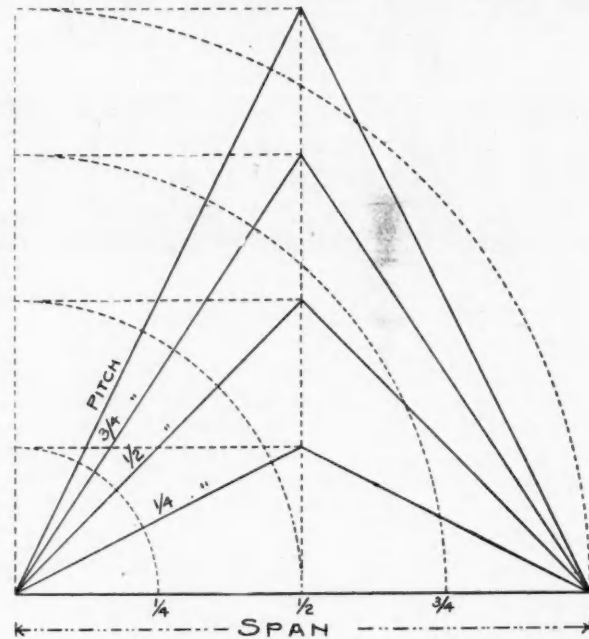


FIG. 1.

one-fourth, one-third, one-half, etc., pitch, must have a rise in that proportion to the span. Reckoned on this basis, a full pitch has a rise equal to its span. See Fig. 1. Here the span

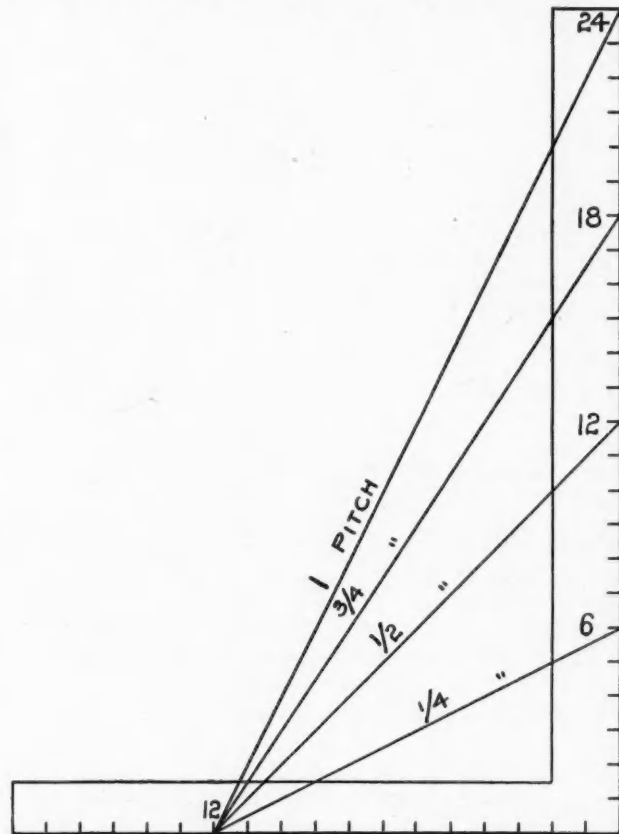


FIG. 2.

is divided into several parts. The dotted lines are shown in the transferring of these parts to the rise line. In Fig. 2 these parts are shown in connection with the steel square.

Twelve is used on the tongue, because it represents a one foot run. The span would, therefore, be two feet, or 24 inches, which is equal the length of the blade. It is then a very easy matter to fix on the mind what figures to use on the blade for any pitch, as 6 is $\frac{1}{4}$ of 24; 12 is $\frac{1}{2}$; 18 is a $\frac{3}{4}$ pitch, etc. A 24 inch rise would necessarily be a full pitch. A 30 inch rise would be $1\frac{1}{4}$ pitch, and so on, representing as many pitches as the roof rises in proportion to the span. For a more extended description, see our regular article in the April, 1906, number of this magazine. A. W. WOODS.



How to Build a Refrigerator

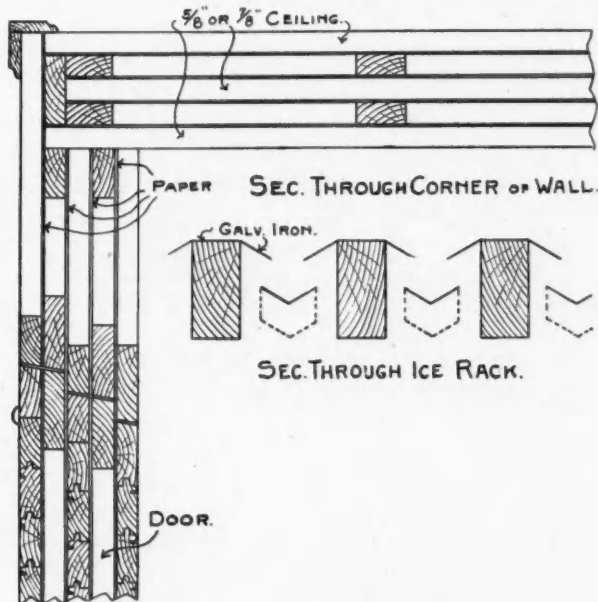
To the Editor:

Lusk, Wyo.

I have a refrigerator to build. Would like to know what is necessary in a refrigerator, as they want this one large enough to hang a beef. Also want to keep vegetables and butter in it. Would it be necessary to build two separate compartments and use charcoal. Would like to have an illustration of the construction and what is the best material to use. I want it as cheap as it can be made, and at the same time answer the purpose properly.

C. A. SCHWATZ.

Answer: In constructing a refrigerator, there is no necessity of charcoal, or any filling whatever. Simply construct



two or more perfectly air tight walls, with dead air chambers between them makes the best possible insulation, as air which is absolutely confined, is the best insulator. Three air tight walls with $\frac{7}{8}$ inch space between will make a good room for the purpose of which Mr. Schwartz speaks. A cheap way to obtain this would be to build the outer wall and cover with good two ply red rosin sized building paper. This should then have a coat of linseed oil to make it air tight and durable, then strip this with $\frac{7}{8}$ inch strips, ceil again, cover with paper as before, being sure that all joints are stripped down and air tight. Next cover the strips with paper as before (this may be oiled and dried before applying) and finish with the inner wall of ceiling, which can be best coated with shellac. To make a job which will economize ice, this should be the construction of floor and ceiling as well.

Now, as to the ice shelf. All that is necessary is to form a rack, which will support the ice wanted, and at the same time give free passage of the air down through and around it, and at the same time carrying the water off perfectly. This may be secured by taking 2 by 4 inch and arrange them side

by side on edge, 4 inches apart, and cover them with galvanized iron so it will project $1\frac{1}{2}$ inches on each side of the 2 by 4's and bend down at an angle of about 30 degrees; then place a series of troughs between the 2 by 4's to carry off the water into another trough at the ends of these, and connect with a drain pipe, which should be trapped so the air cannot pass back through it into the cooling room. It goes without saying that the ice rack should be at the top of the room, as the cold air descends, keeping up a circulation. The doors should be constructed with air chambers, same as the walls.

As to keeping vegetables in with the butter and meat, I think it would be bad economy, as butter is about the best mixer with any loose odors that has yet been discovered, up to the time of going to press. If there is anything that can catch the taste of onions, coaloil, or fish, from an odor of the same in the next county, it is butter. The accompanying cross section will show the construction of the walls, door and ice rack.

J. G. CORDNER.



Making Pebble Cement Finish

To the Editor:

Bessemer, Mich.

Will you please give me as full directions as possible as to method of making and applying pebble cement finish to ordinary residence?

Please state what kind of building paper is ordinarily used over sheathing; what material is placed between sheathing paper and lath; what form of lath is used; how many coats of plaster to be applied; the composition of each coat; and how the rough finish is obtained? Also state if cement coat is run out or under casings and if it is run only to casings, what form of molding is usually applied to cover joint.

CHARLES BERWALD.

Answer: Pebble finishing concrete plaster (stucco) is practically a trade of its own, and an experienced hard wall plasterer is the best to employ for the undertaking. There are numerous finishes which we shall describe, all having for the ground two coats of cement mortar plastered on metal lath; these two coats are about five-eighths inches, being applied at the same time and troweled, or rather floated, to a straight surface with a wood float. The composition for this work consisting of one part hydrated lime or lime paste to fifteen parts sharp sand and four to five parts Portland cement, depending on the nature of the sand, the greater a variety of sizes of sand grains the less cement required. For binding purposes add one and one-half pounds cocoonut or manila fiber to each barrel of lime.

The rough cast is produced by hurling with force by hand pebbles (previously immersed in water) against this surface before the cement has set, thus when sufficient force to bury the pebbles half into the plaster has been used you can consider the work completed, but if pebbles are found to barely hold, they may be pressed lightly with a trowel.

To execute some particular design or lettering with pebbles of various colors, it is necessary to prepare a temporary plaster board the size of the design (this board is made of plaster lath the same as lathing for a well) which is covered with common clay and water mixed to the consistency of mortar on which the pebbles are placed by hand and the design approved, and this design is firmly pressed against the stucco before the cement has set, as previously described. Let remain for at least forty-eight hours, when same is freed by means of water, washing the clay from between the plaster board and the stucco. When rough cast surface is desired, tamp surface with stiff fiber or wire brush. Rock face caste is produced by hurling mortar with a trowel and marking off mortar joints with bead pointer and straight edge. When stucco is applied to frame buildings it is best to sheath and cover with red rosin building paper or two

ply black roofing paper which is nailed by means of plaster lath spaced sixteen inch centers. On these laths the regular diamond mesh expanded metal lathing is stapled or herring-bone lath may be used, either being made of No. 24 or 26 gauge steel.

I always run stucco under casing unless in combination or old work, where same is impossible. Then finish up to wood trims and cover with a light bed molding, and if space permits a cove or quarter round mold. FRED W. HAGLOCH.

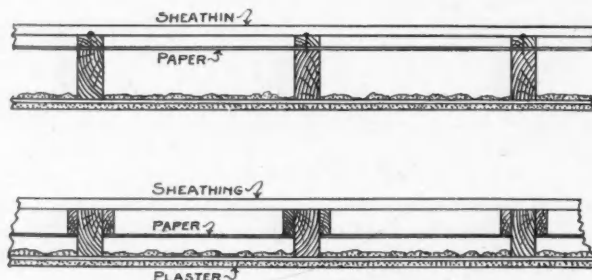
A Substitute for Back Plaster

To the Editor:

Waterville, Ia.

How would it do to use tar paper in the place of back plastering a house, and how should it be put on? E. C. DAHL.

Answer: Paper will answer the purpose, provided it is tough enough. The ordinary tar paper, such as is used for



covering the sheathing, is most too soft and more liable to puncture while the work is being carried on. The accompanying sketch shows two ways of doing the work. In the first illustration, by using 32 inch paper and putting it on vertically, will cover two spaces. All laps should be on solid bearing. Then strip with $\frac{7}{8}$ inch pieces and put on the sheathing, which should also be covered with paper, and sided in the usual way; or it may be done as shown in Fig. 2. But this requires more cutting and fitting of the paper. The former is preferable in many cases, on account of giving a wider fall at window jambs. The object in this construction is to give as nearly a dead-air space as possible. Therefore, every part should be made thoroughly tight or the object sought will be of no avail. A. W. WOODS.

Stretching Screen Wire on Frames

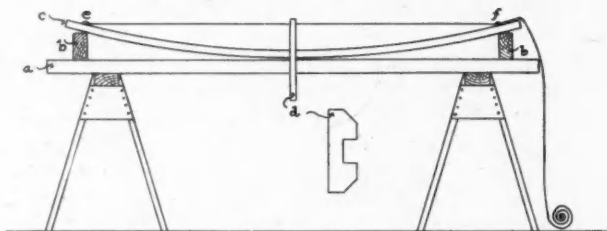
To the Editor:

University Place, Neb.

I note with much pleasure the large amount of correspondence in the March issue. That's right, fellow workmen, if you have an idea which you think is original, air it in the columns of the greatest building paper ever published.

I have been using for four years a form very similar to Mr. Ellis' and I consider it the only proper method.

Several young "know it all" mechanics of this place are



looking forward with much interest to Mr. A. A. Jones' explanation of his problem as stated on page 1439. This "old retired mechanic" will please consider himself the winner of a year's subscription to this magazine when he gives a correct solution, which is to be gained by the use of the

steel square. We will let our expert with the square, Mr. A. W. Woods, decide whether or no the solution is correct. Now then Mr. Jones, it's up to you.

No doubt many carpenters experience some difficulty in stretching screen wire on frames. This is sometimes accomplished by means of clamps and screws on a specially prepared bench in the shop, but here is a method which will greatly facilitate this work, particularly when the screens are made on the job where they are to be used. I have seen many devices and I believe this beats them all.

Place two 2 inch by 6 inch on horses, as shown at (a) in the accompanying sketch. These pieces should be about a foot longer than the frame and should be placed the width of the frame apart and may be tacked to the horses if desired, to hold them in position. Place two 2 inch by 4 inch edgewise as shown at (b). These pieces should not be nailed in position as they are to be removed after the wire is fastened to each end of the frame. Place the frame as shown at (c), press down in the center and apply a clamp at each side as shown at (d). Fasten one end of the wire to the bottom rail as shown at (e), care being taken to see that the wire is going to run parallel with the sides of the frame. Draw the wire reasonably tight and fasten to the top rail with tacks and mold and cut with a sharp chisel. Remove the clamps and 2 inch by 4 inch pieces and complete the fastening of the wire and it is as tight as any one would wish for.

The curvature of the frame in the illustration is somewhat exaggerated, but it serves to convey the idea and may be overcome by making the opening in the clamps larger.

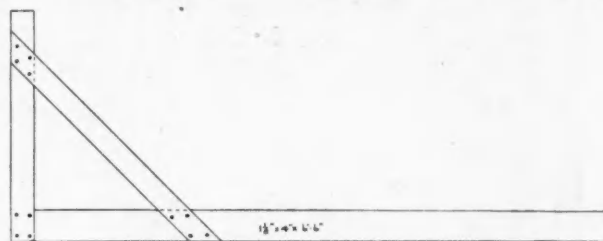
J. M. KELLER.

Square and Straight Edge

To the Editor:

Fondulac, Wis.

I read so much in the AMERICAN CARPENTER AND BUILDER in regard to setting jambs and hanging doors. I herewith send a rough sketch of a combination square and straight



edge, which I use for setting jambs. It can be made of $1\frac{1}{8}$ inch by 3 inch or 4 inch, of soft or hard wood. The tongue and brace of $\frac{1}{2}$ by 3 inch of any desired length. I make it a point to hang most of my doors before I do any casing. Would like to hear from any of the craft on the subject.

W. DITTMAR.

Proper Engine to Use

To the Editor:

Ouray, Col.

Referring to the reply to Mr. Hanna on page 93 of the April issue, would say that to get anything like satisfactory service from a 26 inch bolting saw he should have a 10 horse power engine driving the saw 1,200 revolutions per minute, with at least an 8 inch belt on a 10 inch diameter pulley. A catalogue at my hand gives for a self feed rip-saw of 24 inches a 9 inch pulley with 9 inch face. Of course an 8 inch belt ought to transmit a great deal more than 10 horse power at that speed, but I find that is narrower and they have to be too tight and that takes power. I am using a 6 inch leather link belt on a $4\frac{1}{2}$ horse power engine in my shop and

it slips frequently when the load comes on and it ought to transmit 6 horse power easily, as it is on a 10 inch pulley, running 380 revolutions per minute.

S. M. PRESTON.

and roof more than anything I have ever used. I think the above mentioned methods are new and are original, as I have not seen anyone using them.

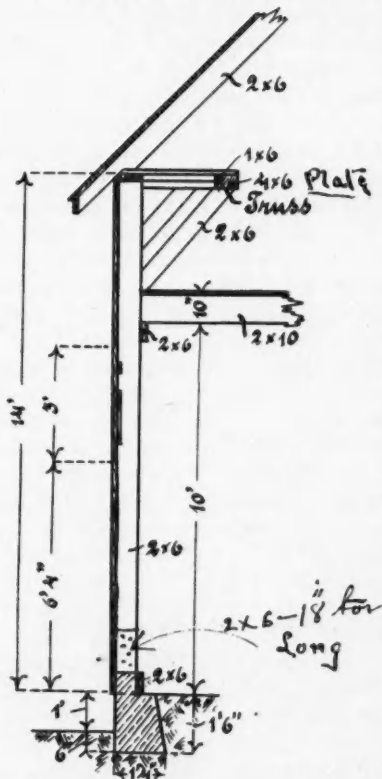
J. A. ULBERG.

Making Concrete Foundations

To the Editor:

Mott, N. D.

Find enclosed a drawing of a method I have used in making foundations of concrete, not using sills, but just cutting 2 by 6 -18 inch nailing 2 by 6 on the inside and sheathing or drop siding on outside, spacing studding same as in wall. Then set this box on the wall and fill same with concrete to top of 2 by 6. When dry and hard continue with your building, setting studding directly down on cement and nailing same to 2 by 6 -18 inches already fast in wall. In this case there is no sill to rot, nor can the wall slip from the foundation, and it can be repaired easily.



With regard to the plate trusses I use this method on all small barns and find it strengthens the walls

Figuring Millwork

To the Editor:

Middletown, Ill.

I have read the letter of the Chicago Millwork Supply Company, and heartily agree with them. I find in my business, as a contractor and builder, it is much guess work to figure against another contractor, when the owner hasn't any complete set of plans and specifications. And on small jobs, they think it is money wasted to bother about getting plans and specifications when, no doubt many times they lose more than the architect would charge; and then again, there is a greater margin for disputes and law suits. We need to be more exact, each one of us. I don't expect to find a perfect fellow in all details.

I read with much interest Mr. Brown's article in the December number of the AMERICAN CARPENTER AND BUILDER and think he should go a step further in a good direction. He gave a formula for mixing a priming coat, and think he should also give one for finishing work, as it might be of great help to those who are ambitious to learn and have to do their own painting.

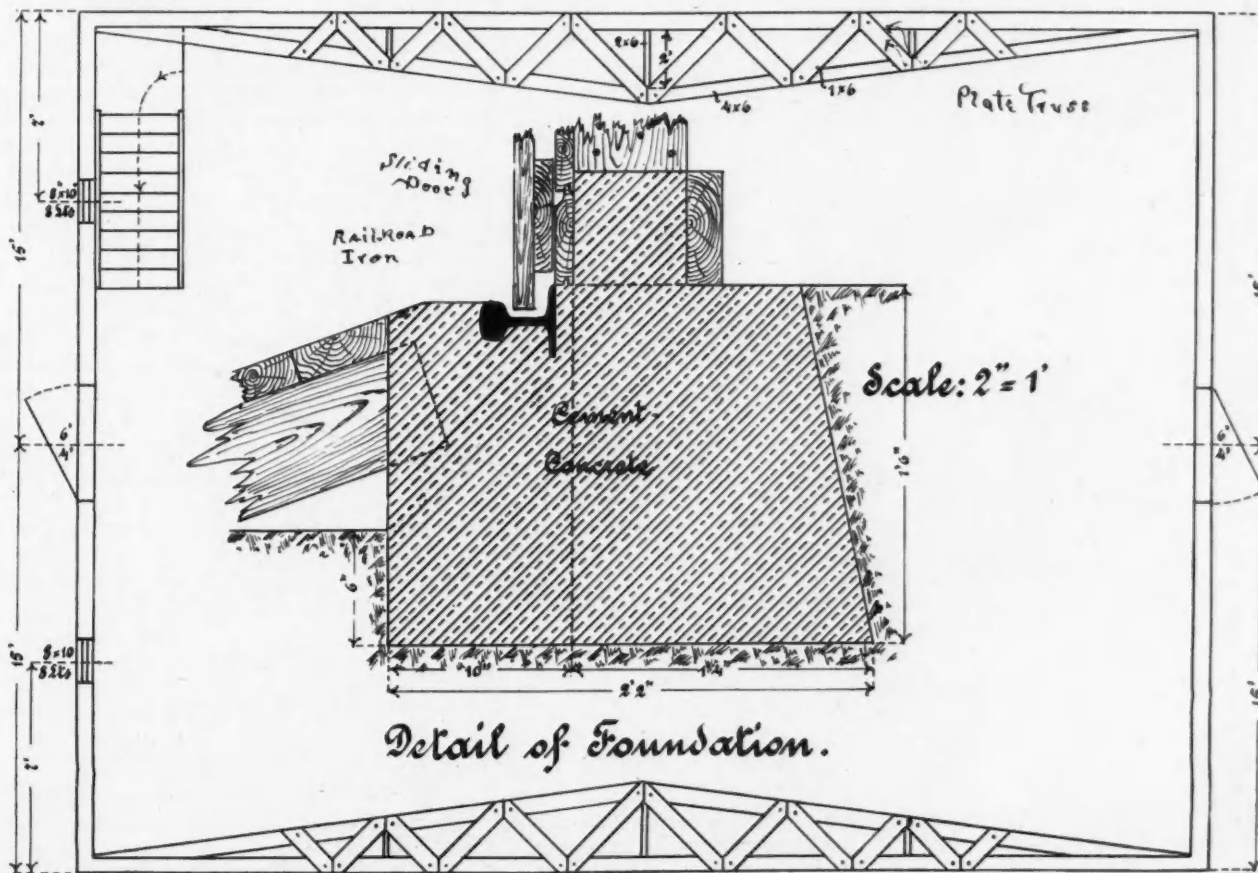
SAMUEL MORRIS.

Overcoming Efflorescence

To the Editor:

Fort Wayne, Ind.

We have under construction here in Fort Wayne a large building made of pressed brick. The brick work was started early last winter. It seems that shortly after the bricks were laid a large amount of white stuff came out of the bricks and made the wall look as though the bricks were mouldy.



Detail of Foundation.

Would like to know if there is a remedy for removing that stuff from the bricks, as it looks very bad to leave it go in such a shape.

J. E. BANET.

Answer: There are two distinct types of this, one being of an alkali nature, and the other of acid, never both, as one chemical will destroy the other. As about 95 per cent of efflorescence is alkali, use any of the following washes and it will disappear. If the brick contains much it will reappear again, as the alkali comes to the surface, and can be removed in the same way.

Wash surface with a solution of two ounces of muriatic acid to one gallon water. Rub with flannel and wash with clean water, or wash with a solution of one ounce oxalic acid, two ounces sulphuric acid and two gallons water. This will remove stubborn cases. Also wash clean with water.

If acid does not affect, then it is an acid composition and can readily be removed by washing with a strong solution of washing soda or even baking soda.

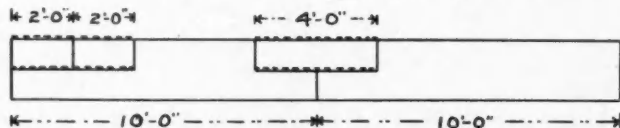
Many clays contain alkali, which makes its appearance when laid in a wall with cement mortar, which I think is the cause in your case; hence the first wash mentioned ought to prove satisfactory.

FRED W. HAGLOCH.

Answer to Problem

To the Editor: Delish, Assa., Can.

In the AMERICAN CARPENTER AND BUILDER, which is a good friend of mine here in the far west, I noticed Mr. C. T.



Everett's problem of splicing two 10-foot pieces to make a 20-foot timber, and the following sketch shows my method.

OLAF OPSUND.

Laying Out Arches

To the Editor: Plymouth, Mass.

In the April issue I noticed an article by T. B. Kidner and also one by A. W. Woods on laying out arches. The method of finding the radius of same, although easily drawn on paper, is not so easy in practice. I have seen the same method practiced by skilled foremen, laying out large arches with the steel square, which is very cumbersome. A simple method was given in a trade paper a short time ago on finding the radius of arches. Thus suppose an arch 100 inches span, 5 inch rise; square $\frac{1}{2}$ the length, 50 inches, equals 2,500; square rise, 5 inches, equals 25; add these numbers, equals 2,525; divide this by twice the rise (2x5 equals 10) equals 252.5 or 21.05 equals radius.

P. S. BURGESS.

How to Turn Croquet Balls

To the Editor: Mt. Washington, O.

I wish some one would give me full directions how to turn a ball something like a croquet ball on a common wood turning lathe.

C. MAYER.

Answer: It is impossible to give full instructions on this subject in a short answer, so this will be made the subject of a future article under planing mill work. Meantime, to give a general idea of how the work is done, I will say that the usual practice is to reduce the pieces out of which the balls are to be made to a cylindrical form of the size of the diameter of the ball. Then with a gauge of some kind scribe on the center of this cylindrical piece a line indicating the center of the ball and also a line indicating each end.

Trim the ends down square, leaving a sort of spindle in the center to hold the stock in the lathe, that is, supposing the piece is just long enough for one ball, which is probably the best way to work it, at first anyway. Then, make a templet of sheet metal and lay it off in lines so that the hollow side will be like a regular polygon. With this, one can scribe lines for turning the ends down in regular steps, after which it is a comparatively easy job to take a turning chisel and round these steps off one into the other in regular curves, thus forming a properly proportioned ball. Then, to make a neater job and finish the balls off better, one should put a hollow chuck on the driving spindle, turned out so that the ball will fit in it tight and not go quite half way in. By fitting the ball into this chuck uneven places can be readily turned off. Care should be used in this finishing process not to cut too deeply in any one place, because then the balance of the ball must be trimmed down to correspond. Should the ball be difficult to hold in the socket, bring the tail stock up and with a pad of leather or some similar soft substance between the tail spindle and the ball you can press the tail spindle center up tightly enough to hold it in place. It is but right to say in this connection that where any great quantities of balls are desired, it would seem best to put in a special lathe for that purpose, as there are lathes designed to do this work so as to save all the scribing and patterning. Of course, they are not worth while where only a few balls are wanted, but where the work justifies, it is always best to have special ball turning lathes.

J. CROW TAYLOR.

Reinforced Concrete Construction

To the Editor:

San Mateo, Cal.

Please be so kind and inform me which is the best way to construct an earthquake proof building. How should it be bonded and how thick should the bond iron be, because there are so many contracting parties in my town and every one has a different opinion, therefore I want yours. From reading the AMERICAN CARPENTER AND BUILDER I see that you are an authority on all matters regarding the building trade. I am about to build a factory building for carriages, buggies and all kinds of wagons and general work. There will be no inside walls to the building and it will be two stories high. Which will be the best, brick or concrete?

F. SMITH.

Answer: Reinforced concrete offers the only practical construction that may be termed earthquake proof, if such construction is possible. Iron will rust away and all other building material will readily separate under such a strain as only an earthquake can produce. The best example of this class of strain was the settling of nearly three-fourths of the sand foundation of a six story reinforced concrete building at Tunis, France, where the sudden heaving of the sand upon which it was built swayed the building 21 feet out of plumb, its height being 89 feet. By means of jacks, this building was replaced in less than two months and no injury to the structure resulted.

By the above it will be seen that reinforced concrete properly designed will meet the requirements. I would suggest that you have a competent engineer design your building, and by placing additional steel in the footings, it will make separation impossible.

FRED W. HAGLOCH.

Method of Shingling

To the Editor:

London, Canada.

Some five years ago, while I was doing some business in a little village in Nova Scotia called "Pugwash," I was given a shingle about 10 inches wide and 19 inches long, in which there was only one nail, and that, it was clear, was a hand made

nail. I have it yet, and it tapers from the point to the head and is square, head $\frac{3}{8}$ inch, body at head $\frac{1}{8}$ inch, and length $1\frac{3}{8}$ inches. History showed this shingle to have been on over 125 years. It was at the entrance to the harbor and the owner had cause to take down this one of a group of buildings, and when it was explained to a number of the old timers, there was no dispute as to the statement as the family ownership had been an important bit of history of the place. However, I profited by the lesson. "The one nail" made me think, and as I had been troubled a good deal with some of my roofs, I concluded that much of it lay in the "steel" nail used eating out by the chemical action of the weather and often going in five or six years. After quite a hunt I succeeded in getting a slate nail, $\frac{1}{8}$ inch body and 5-16 inch head, length $1\frac{1}{2}$ inches. These I purchased at the factory and they tinned them specially for my work. What I wanted to get was an iron nail, but nowhere could I hear of such a thing. Everything is now steel. Now I lay my shingles as far apart as I can place them so as to cover and break joints properly, putting only one nail in each shingle, no matter how wide it may be. That nail goes at the side, and about two inches up from the weather line of the cover, or succeeding shingle. This one nail allows the shingle to expand in the exposed part or contract freely, according to the weather, hence it has no chance to bind on the nail and has lots of room to go and come at the side if required. But it will be noted that before the shingle is completely buried by the succeeding rows that all of the shingles receive two or more nails in their upper ends. This will hold them steady and at a point that they are not exposed to expansion and contraction, because they are thoroughly covered. Then by leaving them an inch more or less apart, the opening acts as a free gutter and allows the air to freely go up under the shingle and the shingle will then dry out thoroughly and quickly. Results: No matter what weather we had I have watched the roofs I have laid this new way and they remain as smooth as the day they were put on. Of course I do not expect them to last 125 years, because the quality of material is not now on the market and all the shingles we now buy are sawed. The old split and shaved shingle had two advantages inasmuch as it had to be made of good timber and its smoothness was a very great advantage.

✦ JOHN M. PARSONS.

Filing Saws

To the Editor: La Fargeville, N. Y.
It would be interesting to know just what proportion of the carpenters file their own saws, and why the others do not file theirs. Some of them say that they can not see

well enough to do so, but we all know that this is sometimes only an excuse. I did not think that I knew much about this work, but the other day I saw a man trying to file a saw by cutting both ways with the file, and later I was able to help a young man to improve his method of filing, so perhaps I can help others.

Let us take for example a saw which has been filed, as many of them are, so that it has a hollow in the middle, instead of being crowning as it should be.

The first step is to joint the teeth to the same length, and narrow the tip of the saw so as to take the hollow out and leave a crown of one-eighth of an inch.

Do not be afraid that you will spoil your saw by making it too narrow at the tip; it will be all the better for this, as it will be much handier to use in many places; but it might be well to remove a part of the extra fullness each time the saw is filed, rather than do it all at once.

After jointing the saw begin at the heel, as there are generally some teeth there of nearly the right shape. An important point is to get the teeth uniform in pitch and bevel. These should be according to the work to be done, the softer the wood to be cut the more bevel there should be; for fast work give plenty of pitch, for fine work give less.

Do not use too large a file, as you cannot see the teeth as well; on the other hand a small file is apt to spoil the shape of the teeth; so use one of medium size.

Never try to cut on the back stroke of the file; hold the file level and roll it to make the desired pitch of the teeth. Do not try to make a perfect tooth at the first filing, go over them three or four times and you will finally get them right. In filing a rip saw, file square across, except for a few teeth at the tip; file these like a cut-off saw, so you can cut through a knot without stopping to change saws.

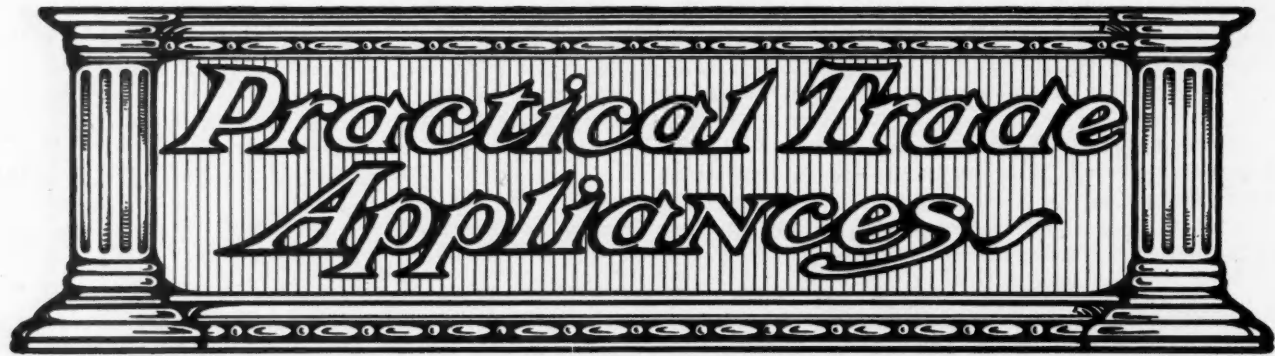
In setting a saw use a set which has two handles to press together. There are several kinds on the market. If you have any other kind throw it away and use a block and punch till you get a good saw set. JOHN UPTON.

✦
"Joe Bing" Poetry

Joe Bing, he hung one dozen doors,
From rise to set of sun;
He hung and fitted them real good—
Yes, sir, that's what he done.
To hang one dozen doors, I vow,
Is one tremendous chore—
Joe Bing hung his behind the stove,
In Luscomb's grocery store.

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Practical Trade Appliances

Hercules Block Machines in Two Sizes

The Hercules Concrete Block Machine, manufactured by the Century Cement Machine Co., of Rochester, N. Y., has gained an enviable record during the past four years. It has been used by many of the largest constructing engineers throughout the world and is capable of producing the very highest grade of concrete stone in an unlimited number of sizes and designs.

The exceptionally fine product turned out on this machine and the reputation gained by it in the past has prompted a request on the part of many stone makers for a Hercules machine built along lines similar to the regular Hercules, but shorter in length. The manufacturers have finally decided to place on the market a second machine, to be known as the Hercules Special.

This machine will be capable of turning out the same high class product, and will be built along the same lines as the regular Hercules, but will be limited to stones 32 inches long; whereas, the regular Hercules is capable of turning out stone up to six feet long.

There is no doubt that the Hercules Special will fill a long felt want on the part of many prominent stone makers desiring a smaller and cheaper machine than the regular Hercules. Any size or design can be made from 3 inches to 32 inches long, and any height from 4 inches to 12, with widths from 4 to 16 inches.

Drawings for Metal Ceilings Free

The Tiffin Art Metal Co. make an attractive offer in their advertisement on another page. Where plans with all measurements are furnished, they will prepare a drawing of an appropriate metal ceiling without charge. Their ceilings have been on the market for three years and have given excellent satisfaction to all who have used them. They have the style and quality, and best of all they will fit, and fit perfectly. Some of the more important reasons why these goods are in such demand are the following: They are the lowest in cost and cheapest to erect; they save time and money and get the most business at the best profit; they are guaranteed to give satisfaction; the price is right. The manufacturers are anxious to have good agents everywhere and will make them a particularly attractive proposition. They carry large stocks, and on account of exceptionally good railroad facilities are in a position to make quick deliveries. Orders will be shipped promptly at all times, and any one handling their line of goods can increase his profits very materially on account of the perfect fit of the ceiling which they furnish. Write to them for their proposition to agents. Address, Tiffin Art Metal Co., Tiffin, O.

Warranted for Twenty-five Years

It is something very unusual to find a conductor pipe or eave trough that is fully warranted for twenty-five years, but an absolute guarantee to this effect goes with every piece of Aluminum Coated Conductor Pipe or Eave Trough manufactured by the Reeves Manufacturing Co., of Canal Dover, O.

They also manufacture roof and box gutters, ridge roll, miters, elbows and shoes of the same material, all of which are equally guaranteed. They are the sole manufacturers of this material, which is practically rust proof. Outside of copper there is nothing which has been used that would not rust out within a few years until they began to manufacture aluminum coated material. It is adapted to all climates, requires no painting to keep it from rusting, is not affected by acid fumes, will solder freely by using muriatic acid with zinc, and will double seam without scaling. It has the rust proof qualities of aluminum and the wearing qualities of copper. Each joint of the material carries a brass tag with the manufacturers' guarantee, and they stand ready to replace any of the goods which rust out within twenty-five years. Write to them for sample and prices. Address, Reeves Manufacturing Co., Canal Dover, Ohio.

Two Cans of Wood Dye Sent Free

Readers of the AMERICAN CARPENTER AND BUILDER have no doubt noticed the announcements of S. C. Johnson & Son, Racine, Wis., the Wood-Finishing Authorities, that have been appearing in this publication for some time. This old established house has been manufacturing hardwood floors and wood finishing materials for over twenty-three years. One of their preparations—Johnson's Prepared Wax, "A Complete Finish and Polish for All Wood"—is sold practically all over the world. More of it is used each year than all other similar preparations combined. Within the last few years, S. C. Johnson & Son have placed on the market Johnson's Wood Dyes. The enormous sale of these dyes is an indication of the great satisfaction they are giving. Johnson's Wood Dye is a dye in every sense of the word. It penetrates the wood, does not raise the grain, retains the high lights and brings out the natural beauty of the wood. Any painter may obtain free of all expense two cans of this dye, any desired shade, and one can of Johnson's Electric Solvo—a preparation for removing old finish from wood, metal and glass—by sending to S. C. Johnson & Son, Racine, Wis., the name of his paint dealer and the jobber with whom the paint dealer does business. It will pay you to look up the page announcement of this concern in this issue.

Book Review

Henley's Twentieth Century Book of Recipes, Formulas and Processes, edited by Gardner D. Hiscox, M. E.—A book of more use than this for the needs of every-day life can hardly be imagined, compiled as it has been for the purpose of accurately and fully describing the processes which underlie the manufacture of countless articles in common use, and of giving selected recipes and formulas for producing compounds that everyone must need at some time. Among the ten thousand formulas contained in this book some will surely be found that meet the immediate requirements at hand. There is hardly a substance employed in any of the arts and manufactures the preparation of which is not fully explained. If there is anything under the sun which is to be made, mended or handled in any way, this book will give

the details of its manufacture or manipulation. Everybody will find in its pages much information of value—the housewife, the painter, the carpenter, the metal-worker, the farmer, the soap and candle maker, the photographer, the jeweler, the watchmaker, the electroplater and electrotyper, the tanner, the mechanic, the engineer, and the manufacturer. The Norman W. Henley Publishing Company, 132 Nassau street, New York, U. S. A.

Contractors' Hoist

The cheapest and most rapid method of elevating building material is the double platform elevator, one platform descending as the other ascends. No contractor can fail to recognize at a glance the economical advantages of this method. The Bates & Edmonds Motor Co., of Lansing, Mich., manufacture a special contractors' hoist, designed particularly for operating such elevators. The hoist can be employed with either their four horse power or six horse power gas or gasoline engine, as by using the double platform elevator the load is almost equally balanced, consequently a large amount of power is not required. They can also furnish engines from 1½ to 25 horse power. Write for their Bulletin No. 5 and ask for prices.

A Weather and Fire-Proof Coating

One of the most attractive advertisements in this issue will be found at the top of the inside back cover. It is that of the Century Cement Fluid Co., of Cincinnati, O. Century Cement Fluid is a liquid preparation that is elastic, weather, water and fire proof, and will not crack, crumble or peel off. When applied according to directions it forms a flexible cement coating. It is strictly sanitary, contains no lead or poisonous material and is easily applied, requiring no skilled

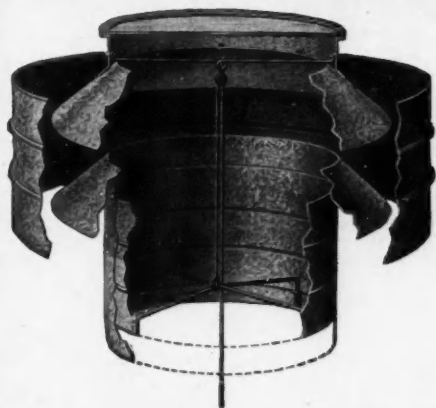
labor. It consists of strictly high grade Portland cement, combined with other ingredients (the secret of which is held by the manufacturers) which holds the cement in suspension while air tight, but after application quickly forms a solid yet flexible monolithic facing. Some of its more important uses are the following:

Roofs.—Century Cement Fluid when applied to shingles makes them practically indestructible. New buildings have been treated by dipping the shingles before placing, and it simply forms a fire, weather and water proof protection resembling slate. What the manufacturers say regarding the fire proof qualities of this material they mean, and stand ready to demonstrate it to any interested parties. As a protection to iron and tin roofing Century Cement Fluid has many special merits. It puts a check to all corroding and rusting, it will not crack or break, fills up all cavities and stops leaks.

Brick Walls.—It is a well-known fact that all brick buildings draw and hold moisture, and after severe rain storms leaves the outside of the building streaked and unsightly, while the inside is damp and musty, and ordinary paint is of no value, as in a short time it peels off. The company has demonstrated on their own factory and other buildings, that were coated with their cement fluid, that the color remains permanent and dampness becomes a thing of the past.

Barns, Out-Buildings, Fences, Etc.—One application of the Century Cement Fluid is a sufficient coating to protect this class of buildings for a long period, as the cement fills up the grain of the wood and it becomes impervious to the weather. As a preparation for posts and foundations underground against dampness it is without a peer; as wood cannot rot nor iron corrode when protected with this material.

Cisterns, silos, concrete tanks and water towers can be made water tight with Century Cement Fluid, and the fact



Notice Sliding Sleeve Damper. Patented.

Sliding sleeve damper "stays set," is absolutely storm proof, does not deflect air downwards, does not collect dust when closed, makes the Burt greater in pulling power than any other Ventilator made. Glass or metal tops as preferred.

Our 64-page general catalogue explains fully why a smaller number of Burt Ventilators will do the work, and why they last longer than any other. Mailed free on request.

The Burt Mfg. Co.

500 Main Street.

Akron, Ohio.

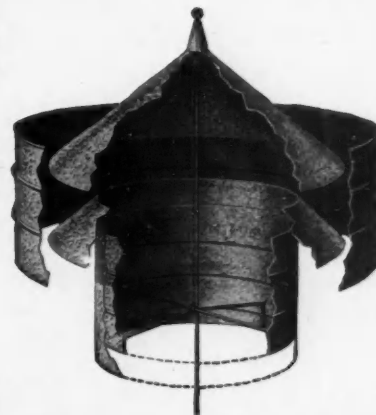
Largest Manufacturers of Oil Filters and Exhaust Heads in the World.

Skylights and Ventilators

You can reduce the cost and increase the efficiency of both by getting them combined in

The Burt Ventilator

The only Ventilator on the market that can be closed without obstructing the light. The Burt glass-top Ventilator with sliding sleeve damper (patented) is at once a perfect skylight and a perfect ventilator.



Notice Sliding Sleeve Damper. Patented.

that there are no poisonous pigments, acids or other injurious ingredients used in its manufacture, makes it a sanitary and safe method of water-proofing.

Century Cement Fluid is sold in seven colors and in one and five gallon packages. Write for prices and particulars to Century Cement Fluid Co., Station M, Cincinnati, O.

Makes All Sizes and Designs

Contractors and builders are frequently confronted by a demand for concrete blocks of various sizes and shapes, and are unable to supply the demand. They may own block machines, but find that they are not equipped to turn out the particular size desired by a customer, or the number of designs is limited to so few that they are unable to meet competition. When buying a machine the only one to get is one which is so constructed that it will turn out blocks of any desired size, shape or design. Such a machine is the Sanford Press, manufactured by the Sanford & Painter Co., Toledo, O. You do not need a machine for each different size or design of block that you may desire to make when you have a Sanford Press. It makes them all. It makes 300 to 400 veneered hollow blocks, and 400 to 500 veneered slab blocks in an eight-hour day. You can use the same face and end plates in the making of solid or slab blocks, and it takes but a moment to remove the cores from the doors of the machine.

There are so many good features to the Sanford Press that it is almost impossible to enumerate them all.

There is an actual pressure of from 13,000 to 16,800 pounds on every block made. The cone-shaped cores give a 35 per cent air space and a stronger block than is possible with any other shaped core. Every part of the machine is adjustable. All of the plates are made from the natural stone, cut, and perfect in design. The machine will make as many blocks to the yard of sand as others, make them faster, with greater adherence, and at the same time creating a 35 per cent air space. This makes a block that comes as near as possible to making a wall that is free from dampness and heat.

The illustration on this page shows the Sanford Press ready to eject an 8 by 8 by 16 inch block; in their advertisement on another page is shown the machine in the same operation, closed. In the advertisement is also an illustration of a wall of blocks in course of construction.

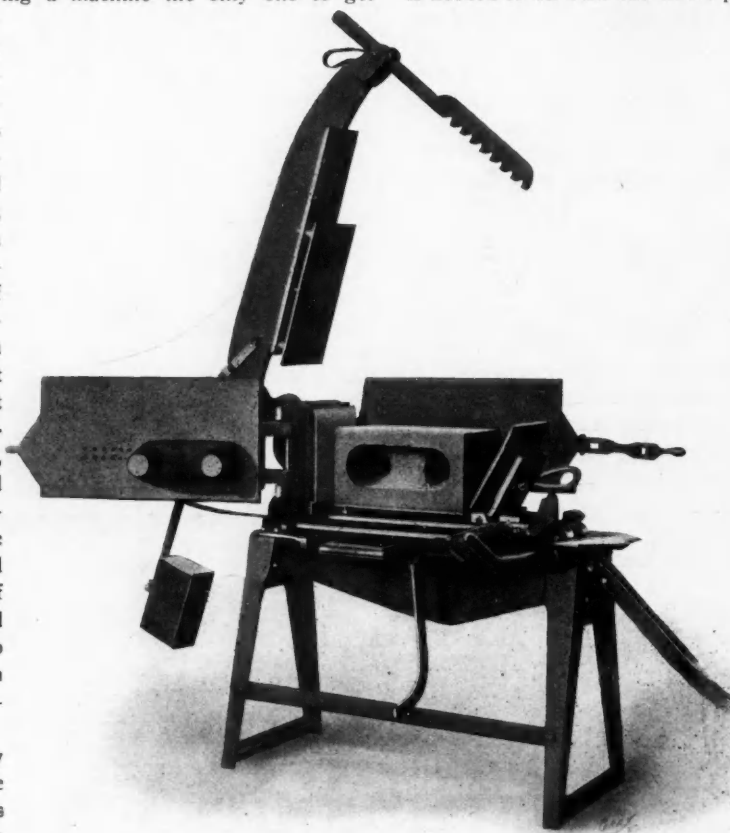
The Sanford Press is constructed by skilled workmen, and made of the best iron and steel. Each part is as carefully made under the same critical eye of inspection as is the finest machinery. Each mold is made perfect; every part exactly right. This insures a perfect block with a perfect working

machine. The machine weighs 900 pounds, crated for shipment, being built strong to stand the enormous pressure to which it is subjected. It exerts from 13,000 to 16,800 pounds pressure on each block, and practically no effort is required by the operator. It turns out from two to three times as many blocks in a day, either hollow or slab, as can be tamped. The cores for the hollow blocks are automatic in their adjustment, being raised by levers on the doors that act when the machine is opened. When the pressure is applied the cores move down with material in the machine, thus pressing the block below the cores the same as above. The Sanford Press does not use any more material than other machines, yet the adherence of the concrete is the best possible to obtain. Only one set of pallets, wood or iron, is needed to off-bear the entire product of the machine, effect-

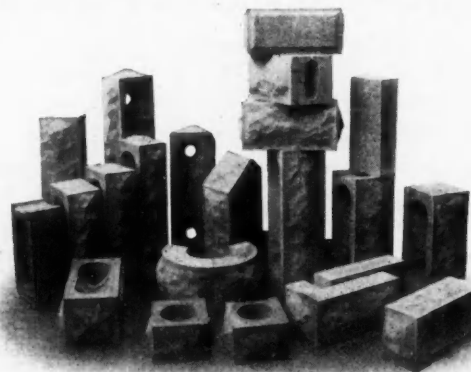
ing a large saving to the operator.

There are several strong reasons why contractors praise the Sanford Press: It makes a most perfect block, being always the same; it makes in the end of each block a hand-hold, thus saving time in the laying of these blocks, and the wear and tear upon the hands in handling them; blocks that are made on the Sanford Press always measure even inches in the walls, and masons and contractors who have used them appreciate this feature; it makes all the different kinds of blocks necessary in building construction, and all on the one machine; the great pressure on the Sanford Press produces the greatest adherence, thus assuring the best construction in building; it requires but a few moments to change from

one size of block to another, or from one design to another; so simple is the construction that any boy can make the necessary changes. Every plate is fastened with cap screws, not merely set in the machine, which makes a perfect mold and

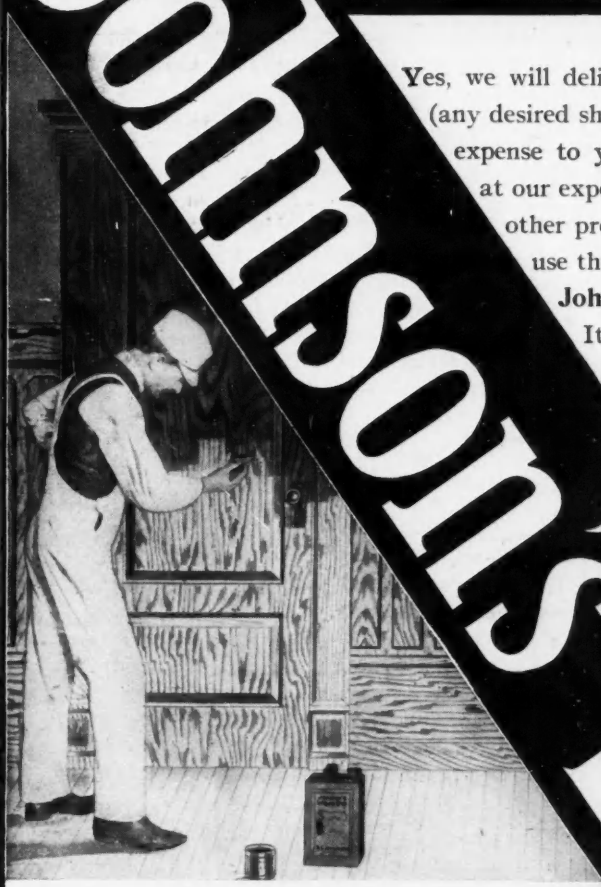


The Sanford Press Ready to Eject an 8x8x16 Block



Group of Blocks Made on a Sanford Press

3 Cans FREE



Johnson's Wood Dye

Yes, we will deliver right to your door two cans of Johnson's Wood Dye (any desired shades) and one can Johnson's Electric Solvo, FREE of all expense to you. We want you to try these well known preparations at our expense and see what they will do. If they are better than other preparations for similar use we know you will continue to use them. Once a user of Johnson's Goods always a user.

Johnson's Wood Dye is a dye in every sense of the word. It penetrates the wood; does not raise the grain; retains the high lights and brings out the natural beauty of the wood.

Be sure to get Johnson's Wood Dye and you will be satisfied. Sold by the best dealers everywhere. Half-pint cans 30 cents. Pint cans 50 cents. Quart cans 85 cents. Gallon cans \$3.00. Put up in all shades as follows:

- No. 131, Brown Weathered Oak. No. 129, Dark Mahogany. No. 172, Flemish Oak. No. 140, Manilla Oak. No. 126, Light Oak. No. 110, Bog Oak. No. 123, Dark Oak. No. 128, Light Mahogany. No. 121, Moss Green. No. 125, Mission Oak. No. 178, Brown Flemish Oak. No. 130, Weathered Oak.

1 Can Johnson's Electric Solvo FREE

We also want you to try at our expense the finest preparation for removing old finish from wood, metal and glass—Johnson's Electric Solvo, so we will send you one can of it FREE with the two cans of Dye. Use the coupon in lower right hand corner.

Be sure to send us your paint dealer's name and the name of paint jobber with whom your paint dealer does business, so we can make it easy for you and your dealer to get our preparations.

Send coupon today for copy of our new 25 cent book, "The Proper Treatment for Floors, Woodwork and Furniture," FREE with above.

S. C. Johnson & Son
Racine, Wis.

"The Wood-Finishing Authorities."

ACB 6
S. C. Johnson & Son
Racine, Wis.

Gentlemen: My paint dealer's name is _____

His address is _____

My paint dealer's jobber's name is _____

His address is _____

for which please send me FREE, pre-paid, 2 cans of Johnson's Wood Dye _____ shades, and 1 can Johnson's Electric Solvo, and copy of your new 48-page color book, all FREE as per your offer.

My name is _____

Address _____

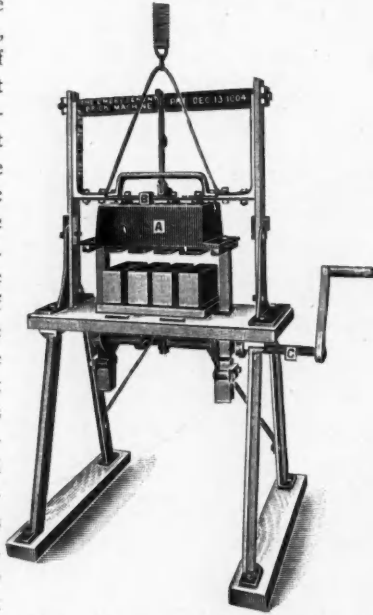
CUT OR TEAR OUT ON THIS LINE

one that will remain so. Every part of the machine is adjustable, and it takes but a moment to make any change desired.

Those contemplating purchasing machines, or adding new ones, should write for full information to Sanford & Painter Co., Suite 937 Nicholas building, Toledo, O. Ask also for information regarding mixers and cars.

The Question of Machine

The time has arrived when it is a question of machine and not material. Cement-concrete has been tried and tested for the past twenty-five years in this country, and it has proven itself to be one of the best materials known. Cement bricks are without doubt coming to the front with gigantic strides and will soon be used almost exclusively. It requires very little money to start a plant of this kind. A machine can be taken to the sand pit and cement shipped to it, and this sand bank made into cement brick that will carry a load, compression strength three times greater than clay brick. All that is required to equip a cement brick yard is a cement brick machine. If you are interested in the manufacture of cement brick, look well into the merits of the machine manufactured by Emery & McKerlie, of Bay City, Mich. Their claim is that they will furnish you with a machine that will make, from ordinary sand and cement, brick of which the finest structure may be built. It will manufacture both plain or rock-face brick. Lime mortar or plaster adhere to it quicker and more firmly than to clay



brick. The machine is a hand machine with a daily capacity of 6,000 bricks and its weight is 250 pounds. The Emery Cement Brick Machine makes a solid cement brick standard size, $2\frac{1}{4} \times 4 \times 8$, either common or red stock. This is a comparatively new machine, but has enjoyed four years of unvarying success. One of the main features embodied in this machine is its simple construction, it being practically immune from getting out of order. The three principal parts are "A," "B" and "C."

"A" is the box or molds for receiving the material for the brick. "B" are the tamps, which are raised and lowered onto the molds. They weigh about fifty pounds and are easily operated, as there is a heavy coil spring attaching to them and fastening onto—say the roof of the shed, or any framework quickly constructed. This spring counterbalances the weight. "C" is a small shaft which, when turned by the handle to the right, causes the molds to be raised clear of the brick. The brick are now ready to be taken away and left to harden. The whole process taking about twenty seconds from the time the composition is placed in the molds until the bricks are placed on the shelves. A card mentioning the AMERICAN CARPENTER AND BUILDER to Emery & McKerlie, Bay City, Mich., will bring to you a detailed description of their product.

Beautiful Tile Effects

Modern bathrooms and kitchens are made very attractive by the beautiful tile effects. These can be inexpensively obtained by using No-Co-Do Steel Tiling. It is light in weight, durable, vermin-proof, waterproof and fireproof, never cracks or breaks, and can be put up—without muss—by any mechanic—over plaster or old wainscoting if desired. It is free from all the objectionable features of expensive earthenware tiles, paper, fabric, or plaster imitations. It is manufactured by the Northrop, Coburn & Dodge Co., 32 Cherry street, New York City. They will be glad to furnish a booklet upon request, or will send you a descriptive catalogue of the Northrop steel ceilings and walls.

Palmer Patent Gluing Clamps

The cut below represents a gluing clamp which has been manufactured by Albert E. Palmer & Sons, of Owosso, Mich.,



The Heart of Enterprise

¶ The Architect, the Draftsman, *the man who plans* big undertakings has the advantage of working in the very heart of the World's enterprises. He is the center about which great projects grow. The "boom" that transforms the village into a city with such startling rapidity is often the development of an idea that springs from his brain. ¶ *If you are a young man* with no well defined idea about the future, *an older man* whose present prospects are not alluring, would you like to occupy such a niche in the world's work? *The study of drawing* is the first step toward preparing yourself for such a career. ¶ The American School of Correspondence teaches all branches of Engineering and Technical work. We believe our books offer the best chance to demonstrate the superiority of our regular courses of instruction. The

CYCLOPEDIA OF DRAWING

Four Volumes nearly a foot high. 2,000 Pages. Half Red Morocco. Marbled Edges. Gold Stamped.

¶ Compiled from representative instruction papers of the School. It is thoroughly practical for *home study work*—every chapter is complete in itself—every subject is thoroughly analyzed, dissected and discussed by well known authorities. It is entirely free from purely technical descriptive matter so easily misunderstood by the layman. It is also a complete reference library for the Technical Man who wishes to use it for consulting purposes or to "brush up" on his weak points. ¶ To introduce the School's courses for the next 30 days, we are making a special

HALF PRICE OFFER SENT ABSOLUTELY FREE **\$12 instead of \$24**
FOR EXAMINATION.

Sent by prepaid express if you mention American Carpenter and Builder, June, '07. If satisfactory send \$2 within one week and \$2 a month thereafter for five months; otherwise notify us to send for them.

Some of the Chapters Mechanical Drawing—Architectural Lettering—Pen and Ink Rendering—Architectural Drawing—Perspective Drawing—Shades and Shadows—Roman Orders of Architecture—Working Drawings—Machine Drawing—Shop Drawings—Machine Design—Tinsmithing—Sheet Metal Work—Skylights—Roofing—Cornice Work, etc.

AMERICAN SCHOOL OF CORRESPONDENCE, Chicago

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER

ANDREWS HOT-WATER HEATING

SOLD ON A YEAR'S TRIAL

THEN THE PURCHASER IS BOTH JUDGE AND JURY

The question is not whether you "should be satisfied;" not whether we have done all that we agreed to, or that the law would require of us,—the only question is, are you or are you not satisfied? If not fully satisfied it is up to you to send back the heating plant and get back from us every cent you paid us.

Such a proposition would bankrupt us, if we didn't make good. No other heating concern in the world, big or little, has ever tried to do business on such a liberal basis. We can trust the purchasers of Andrews Home Heaters to treat us fairly, because they really get more value and a better plant for their money than they expect—more than their money would buy of any other hot water heating plant.



WE SAVE YOU MONEY, FUEL AND TROUBLE

THIS IS WHAT CUSTOMERS SAY

Conceded to Be the Best in Every Way.

MONEY

Mr. J. W. Hensznan,
Grand Rapids, Mich.

Jan. 9, 1906.

Dear Sir: In reply to yours of the 6th inst., inquiring about the Andrews Heating Plant installed in my house, I will say that it is perfect. This is my third winter with it, and it is entirely satisfactory in every way—heats thoroughly and at a very economical cost.

There are several different heating systems in our town and mine is conceded to be the best in every way, and at a cost of from 20 to 50 per cent less than the others.

There is no fault about it that I can find. It does the "Business."
Clinton, Ill. R. R. No. 2.

Yours, etc.,

B. F. Peltz.

Less Fuel Than a Furnace.

FUEL

Andrews Heating Company.

March 10, 1904.

Gentlemen: I installed in my residence your Number 24 Home Heater last fall, and after a thorough test during the past winter I am glad to be able to say it has been a pronounced success and has given thorough satisfaction. We have had no trouble in keeping our home at a uniform temperature throughout, something we have never before been able to do, and the consumption of fuel has been much less than with a hot air furnace. I have no doubt you will receive several orders from this city during the coming season.

Great Bend, Kan.

Very respectfully,

F. Vernon Russell,

Cost Less Than \$1.00 to Install.

TROUBLE

Andrews Heating Company.

June 25, 1905.

Gentlemen: I am more than pleased as to the working of my plant. It gave perfect satisfaction with less work than it takes to attend a stove; and am enjoying warm floors and uniform temperature throughout.

The installation cost less than one dollar.

Ever a good word for the Andrews.
Lima, Ohio.

Yours truly

A. L. Jones, M. D.

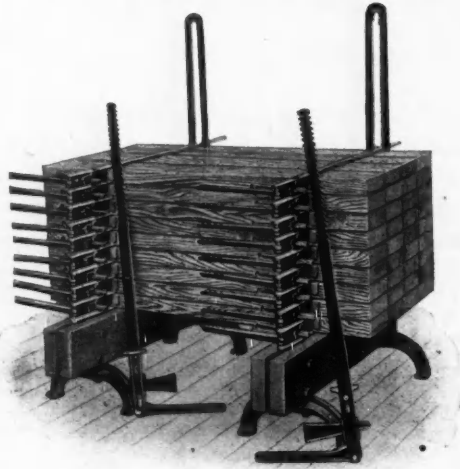
WE DO IT RIGHT IN 44 STATES, CANADA AND ALASKA

624 Heating Bldg.
MINNEAPOLIS

ANDREWS HEATING CO.

555 LaSalle Bldg.
CHICAGO

for several years, and is fast coming into general use. The clamp consists of a malleable iron standard about 44 inches long and 4 inches wide with a $\frac{7}{8}$ inch slot nearly its entire length. This standard is attached to the side of a truck or to the end of a small bench for the purpose of keeping the



jointed stock up off from the floor. The clamp proper is made of steel bars $\frac{3}{8}$ inch wide by $\frac{1}{4}$ inch thick and in seven different lengths to clamp any width stock up to five feet wide. One end of these steel bars has $\frac{5}{8}$ inch teeth on both edges of the bar for 16 inches of the length of the bar. To the opposite end is a malleable iron clamp head. It consists of a movable jaw made in two parts, connected together by a sliding wedge. These in turn are connected to a hand lever by a toggle link or knee which, as it is forced in line by the hand lever, exerts a great force, and as the wedge by sliding

forward takes up all the slack in the work, leaving but a fraction of an inch for the final pressure, which is accomplished with the hand lever with the greatest of ease. The lever, as it is thrown at right angles with the clamp, snaps into place, all in line and in out of the way.

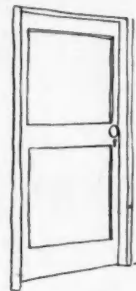
This clamp is being used very extensively in both this and foreign countries, and its sale is unprecedented.

If you are interested write A. E. Palmer & Sons, Owosso, Mich., mentioning the *AMERICAN CARPENTER AND BUILDER*, and they will be pleased to send you a detailed description of their product.

Rufus the Roofer

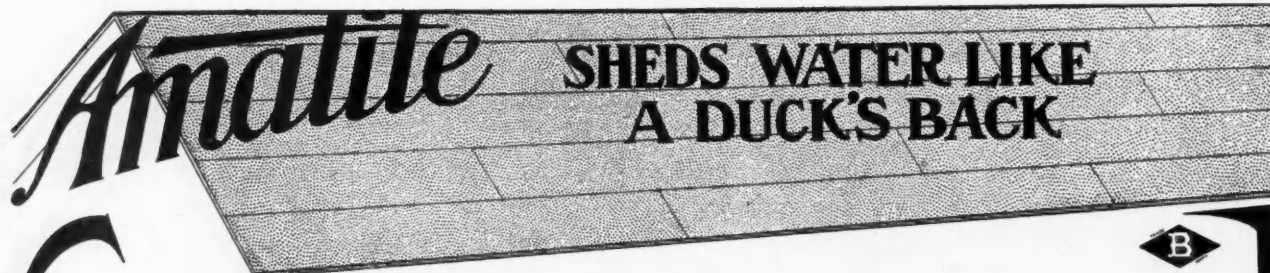
"Now that we are standin' on the threshold of a nice, clean new season, it's right and proper that we should pause and wipe our feet, as it were.

"To be sure, some of us may be approachin' the doorway with less mud stickin' to us than others, but none of us has finished the lap with a perfect score and it's by admittin' our



fall-downs and analyzing the cause thereof that we become surer-footed for the work ahead of us.

"You know, m'son, that any man is likely to fall down at



The Mineral Surfaced Roofing

Ever heard of Amatite?

Well, if you haven't we want to tell you something about it.

First of all remember the name—Am-a-tite.

It's worth your while because it is the real mineral surface roofing that everyone who sees buys. It's the winner in Ready-Roofings, and a vast improvement over the other styles. It's ready-to-lay—any one can do the work.

It's rain-proof, wind and weather-proof—out-wears all other kinds, is less expensive, and, most important—it never requires painting or repairs.

That is a pretty broad claim, but we can back it up to the letter. But don't take our word for it. Send in your name and address to-day and we will send you the proof—an illustrated booklet and free sample. Once you see the roofing itself you will not wonder why everyone is buying it. Write to-day.

Barrett Manufacturing Company

New York, Chicago, Cleveland, Allegheny, Kansas City, St. Louis, Boston, Minneapolis, Philadelphia, New Orleans, Cincinnati, London, Eng.





The Sanford Press in Operation, Making an 8 x 8 x 16 Hollow Block

An actual pressure of from 13,000 to 16,800 pounds on every block made.

Our cone-shaped cores give a 35 per cent air space and a stronger block than is possible with any other shaped core.

Every part of the machine is adjustable.

The Contractors' and Builders' Friend

The Sanford Press

Approved by Architects of Best Standing

One set of pallets will off-bear the entire product of the Sanford Press; wooden pallets may be used.

Cores are automatically raised to position when machine is opened, and are forced down with the material when the block is pressed.

Plates are not removed when block is taken from the Sanford Hollow Block Press.

You do not need a machine for each different size or design of block that you may desire to make when you have a Sanford Press. It makes them all.

It makes 300 to 400 veneered hollow blocks, and 400 to 500 veneered slab blocks, in an 8-hour day.

ASK ABOUT OUR BRICK ATTACHMENT

AN ILLUSTRATED CIRCULAR FREE
showing the various sizes and styles of blocks

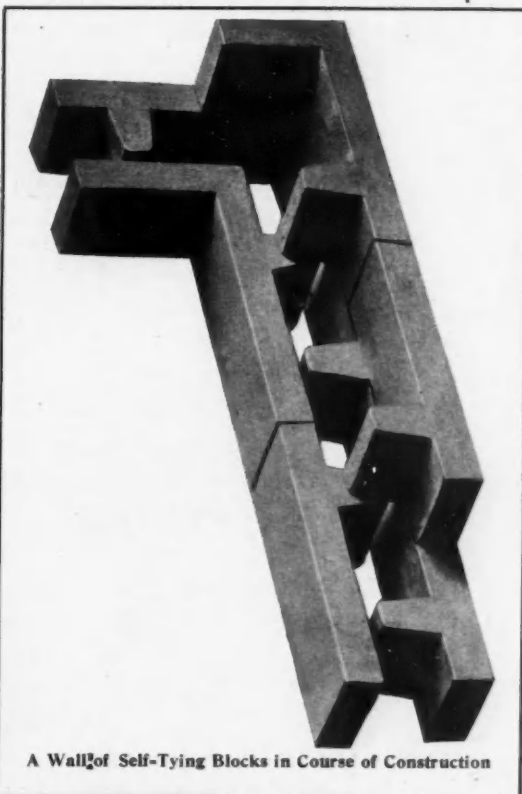
Sanford & Painter Company

Jos. I. Cox, Gen'l Mgr.

Suite 937 Nicholas Building

Toledo, Ohio

Ask for information regarding Mixers and Cars



A Wall of Self-Tying Blocks in Course of Construction

some time or other, but if he doesn't stay down, his chance to win is worth riskin' your money on.



"And when it comes to fallin' down, there's a difference between fallin' of your own accord and bein' tripped. To illuminate my point let me cite a little instance out of my own year-book.

"A year ago last April, as you may remember, I went over into Essex county and roofed a house for old Squire Pemberton. The Squire is good pay, reasonably decent and decently reasonable on almost everything except spendin' money, and there he's as tight as the bark on second growth hickory.

"I won't dwell on the preliminary skirmish, when I was fightin' for 'Target-and-Arrow' tin and he was fightin' for anything else just so 'twas cheap. I won, of course; otherwise I'd have passed the job up. I roof with what will make my ability count or I don't roof.

"Well, I simply spread myself on that job; used '100 to 100' solder, and cleats everywhere; watched the temperature of my irons so as not to get them too hot; wore gum shoes to protect the coating—in short, put on a roof that with ordinary care would have been doin' duty when the Squire's great-grand-children reached the age of discretion—if any descendants of a man like the Squire ever could.



"Well, I never heard a thing from that roof until about a month ago. Then I learned that it was all rusted out and leakin' like a sieve and that all of the cheap composition pushers in this section were running excursions out to the Squire's place to show prospective builders what sort of a gold brick I had handed him.

"Did I let them get away with it? Not on your Taylor-made tintype. I got over to the Squire's place right after my breakfast and before his. I didn't give him time to think up any names to call me—just started for the roof with the Squire at my heels.

"It sure was a wreck. Whoever said it leaked was modest. It must have fairly belched water when it rained. There were more holes in it than you'd find in a golf course, and about the same size. I asked the Squire to tell me honestly whether he had used the roof for exercisin' Clydesdale hosses or merely for athletic sports such as throwin' the hammer or pitchin' quoits.

"To shorten a long tale, it developed that every hole in that roof had been cut with a hatchet by a fool hired man



THE *Cheer of the Man who* **WINS**

The man who wins a good position and a high salary is **entitled** to cheer. He has accomplished something worth while, and yet it is really easy—yes, it is easy for **YOU** to gain a better position, increased earnings, and a successful life. First, because there are more good positions than there are trained men to fill them; second, because you can have the aid of the enormous resources, the unlimited facilities of the INTERNATIONAL CORRESPONDENCE SCHOOLS—an institution of 15 years' standing, supported by \$6,000,000 capital, and conducted for the sole purpose of training poorly paid men to earn higher salaries. That this is the grandest success of any plan ever conceived for helping handicapped workers is attested by thousands of well paid men in nearly every trade and profession who declare that they owe their entire success to the day they marked the I. C. S. coupon.



If **you** have enough real ambition to want to know how the I. C. S. will, at its own expense, take up your own personal case and explain how it can adapt its six-million dollar system of salary-raising training to your own individual needs, all you have to do is to mark and mail the coupon below so that it may have the intelligent consideration of men who helped other men to win. It puts you under no obligation to do this.

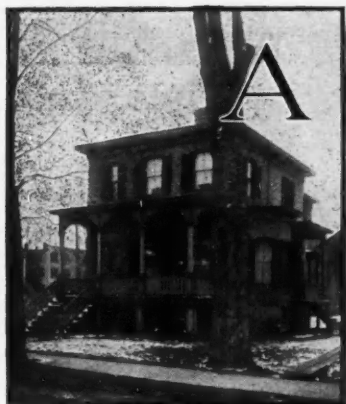
Will you let a postage stamp prevent your winning a better position?

International Correspondence Schools
Box 910, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position before which I have marked X.

Architect	Estimating Clerk	Foreman Mach'st
Arch'l Draftsman	Bridge Engineer	Sh.-Met. Pat. Drfts.
Contr. & Builder	Civil Engineer	Mining Engineer
Building Inspector	Surveyor	Textile Expert
Struct'l Engineer	Mechanical Eng.	Bookkeeper
Struct'l Draftsman	Mechanical Drafts.	Stenographer
Plum. & Heat. Con.	Stationary Eng.	Ad Writer
Supt. of Plumbing	Electrical Engineer	Window Trimmer
For. Steam Fitter	Electrician	Illustrator
Plumbing Inspect'r	Elec.-Light. Supt.	Civ. Ser. Exams.
Heat. & Vent. Eng.	Elec.-Ry. Supt.	Chemist

Name _____
Street and No. _____
City _____ State _____



**“TARGET AND
ARROW OLD
STYLE” Tin Roof**
with thirty-eight years
of service to its credit

THE house is located at Stamford, Connecticut, and was built in 1869 by Mr. W. W. Gillespie. The roof of “Target-and-Arrow Old Style” tin was laid at that time. Although it has been painted but four times, it is still in perfect condition and bids fair to outlive the building. Rotting leaves have impaired the gutters, but every inch of the roof is sound.

THERE is a tin roof on an old building at Newark, N. J., which furnishes a striking example of the durability of old-time, hand-made, heavily-coated tin. This roof was laid eighty-five years ago and does not show a leak or a sign of wear.



This trade-mark stamped on each sheet of the genuine original “old style” tin

THE durability of “Target-and-Arrow Old Style” is not equaled by any other tin or any other roofing material. Our booklet, “A Guide to Good Roofs,” explains why. Write for free copy.

N. & G. TAYLOR COMPANY
Established 1810
PHILADELPHIA

who went up there last winter to chop the ice off. On top of that some workmen had thrown about two pounds of nails in the gutters and there they lay rustin' right through the good paint I had put on and eatin' into the tin itself. To make matters worse some roof cobbler, called in to stem the deluge, had patched the holes with putty and cement, which is about as effective in stoppin' a leak as a piece of thread would be in stoppin' a runaway team.

"Before I got through with the Squire he admitted the fault was not mine or the tin's, but due to his own stupidity and I am going to fix that 'Target-and-Arrow' roof on his house just as soon as the weather breaks.

"I mention this, m'son, to show what extreme and inhuman cruelty roofs sometimes get inflicted on them and how a good roof and a good roofer can lose their good name. All I ask for a 'Target-and-Arrow Old Style' tin roof is a little care and attention. Treat it right and it makes the best roof on earth.

"RUFUS THE ROOFER."

"Heughes" Steel Joist Hanger

F. L. Heughes, of Rochester, N. Y., has perfected a steel joist hanger and steel post cap that for strength, reliability, ease of attachment and cost bids fair to make them the most popular on the market. In constructing this new joist hanger the same method is employed that is used in uniting steel plates, angles and other sections, through the medium of rivets.

The hangers are constructed so that their tensile strength is greater than the carrying power of the joist, or in other words, the joist would break before the hanger. The loss in strength which might be caused by the holes for rivets is equalized by the thickness and width of the hanger.

The "Heughes" Steel Post Cap is very simple in construction, being formed by two steel structural angles, which form

the main channel to receive the wood girder, and are connected underneath by two transverse angles which, with two side bars, form the pocket for the lower post. The structural angles of which this new steel post cap is formed are the same as those tested and approved in every steel structure of the age. The rolled angle, with its fillet, is far superior in strength and form to the bent plate without a fillet.

For further information address, F. L. Heughes, 190 South avenue, Rochester, N. Y.

Hight's Spirit Level and Plumb

The cut herewith represents Hight's Spirit Level and Plumb. It is easily adjusted and firmly held in place. A new vial can easily be placed and adjusted. The stock is laid up of four pieces of walnut and birch or mahogany and walnut and will never warp; they are 24, 26, 28 and 30 inches long, 1 1/2 inches thick, 3 1/2 inches wide, and are finished in natural color with pure shellac, and are perfectly water proof.

Practical Art Metal Ceilings



Quickly and easily applied. We are the only manufacturers who cut the beads in the dies after casting. RESULT—Square and accurate plates—which will save you time and labor in cost of erection.

Send for Catalogue No. 2, which shows 200 new and original designs.

MANUFACTURED BY
Wm. Foster & Sons Co., Inc.
Springfield, Illinois

Also manufacturers of Radiator Shields, Fire Proof Window Frames and Sash, Gal. Iron Fronts, Hip Shingles, Cornice, Skylights.

...to wheat and locally there for hard winter at the scale 1,100,000 bu. 1,800% and 80% July, and 84% annual figures being and 80% for

y' losses. ed largely by the t. declines being lent stiffening all apperatively light, resulting from the high several cash supporting the) The final quoa of 1/2 for May, September, so there more fa- to predictions of str up ginger in pjs were 242 cars, g 446 cars. Sea- 100 bu. The visae of 872,000 bu, 50 bu a year ago k were 3,808,000 year, supplies on increase of 406,000 condition 71, cent larg

we firmer. g start the more p strength, clos e July and 1/2% under pressure of e day, wound up as of 1/2. Prices steady to a little re or four days stract out have ic warehouses. 20 cars less than today being 471 were insignifi- red an increase a decrease of last year. Mil- n at 75, with the crease of 8 per t was prompted wheat and the

**Seven, Eight, Nine Room
STRICTLY MODERN
Hot Water Heated Homes**



A poorly built house is almost certain to prove a lasting disappointment; you can well afford to pay a few hundred dollars more in the start, because it will be a distinct saving in the long run. These are homes that are built as they should be; every inch represents the highest standard of modern construction. Convincing proof can be shown that they can not be replaced now for \$500 above prices asked.

HOW BUILT AND WHAT THEY CONTAIN,

Spence hot water heating system
Handsome combination fixtures
Hardwood finish practically throughout,
Eighteen-inch stone foundation,
Eight to nine foot plastered ceiling
basements,

Plastered dust-proof laundry room,
Spacious closets and butler's pantry
Laundry stove and hot water heater,
Large stationary refrigerator,
Spacious front and rear porches,
Beautifully decorated in Wainot & Mus

- 511 Devon Ave., 30x155
- 3792 N. Hermitage Ave., 37 1/2 x 162
- 3708 " " " " 37 1/2 x 162
- 3815 " " " " 37 1/2 x 162
- 3827 " " " " 37 1/2 x 162

Kellogg-Mackay-Cameron Co.

CHICAGO Minneapolis
Kansas City Seattle

**The Selling Points
of a Well Built
House are Easily
Recognized**

Spence Hot Water Heating systems make comfortable homes, and valuable property—remember this when building yourself, or recommending the best methods for a client.

Ask us for information regarding Klymax Boilers and Kewanee Radiation. They will meet your requirements.



¶ There is no haphazard guess-work about the building of railroads, or the bridging of yawning chasms; every detail of construction, every little problem has been solved. Every move has been carefully **planned** before a stroke of work is done. There is a reason for every spike, every switch, every twist and turn of the track. The safety of human life depends upon the accuracy with which every inch of rail is laid.

¶ Your success in life depends upon the careful thought with which you have planned your career. Will you be holding a better position five years hence, earning more money, **because** you are planning step by step to reach such a position, or are you merely hoping and wishing that something will "turn up" to help you? Are you holding your **present** position by accident, or by choice? You cannot succeed unless you give at least as much careful thought to **planning** your journey through life as you would a fifty mile pleasure jaunt.

¶ If you are a young man, without a profession or trade, an older man dissatisfied with poorly paid, uncongenial work, you can better yourself by studying in your spare hours. Send for our FREE handbook today, describing over sixty Engineering and Technical Courses. Mark the subject on the coupon and let us help you to plan a paying career.

We Employ No Agents to bother you with repeated calls at your home or place of business. We talk to you only by mail. The money you pay is not used to maintain an expensive organization of high-priced agents, but is used to give you better instruction at a lower cost.

COUPON
Cut on dotted line

Please send me 200-page hand-book. I am interested in the course marked "X."

-Architecture
-Carpentry
-Contract'g and Build'g
-Concrete Engineering
-Heat, Vent. & Plumb.
-Sheet Met. Pat. D'f'g
-Civil Engineering
-Mechanical Engineer'g
-Electrical Engineering
-A.C.B., June, '07
-Structural Engineering
-Steam Engineering
-Locomotive Engineer'g
-Mechanical Drawing
-Telephone Practice
-Telegraphy
-College Prep. Course (fitting for entrance in engineering schools)

Name.....

Address.....

AMERICAN SCHOOL OF CORRESPONDENCE
Chicago, Ill., U. S. A.

The ends are protected by suitable tips. These levels are made especially for carpenters and that class of workmen; they are all union made and bear the label, and are not equalled by any spirit level made as to appearance and ease and accuracy of adjustment. They sell for \$3.00.

Mr. Hight also makes a mason's and bricklayer's level which sells for the same price. It is 36 to 42 inches long, 1 1/4 inches thick and 4 inches wide, and it has two plumbs and one level. It is made of white pine, or other suitable light wood, the ends are tipped and nicely protected, and it is fin-

modern to be had. They are compiling a book treating on Perfect Art Metal Ceilings which will be ready for distribution in a short time.

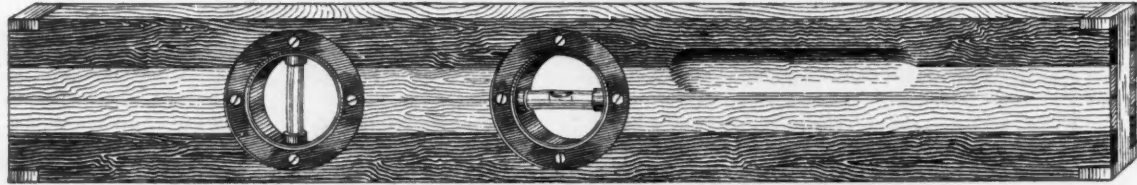
Demorest Little Giant Mixer

The letter below is just a sample of many letters received by the Ballou Mfg. Co., Belding, Mich.,

Grand Rapids, Mich., December 19, 1906.

Ballou Manufacturing Co., Belding, Mich.

Gentlemen: We have been using one of your power mixers



ished in mahogany and well shellacked, making it handsome as well as very durable.

For further information, address A. W. Hight, P. O. Box 322, Toledo, O.

Perfect Metal Ceilings

The Perfect Art Metal Ceilings manufactured by the James H. Watson Company, of Bradley, Ill., have a very suitable name from the fact that they have the most artistic appearance of any ceilings on the market today. On page 475 we illustrate two of their new designs and you can readily see the sharpness of stamping and gracefulness of their work. The patterns they manufacture are absolutely new and it will be appreciated by many dealers, architects and contractors as well as the public that they have made the move to put Perfect Art Metal Ceilings on the market. One of the principal features in the construction of their goods, is the fact that they have a perfect fitting bead; this not only adds to the attractiveness of their patterns but increases the speed in erecting the ceilings.

At the present time they manufacture the three following classifications: Louis XIV., Colonial, Italian Renaissance.

Their machinery for turning out this work is the most

for the past month and will say that we are greatly pleased with its operation. We are using at the same time an \$800.00 machine with steam power. The latter is a batch mixer, and we notice every time the men get a little lazy, they don't put in as much gravel as they ought to, which increases the necessary portions of cement. We also notice that in the operation of the batch mixer, four or five laborers are frequently waiting for the batch to be mixed, thus much time is lost; while with your mixer we can load up the wheelbarrows as they come around.

We are also much pleased with the thoroughness with which the cement is mixed with the gravel. It is a perfect mixture and the proportion of cement and gravel can be regulated to a nicety. If purchasers only realized that your machine is more exact in proportion of gravel and cement than batch mixers as they are usually worked, we do not see why you should not sell all the machines that are needed. We also find a great economy in the fuel expense, the coal for the batch mixer costing \$1.00 a day, and the gasoline only fifty cents a day. Another economy is in the cost of the engineer. The batch mixer calls for a man at \$2.50 a day to shovel coal and attend the engine. Your mixer requires no such expense. It also takes fewer men to shovel the gravel

BUILD WITH PRACTICAL KNOWLEDGE If you are a House-Owner or planning to build, this set of books will save you many times its cost. For the young man no better chance to learn a paying trade or profession could be offered. If you are a Carpenter, Contractor, Builder, Architect, Draftsman or Mechanic this advertisement offers you an exceptional chance to advance in your present occupation. The truest test of your present efficiency is the amount of money earned by you from week to week. Unless you are advancing and earning **more and more** money as you grow older, there must come a time when younger and more ambitious men will crowd you out. Learn now to turn your spare time into money.

Cyclopedia of Architecture, Carpentry and Building

Compiled from representative instruction papers of American School of Correspondence. This offer is made to advertise the School. We believe this great work will easily demonstrate the superiority of our method of instruction. If you mention this Magazine, a 200 page hand-book describing the School's 60 regular courses will be sent FREE.

SPECIAL ADVANCE SALE

LESS THAN 1/3 REGULAR PRICE, IMMEDIATE DELIVERY

TEN MASSIVE VOLUMES, each nearly one foot high. Bound in red half morocco. Over 4,000 pages; 3,000 illustrations, full page plates, plans, sections, etc. Printed on highest grade paper; entirely new type—**DE LUXE** book in every particular.

Special \$19.80 Price
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Sent by prepaid express. Send \$2 within one week and \$2 a month if satisfactory; otherwise notify us to send for them. In any case you lose nothing. Absolutely no orders accepted at this price if postmarked later than July 31, 1907.

Among the Chapters: Reinforced Concrete Construction—Carpentry—The Steel Square—Building Law—Fireproofing—Stair Building—Superintendence—Estimating—Contracts—Specifications—Strength of Materials—Architectural Drawing—Masonry—Electric Wiring—Plumbing—Steam Fitting—Heating—Ventilating—Cornice Work—Skylight Work—Roofing—Steel Construction.

AMERICAN SCHOOL OF CORRESPONDENCE
CHICAGO

AMERICAN SCHOOL OF CORRESPONDENCE Chicago, Ill.

Please send set Cyclopedia Architecture, Carpentry and Building for week's free examination. I will send \$2 within a week and \$2 a month until \$19.80 is paid; otherwise I will notify you to send for the books.

Name.....
Address.....
A.C.&B. 6-7.

COUPON
Cut on Dotted Line

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER

Celebrated Furman Boilers

ESTABLISHED 1868

40 Years of Successful Manufacturing

**Hot Water and Low-Pressure Steam Heating
for Homes, Churches, Schools,
Stores and Greenhouses**

Furman Boilers have an unusually large and intensely effective surface. Over four-fifths of the Boiler is absolutely exposed to the direct action of the fire

Many Styles

Furman Boilers are designed in upwards of two hundred different styles and sizes; from small Tank Heaters for warming water for domestic purposes to large Sectional or Brick Set Boilers for heating all classes of large buildings.

Economical in Fuel

The well-known economy of fuel and ease of management of Furman Boilers are largely due to four principles of construction:

- 1st. All fire strikes directly against the large water heating surfaces at right angles
- 2nd. The water in Furman Boilers is divided into small units, thereby absorbing heat quickly.
- 3d. The vertical movement of water through Furman Boilers insures rapid and powerful circulation.
- 4th. Furman Boilers have large fuel capacity, thereby requiring minimum of attention.

They will return large dividends in improved health, increased comfort, and fuel saved.

We quote from letter recently received:

"My residence containing eight rooms and bath is heated by a Furman Round Sectional Boiler. Fire was started October 14th last. It will not require over five tons of coal this winter. This does not seem reasonable, but we have maintained a temperature of 70 to 74 degrees all the time.

"My neighbor, who is using a _____ Boiler, carrying the same amount of radiation, will use nine or ten tons. The Furman is the best Boiler on the market for heating and saving fuel."

Built on Merit

The success of Furman Boilers is eminently attested by the valued endorsement of Heating Engineers and Contractors, Architects and House-Owners, and the many Medals and Awards of Merits that we have received at various Conventions. This has given Furman Boilers their unequalled reputation.

Samuel A. Esswein, the noted Heating Contractor of Columbus, Ohio, wrote us in January as follows:

"While this testimonial is unsolicited, I feel it my duty to recommend anything I buy that gives satisfaction. I have used almost every cast iron boiler that is made, in executing my contracts for steam and hot water installations over the country, and I say without fear of contradiction that in my installation of some 300 Furman Sectional Boilers within the last three and one-half years I have not had one complaint.

"The Furman Sectional Boiler is easily and quickly erected (which means something to the Contractor), and from practical demonstrations, I find that it will make steam quicker and circulate water quicker, with less fuel than any Boiler I have used."

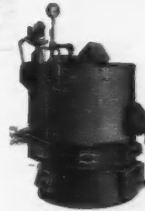
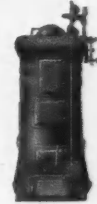
Profitable Investment

The purchase of a Furman heating apparatus is one of the best investments a thrifty man can make.

It will very largely increase the value of his property either for selling or renting.

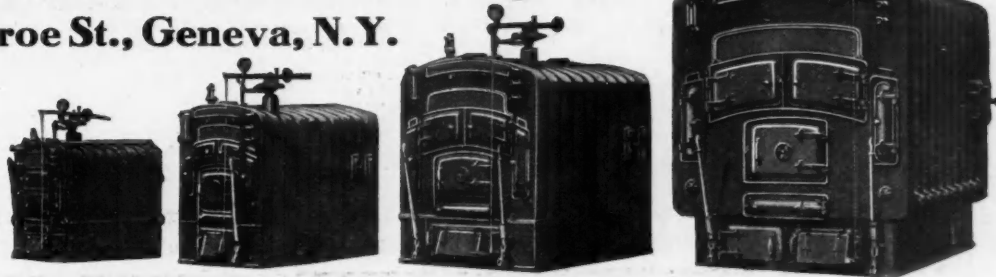
It will mean a large saving in fuel over other methods of heating, and will give a uniformly heated building at a minimum expense for fuel.

The many advantages and desirable features of a Furman Steam or Hot Water system are fully described in our illustrated catalogue. A copy will be mailed FREE on application. Address



Herendeen Manufacturing Co.

6 Monroe St., Geneva, N. Y.



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER

into the machine because they can work steadily, while with the batch mixer they have to wait until the batch is mixed and emptied every time. We figure the saving in labor and fuel at \$15.00 per day over the batch mixer, and they are running side by side, and your machine will make more concrete than the batch mixer.

Very truly yours,

GRAND RAPIDS FURNITURE CO.

Write this firm for booklet and see their ad. on another page.

The Lightning Block Machine



The writer wishes to call the attention of all block men to investigate the Lightning Block Machine, which appears on page 452. This machine is a new departure for making blocks rapidly on account of its automatic movements. It has no equal. The Lightning Concrete Block Machine is a strictly first-class face-down machine and has but few working parts. It is sold direct to the user, which makes it a low priced machine. Every carpenter and builder should get in touch with it.

D. F. DETRICK.

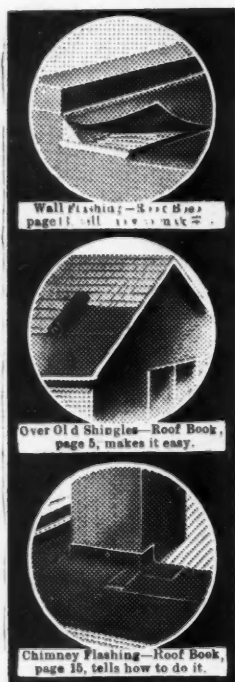
Concrete Blocks in Porto Rico

The use of concrete block as a building material is fast coming into general use throughout the island of Porto Rico. These blocks, made from sand, gravel and Portland cement and fashioned into various ornamental designs, are rapidly displacing other building materials, owing to their cheapness and great durability. Buildings erected with them never require painting or repairing, and instead of deteriorating from year to year, the concrete block continues to grow

stronger and better with age. Machinery for producing all sizes and designs of blocks can now be had at reasonable cost. The Century Cement Machine Co., of Rochester, N. Y., U. S. A., manufacturers of the Hercules Concrete Block Machine, report a steady demand for their machinery for Porto Rico. Mr. F. B. Hatch, a well known builder of San Juan, operating Hercules Machines, has recently completed a number of exceptionally fine concrete block buildings, among them the George O. Robinson Orphanage. Contracts now under way include numerous churches and apartment houses, while several large warehouses have already been completed for the Porto Rican American Tobacco Co. Owing to the excessively high price of lumber, the board of education have decided to use the concrete block exclusively in the erection of school buildings throughout the Island. For the purpose of supplying the stone required at the start, several Hercules machines have already been installed and more will be added as they are required.

"Stone Making"

The Pettyjohn Company, of Terre Haute, Ind., has just issued a new edition of their "Stone Making" catalogue, which is said to be the most complete and up-to-date booklet of its kind ever published. In addition to an elaborate description of a full line of concrete molding machinery and appliances, it contains much information of vital interest to any manufacturer of concrete products. The Pettyjohn Portable Upright Model has long been recognized by the hard-headed contractor as the speediest and most versatile block machine on the market. It is an argumentative fact that there are more of these machines in use than any other, and that the largest block factory in America uses them exclusively. The Pettyjohn Company are pioneer manufacturers of concrete molding machinery, and the Pettyjohn system of block making is recognized wherever stability of product and minimum expense are sought. This well-known company has recently put on the market a new block machine, called the "Invincible," which embodies the idea of molding the blocks face down, but overcoming the faults usual with other off-bearing machines. The "Invincible" is especially adapted to the wet process, and it is claimed that it will carry a larger percentage of water than any block machine made. This is a highly important feature, in view of the fact that many contractors and architects are



NO-TAR ROOFING

Defies Time, Water, Sparks, Cinders, Wind

"No-Tar" Roofing has a surface as hard as flint—it is flint! Can't catch fire from sparks or cinders. It's as flexible as rubber—and absolutely waterproof. It's tougher than leather. Costs less and lasts longer than shingles, iron or steel. Won't run in the hot sun. The building that has a "No-Tar" Roof protection will last longest.

Accepted by all Fire Insurance Companies, who charge 25 per cent less for insuring buildings protected by "No-Tar" Roofing than for buildings with shingle roofs.

For Store Buildings and Factories "No-Tar" Roofing is far more durable and satisfactory for flat or steep roofs than tin or gravel roofing. Will not rot, rust or run.

For Barns and Outbuildings "No-Tar" Roofing is made in various weights, for all sorts of buildings. Nothing better or cheaper for siding houses, out-buildings, etc. All joints water tight. "No-Tar" Roofing keeps stock and poultry snug, safe and warm in coldest weather. Quick and easy to lay. Exceedingly popular among farmers stock raisers and poultrymen.

For Houses "No-Tar" Roofing will add immensely to the appearance of your residence. Use it on your new house or cover the old, leaky shingle roof with "No-Tar" Roofing and avoid disaster from water or fire. "No-Tar" Roofing is a non-conductor of heat or cold. Keeps your house warm in the winter and cool in the summer. Try it on your porch or kitchen.

Free Samples to Test When we send you the Free Sample of "No-Tar" Roofing we will tell you ten ways to test it and prove its superiority to any other roofing.

Free Roof Book This book tells "How to Do Your Own Roofing." Tells how to make Valleys, Gutters, Flashings, etc. How to Measure a Roof. Explains the whole roofing proposition. We send the book FREE, postpaid, on request. Get "No-Tar" Roofing from your local dealer. Special nails and cement FREE.

The Heppes Co., 625 Fillmore Street, Chicago

Dealers Attention—Write for FREE PLAN, by which you can quickly build up a profitable Roofing Department.



Hight's
 Union Combination
SQUARE
 Five Tools in One

8-INCH TRY-SQUARE, BEVEL, MITRE MARKING GAUGE AND BUTT GAUGE

The protractor works over a segment on the base of the square, which is divided into three scales of 0 to 12, showing rise of inches on a 12-inch base. The opposite side of the segment is laid off in degrees. The notches in the blade are $\frac{1}{4}$ inch apart, making a dandy marking gauge. A notch in the lower end of the protractor is handy for a butt gauge. A mitre is cut in the base of the square or the protractor clamped on 12 of the first series makes a mitre. Many of the best dealers handle this square, if yours don't. We will send it prepaid on receipt of \$1.25. Dealers and agents wanted in all territory.

The Hight Manufacturing Co.
 837 Spitzer Building, Toledo, Ohio

PALMER'S Patent GLUING CLAMPS



Clamp "A"
 Take Stock up to $1\frac{1}{4}$ inch

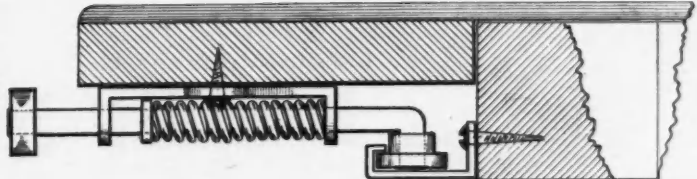
Are the most successful Piling Clamps made—for the following reasons:

They clamp instantly any width of dimension stock; no adjusting clamps to fit the work, they hook at once to the desired width. Released instantly—throw out the lever and take them off. The work can be removed as fast as it can be handled. As the clamp is placed over the work and locks into the one below it the draw is alike on both sides, prevents all springing, no matter how wide the stock may be. Impossible for them to slip; the wedge has serrated edge and cannot be moved when clamp is closed, hammer all you like. Unlimited power; great strength and durability; malleable iron and steel; the knuckle joints are socket joints, not rivets. Although the best they cost you less. For further information ask for catalogue No. 5.

Albert E. Palmer & Sons
 203 John Street Owosso, Michigan

THE EUREKA T-SQUARE AND Drawing Board Attachment

A TIME-SAVING DEVICE FOR EVERY DRAFTSMAN



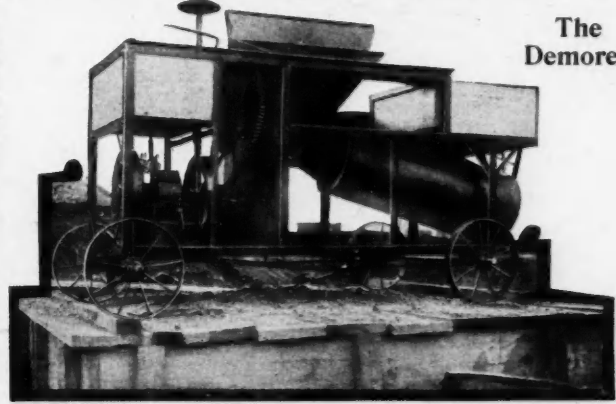
YOU NEED IT BECAUSE

It holds the T-Square where desired upon the Board, insures accuracy, affords you the use of both hands to do your work; you can do more work accurately; it can be attached to the Board and T-Square you are now using, and because your outfit is not complete without it.

Set consisting of one spring attachment and 24 inches of track, screws, etc., sent complete, postpaid, to any address in U. S. on receipt of \$2.00. Additional length of track furnished at 25 cents for each 6 inches.

In ordering state length of your T-Square that the proper spring may be supplied, also width of your Board, for the proper length of track. **Agents Wanted.** Descriptive Booklet sent on request. Address

THE L. I. COONRADT CO. 810 Olive St. ST. LOUIS, MO.



The Demorest **Little Giant Mixer**

automatically proportions—mixes dry, then wets. Product approved by engineers. Capacity greater than any Mixer costing twice its price. Easily portable. One customer claims \$15.00 per day saving over one of the best known Batch Mixers.

Send for Booklet "a"

BALLOU MANUFACTURING Co.,
 50 High Street : : BELDING, MICH.

now specifying wet process products. The "Invincible" is furnished in various sizes, ranging in price from \$35.00 to \$215.00, but the Tandem Invincible is an especially desirable machine for the rapid and economical production of blocks. It will make a stone 40 inches long, or two 20 inch ones, at one operation, or one 24 inch and one 16 inch, or any other fractional combination of from 4 inches to 40 inches. This Tandem machine has been pronounced by every contractor who has seen it to be the greatest block producer and biggest money maker in the field. To those who are interested in concrete block machinery or the great modern industry of concrete block making, it will certainly be worth while to write for a copy of this new edition of "Stone Making." It may be had by simply addressing the Pettyjohn Co., 634 North 6th street, Terre Haute, Ind., but if you will mention the AMERICAN CARPENTER AND BUILDER your letter may be accorded particular attention.

Fireproof Window Construction

Builders today are beginning to appreciate the fact that fireproof metal windows are at least getting to be an absolute essential in the construction of a building.

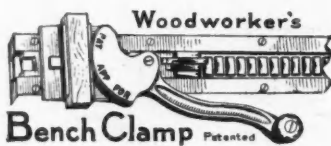
Times without number they have proven themselves to be invaluable, and it is to the interest of any and every builder to look carefully into this subject.

The Valley Cornice and Slate Co., Ltd., of Sagniauw, Mich., manufacture not only a very complete line of metal fireproof windows, but also manufacture a complete line of metal ceilings, cornices, skylights, etc.

They also make a specialty of Genasco roofing, about which they would be pleased to give you full particulars. Just drop them a card mentioning the AMERICAN CARPENTER AND BUILDER and they will forward you immediately descriptive literature showing their entire line.

The Woodworker's Bench Clamp

The woodworker's bench clamp is a new invention just being placed on the market by the Woodworkers' Bench Clamp



Woodworker's
Bench Clamp Patented

Company, of Traverse City, Mich. This clamp is what the name suggests.

A clamp to be used on the work bench. It centralizes in one tool the utility of the side vise, tail screw and the dog. It is placed at the head of the bench, crosswise of the bench, and the bed piece is countersunk so that when the clamp is not in use the jaws and cam are run to the back of the bench, leaving the entire surface of the bench clear. This clamp holds material of any thickness up to 13 inches, while by adding extra bed pieces the width is unlimited. It is very quick acting with a positive grip. It will, without question, prove a time saver on any

bench. There is much work done on the bench which should be held so the workman has both hands free, and this clamp accomplishes this purpose. It will be found useful in planing, jointing, bench mortising, cleaning up long lumber, plinth blocks, head blocks, sawing miters, coping, dadoing, in fact, its use is unlimited.

The Cushman Metallic Shingle

The demand for metal shingles is constantly increasing, and one of the best known is the Cushman Metallic Shingle. Its plan of construction is the very simplest and best, and in architectural beauty it has not a peer. Is quickly and easily applied to sheathing boards. Will not crack, spilt, warp, rattle, slide off or get out of repair. Is water and fireproof, cheap and durable. Made in three sizes, of best materials, or galvanized iron, copper, tin painted and Bessemer steel or iron painted, and packed in crates containing one square (100 square feet). The price of galvanized shingles is now within the reach of everybody, and while first cost is a little more than painted steel or iron, yet it is the cheapest roofing in the end. It is very durable and therefore always satisfactory. They are in use in all parts of this country and in many foreign countries. The cost of roof construction is reduced by the light weight of these roofings compared with slate and other materials. Their fireproof qualities reduce the cost of insurance, as they often prevent fires and the spreading of fires. A layer of building paper is an advantage to the roof,

Classified Advertisements.

Advertisements under this heading will be inserted at the following rates:
One month \$0.45 per line
Three months 1.25 per line
Six months 2.25 per line
One year 4.25 per line
Count 10 words to the line. Situations wanted one-half above rates.
Replies may be addressed in our care and will be promptly forwarded.

Help Wanted.

WANTED—Carpenters to read our ad. on page 353. Gage Tool Co.

LUMBERMEN WANTED—In all branches of the lumber trade positions are open and waiting. If you are open to engagement or advancement with a good company let us represent your interests. We have written agreements with over 600 glitgedge lumber concerns in the United States, Cuba, Canada and Mexico. 5,000 lumbermen indorse our methods. We guarantee positions to men of ability in the following: Superintendents Saw and Planing Mill Foremen, Inspectors, Yard Managers, Machinists, Logging Superintendents, Sawyers, Filers, Managers, Estimators, Buyers, Salesmen, Draughtsmen, Bookkeepers, Office Managers, Stenographers, Woodforemen, etc. Write us today, enclosing stamp, for full information. Mason's Agency, Nashville, Tenn.

For Sale

ONE 2½ horse power Steam Engine and Boiler; one Barnes No. 4 Saw, good as new; one Barnes foot power Mortiser; one 12-foot Turning Lathe. Am going out of business and will sell at a bargain. E. A. McINTIRE, Rydal, Kansas.

Instruction.

LEARN CEMENT CONSTRUCTION in all its branches for \$1.50. Building Blocks Water Proof, white or any color. Bridges, Roof, Floors, etc. Write for descriptive circular No. 30. Cement Institute, St. Louis, Mo.

Furnaces

\$100 FURNACE \$59. Contractors' Favorite. America's Highest Grade Mail Order Heater. Book free. Century Furnace Co., Box E., Youngstown, O.

Wood Working Machinery.

WOOD WORKING MACHINERY—Band Saws, Jig Saws, Planers, Molders, Shapers, Wood Lathes, Rip and Cut-Off Saws, Engines, Boilers, Gas Engines. Above in both New and Second-Hand Rebuilt Machines. Send for Stock Sheet and Catalog. Hanna-Brackenridge Company, Box 463, Fort Wayne, Ind.

Patents.

C. L. PARKER, Solicitor of Patents, 20 Dietz Bldg., Washington, D. C. Handbook for Inventors send free upon request.

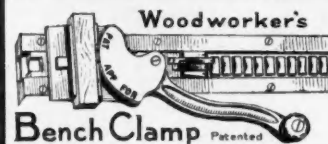
PREVENTS DRAFTS, DUST AND WINDOW RATTLING.
IVES' PATENT
Window Stop Adjuster.



HEAVY BED

PATENTED.

The only Stop Adjuster made from one piece of metal with solid ribs and heavy bed that will not cup, turn or bend in tightening the screw. Manufactured only by The H. B. IVES CO., New Haven, Conn., U. S. A. (Fifty-page Catalogue Mailed Free.)



Woodworker's
Bench Clamp Patented

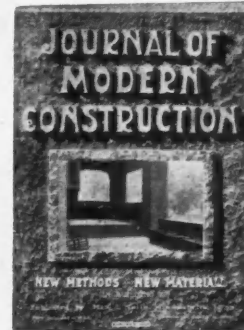
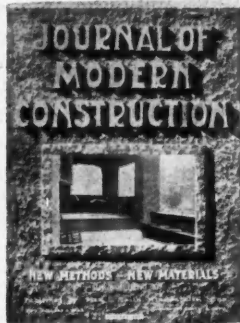
Cash with order. \$2.00
Price

30 day Money Back Trial. 365 day Guarantee.

Centralizes the utility of side vise, tail screw and dog. Instantaneous action, positive grip. Holds up to 13 inches widths. Any length material worked on short bench. Bench clear when not in use. Bed piece countersunk crosswise at head of bench. Made of iron and steel.

WOODWORKERS' BENCH CLAMP CO.
S. 7th Street, : Traverse City, Mich.

PLANS FOR CONTRACTORS



Working plans for this house in Feb. No.—For this house in June

Each issue of this high grade magazine contains a house plan to interest you and 40 to 48 pages of instructive money-making ideas for builders. Current issue on sale at news-stands 20 cents, sub. \$2 a year. \$1 Special Offer to Contractors. A six mos. trial sub. and any two back Nos. extra. Send for descriptive folder showing twenty inexpensive homes to select plans from. Free on request. 506 Lum. Ex., Minneapolis, Minn.



Success to Concrete Block and Brick Makers

If you contemplate the making of Concrete Blocks and Brick. I can show you how to save money—at least \$1.50 per hundred blocks and \$1.25 per thousand brick. Blue Print Drawings, scale 1/4 inch to the foot, with a complete itemized bill to construct a Money Saving Plant, for the sum of \$1.00. (Money order or bill.) For references as to my experience and success, address The Old Second National Bank of Bay City.

J. H. EMERY

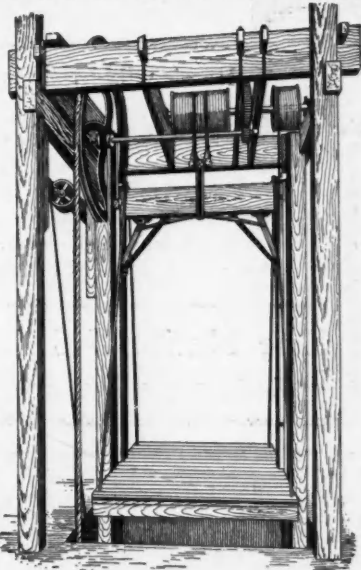
807 W. Midland Street, : : : BAY CITY, MICH.



Elevator Repair Bills

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By Using

THE EATON & PRINCE



Center Lift Store Hoist

We Pay the Freight—You Install Elevator Yourself

We will ship this Elevator direct to you, freight paid and you can install it yourself without expense except the help of the average mechanic. This is an exceptional offer. Everyone knows that EATON & PRINCE means dependable Elevators. No other Elevator is quite as good because none is made with such infinite care. Send for Catalogue No. 99.

We are also extensive makers of Passenger and Freight Elevators, for direct and alternating current. Send for catalogue.

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SLATE WE HAVE WHAT YOU WANT

*In Roofing Slate, Slate Blackboards
Structural and Plumbers' Slate*

SATISFACTION GUARANTEED IN QUALITY AND PRICE

ASK FOR DELIVERED PRICES

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CUT STONE WORKS**

Bedford, Ind.

Cut, Planed and Turned Bedford Stone in any quantity

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STEEL SQUARE POCKET BOOK, second edition, 159 pages, 150 cuts, cloth bound 50 cents.

FOLDER, third edition, 25 cents.

BOOKLET on DESIGNING, second edition, 30 cents, all for \$1.00.

DWIGHT L. STODDARD

328 W. Raymond Street

INDIANAPOLIS, IND.

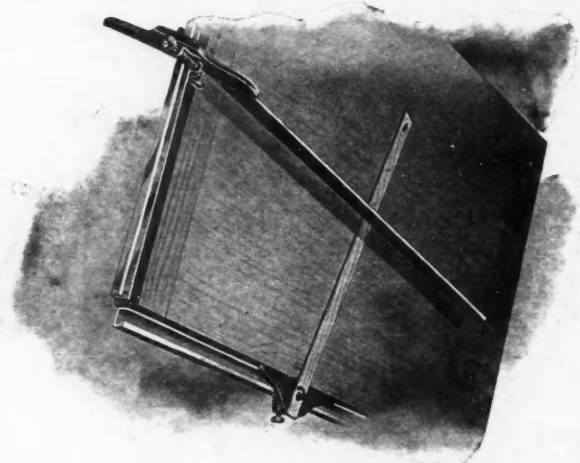
the same as to any other part of the building. It absorbs any moisture originating beneath the sheeting.

Write to the Kanneberg Roofing & Ceiling Co., Canton, O., who will send you samples, showing the construction, and an interesting descriptive circular.

Important Drawing Board Attachment

The Eureka T-Square and Drawing Board attachment, as shown in the accompanying illustration, and further described and shown on the 435th page of this issue, is a new and much needed device.

Every draughtsman knows how difficult it is to hold the T-square in its proper position, and heretofore there has never been any satisfactory means provided for doing so. But the



Eureka does positively hold the T-square across the board, thus accuracy is insured, the user has the free use of both hands to do his work, he can execute more work; in fact, there is every advantage gained and not one disadvantage. The entire instrument is thoroughly practical, simple of construction, durable and in fact a piece of art in itself. It can be attached to the outfit you now have and the price is so reasonable that it is within reach of all. Order one today, or send for further particulars to L. I. Coonradt Co., 810 Olive street, St. Louis, Mo.

Loeven's Level Attachment

When a builder is working on a building, first in one place and then in another, quite a little time is lost in keeping track of the level, without which you cannot proceed. A very handy little device is now being manufactured and sold by its patentee, Mr. Wm. Loeven, 499 West 15th street, Chicago, Ill. This device is an attachment to the steel square, and it not only takes the place of the level, but also has numerous advantages over it. In the first place it weighs

only three ounces and as it attaches to the square, it becomes part and parcel of the square. It tells at a glance, not only that the work is not level, but also just how much it is out of level. This little device should be in the hands of every carpenter, bricklayer; in fact, every mechanic should add it to his tools. The price of this handy device is very reasonable and within reach of everyone. Just send 35 cents to Mr. Wm. Loeven for one of these attachments with directions for using, and it will save you hours of time and thousands of steps every month.

An Exceptionally Fine Catalogue

One of the most artistic and complete catalogues of concrete machines comes from the Ideal Concrete Machinery Co., South Bend, Ind. It shows not only the machine and its appurtenances, but also excellent illustrations of the various blocks made on it. The book contains some very valuable information that should be known by every purchaser of a concrete block machine, including directions for figuring the cost of blocks, standard specifications for their manufacture, and important points on mixing, manufacturing, curing, laying and coloring. There are also directions for finding the number of blocks required for a house of any dimensions. In the back of the book are some fine, clear photographs of residences and many other buildings, including a power house, school house, ice house, church, stable, manufacturing plant, burial vault and retaining wall. The Ideal Concrete Block Machine, upon which the blocks were manufactured for all of these buildings, is one of the best machines on the market. Probably more machines of this kind are sold in the United States, Canada and abroad than of any other. The catalogue, in addition to describing the advantages of this machine, has so much valuable information for the man contemplating the purchase of a machine that it should be in the hands of every contractor. In writing address Department A. T., Ideal Concrete Machinery Co., South Bend, Ind.



Here's why we deserve your orders for
Structural Slate

We give prompt service, honest goods, lowest possible prices, fair treatment, and your money's worth all through. It costs very little to verify this. Write us.

The National Slate Vault Co.
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SEND US PLAN OF SPACE TO BE TILED, WE WILL QUOTE LOWEST PRICE DELIVERED AT YOUR STATION ~ CERAMIC - MOSAIC - & ENCAUSTIC TILE for FLOORS IN WHITE AND COLORS ~ DESIGNS SUBMITTED ~ WORK EXECUTED IN ANY PART of the COUNTRY

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TILE LAST FOREVER · 420 MILWAUKEE ST. MILWAUKEE, WIS.

BATH FLOORS · BATH ROOMS · VESTIBULES · PUBLIC BUILDINGS ·

"LIGHTNING" CEMENT BRICK MACHINES and Improved All-Steel Cement Mixers



THIS BRICK MACHINE Excels All Others, BECAUSE it manufactures the brick ON THEIR FLAT—the only way to prevent having broken brick—from a quarter to a half of all brick made on edge or face are broken the next morning because of warped pallets.

"Lightning" Cement Brick Machines are made in three sizes for making 6, 16 or 24 brick at an operation. We warrant them to be the simplest, the fastest, and the ONLY REAL PRACTICAL Cement brick machine made to-day. Day by day and week by week they will turn out DOUBLE the amount of PERFECT BRICK of any machine in the world.

OUR ALL-STEEL CEMENT MIXERS

Our latest improved cone-shaped, all-steel Concrete Mixer is the most complete, durable, and fastest working batch or continuous mixer on the market. We absolutely guarantee it to do better and more thorough work than has ever been accomplished before by any mixer costing double the price. It is operated by hand or power and is built inside and out on the structural steel principle. Write for particulars at once to

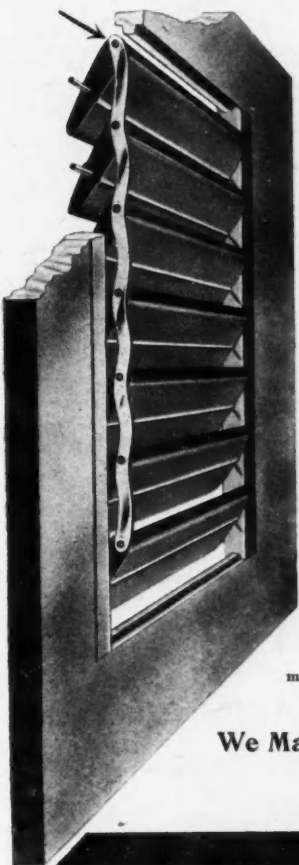
Wettlaufer Bros 307 Ellicott Street
BUFFALO, N. Y.
CANADIAN OFFICE: Stratford, Ontario
NEW YORK CITY OFFICE: 420 W. 23rd. Street.



Operates Hand or Power

Write for our Special Offer covering complete Portable Outfit consisting of an Improved All-Steel Mixer and a 2½ H-P. Gasoline Engine both mounted on Strong Wagon ready for business

Corrugated Steel Slat Rod (See Arrow)



Neat,
Effective,
Easily Operated,
No Lost Motion.

PHOENIX INSIDE SLIDING BLINDS

The PHOENIX Inside Sliding Blinds are a success and fully appreciated by architects, builders and house owners wherever sold. They are far superior to the old style of Folding Blinds—either outside or inside.

The lately improved springs and corrugated steel rods put the "PHOENIX" far in the lead of less improved styles.

The Corrugated Steel Slat Rod

This rod is one piece (not short pieces), consequently there is no lost motion, as all slats move perfectly and positively. Our slats have steel tenons that act smoothly and cannot break. All other makers must use the old wooden tenons. The Phoenix is a flat and strong corrugated steel rod, placed on the end of slats, "out of sight."

Our Counter Balancing Springs

With the PHOENIX Counter Balancing Springs, the block in center is of hard wood, supported at either end with steel springs attached to the solid wood of the stile of blind, and not to a piece glued in. To increase the tension on the friction block, the groove where end of spring is attached can be cut deeper. The friction block is attached to the springs by metal pins passing through slots in springs; this allows block to adjust itself to any inequality of surface.

TESTIMONIALS

CORSICANA, TEX.
The Phoenix Sliding Blind Co.:
I consider your blinds the best fixture I have in my house.
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I enclose check for \$88.41 for blinds as per contract. They fit all right and are satisfactory to the owner.
JOSHUA D. COOPER.

Send for Catalog "C"

We Make Highest Grade Hardwood
Veneered Doors

Phoenix Sliding Blind Company
Bridge and Canal Sts., PHOENIX, N. Y.

CONTRACTORS' HOIST

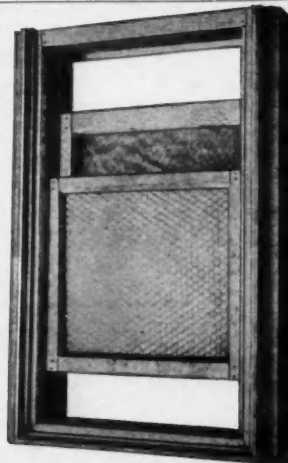


Our direct connected, self contained hoist for double platform elevator work can't be beaten.

Equipped with our Standard Gasoline Engine it certainly is the most economical method of elevating building material known.

Write for our Bulletin No. 5, and let us name you price. We also make a full line of Gas and Gasoline Engines, from 1½ to 25 H.P.

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Fireproof Windows,
Metal Ceilings,
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No. 577

GRILLES

NET PRICE

in pine, plain sawed oak, birch, cypress or woods of equal value, for opening 8" x 8" **\$24.00** in white.

Other sizes in proportion. Extension from wall 16." Posts 3 1/2" dia.

We show 190 new designs in new catalog. SENT FREE.



No. 528

5" x 1" **\$4.75** in white.

Decorators Supply Co. Archer Ave. and Leo St. CHICAGO, ILL.



Twin Molds

Will save you time. Time worth fighting for. Write the

Haltman Mold Co.,
10 and 12 Michigan Ave. DAYTON, O.

Rider Agents Wanted



in each town to ride and exhibit sample 1907 model. Write for Special Offer.

Finest Guaranteed 1907 Models \$10 to \$27 with Coaster-Brakes and Puncture-Proof tires.

1906 & 1906 Models of all of best makes **\$7 to \$12**

500 Second-Hand Wheels All Makes and Models, good as new **\$3 to \$8**

Great Factory Clearing Sale. We Ship on Approval without a cent deposit, pay the freight and allow **TEN DAYS' FREE TRIAL.** Tires, coaster-brakes, sundries, etc. half usual prices. Do not buy till you get our catalogs. Write at once.

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WHO WANTS SLATE?

Roofing Slate for Houses, Barns, etc. Always clean, beautiful and fireproof. **Blackboards** for Schools, Colleges, etc. Needs no commendation; universally used all over this and other countries.

Structural Slate. Electrical Stock, Sinks, Troughs, Washtubs, etc. Superior to all stone for such purposes.

Slaters' Supplies. Handmade Slatting Tools, Felt, Cement, Nails, Snow-guards, Punching Machines, etc.

Write for prices and I will tell you all about Slate.

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This \$20 Watch for \$5.45



These figures tell exactly what we are doing—selling a \$20.00 watch for \$5.45. We don't claim that this is a \$40.00 watch or a \$50.00 watch, but it is a \$20.00 watch. A leading watch manufacturer, being hard pressed for ready cash, recently sold us 100,000 watches—watches actually built to retail at \$20.00. There is no doubt that we could wholesale these to dealers for \$12.00 or \$13.00, but this would involve a great amount of labor, time and expense. In the end our profit would be little more than it is at selling the watch direct to the consumer at \$5.45. This Evington Watch, which we offer at \$5.45 is a rabid jeweled, finely balanced and perfectly adjusted movement. It

has specially selected jewels, dust band, patent regulator, enameled dial, jeweled compensation balance, double hunting case, genuine gold-laid and handsomely engraved. Each watch is thoroughly timed, tested and regulated, before leaving the factory and both the case and movement are **guaranteed for 25 years.** Send us your name, postoffice address and nearest express office, and name of this paper, tell us whether you want a lady's or gent's watch and we will send the watch to your express office at once. If it **satisfies** you after a careful examination, pay the express agent \$5.45 and express charges and the watch is yours, but if it doesn't please you return it to us at our expense. A **25-Year Guarantee** will be placed in the front case of the watch we send you and to the first 10,000 customers we will send a beautiful gold-laid watch chain **FREE.** We refer to the First National Bank of Chicago, Capital \$10,000,000.

NATIONAL CONSOLIDATED WATCH CO., Dep. 642, Chicago

VICTOR HAND-FORGED AUTOMOBILE



Water cooled; 2 cycle engine 4 1/2 x 4 cylinder; wheels 37 inches; 1 1/2 inch Goodyear cushion tires; runs from 1 to 25 miles per hour. No country too rough or hilly for the Hand-Forged Victor. Price \$450, including leather top, fenders, lamps, horn, tools, etc. Write for Catalogue and full particulars.

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25% REDUCTION

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FIVE ORDERS OF ARCHITECTURE

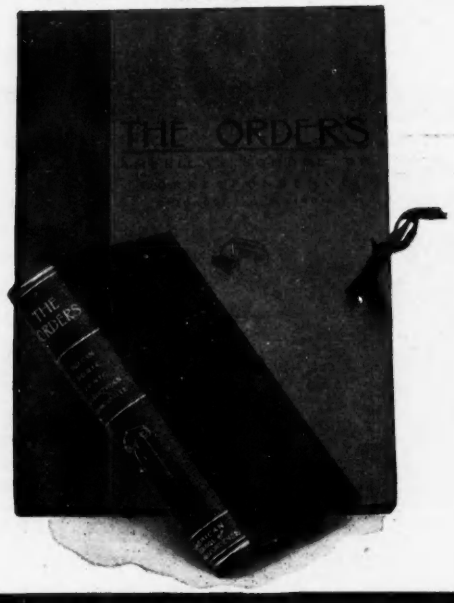
A new work for architects, draftsmen, carpenters and architectural stone and sheet metal workers. The simplest and most comprehensive treatise on the Greek and Roman orders yet published. Illustrated with over 300 sections and details drawn to a scale.

This work is compiled from the representative instruction papers of the American School of Correspondence. It has given such universal satisfaction that, merely as an introduction for the Architectural courses of the School, we have decided to sell this complete set during the next 30 days for

\$12.00 instead of \$16.00

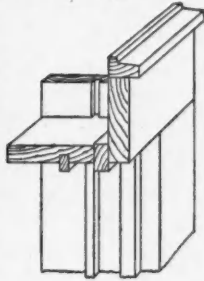
Sent by prepaid express, for one week's free examination, if you mention American Carpenter and Builder, June, '07. Study the books carefully. If satisfied, send us \$2.00 within one week and \$2.00 a month for five months. We will remove the books at our expense on notification from you if they are not adapted to your needs. You cannot lose anything by ordering the books now, even if they do not fulfill your requirements. You will lose \$4.00 by delaying your order beyond 30 days.

AMERICAN SCHOOL OF CORRESPONDENCE CHICAGO



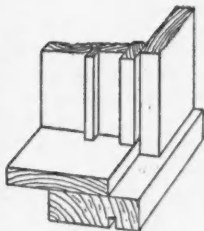
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Right now we are booking 5,000 window frames to be shipped during this month.



That indicates we are giving satisfactory quality and service.

Send us rough sketch of frame you are using, and we will quote you price by return mail.



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are bound to increase our list of customers. Will YOU allow us to enroll your name on this list by sending us a sample order for frames by first mail?

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MALTA, OHIO

Artistic Mantels



in Mission, Colonial, White, Mahogany and Oak.

Everything from the cheapest to the best. Fireplace hardware and tiling of every description.

Large catalogue and wholesale price list sent on receipt of 25c in stamps.

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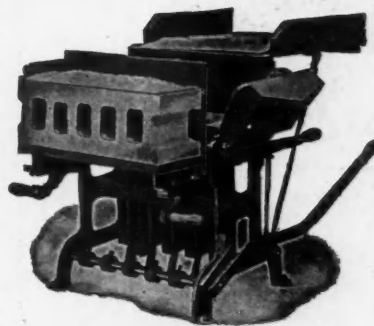
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Always at the front with the very best

READING BRICK MACHINERY CO., manufacturers of high grade cement brick machines and concrete mixers, paving block molds, and molds for ornamental trimming. Our brick machines make the brick flat—the only way to make a good brick. We guarantee every machine to produce perfect work or refund the money. Send for catalogue No. 3. This will show you at a glance what the machine will make. It makes a greater variety of work than any other machine on the market. We are open for investigation.

Reading Brick Machinery Co., Reading, Pa.

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Can you afford to experiment?

Why not take advantage of our long experience and purchase a machine that has proven successful in every particular. Many hundreds of **SIMPLICITY MACHINES** and thousands of **SIMPLICITY BLOCKS** used daily in all parts of the world.

Ask for catalogue and price.

THE STANDARD SAND & MACHINE CO.
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Manufacturers of

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THESE BEAUTIFUL AND USEFUL CONCRETE LAWN ORNAMENTS

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Send for catalogue of moulds for making them. Also a complete line of up-to-date concrete machinery and tools.

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Contractors Make a Splendid Profit BY USING THE Simpson Cement Molds

to produce Ornamental Cement Blocks for veranda work. No power or machinery necessary; only a small investment for the molds.

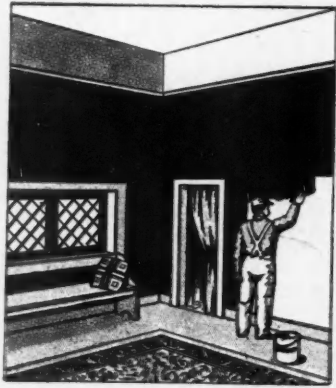
Write now for full information and illustrations of verandas of beauty already made with our molds. Also ask about waterproofing; cost 15c a gallon at your door.

Simpson Cement Mold Co.

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Ashbaugh's

Sanitary Wall Finish

*A high grade flat finish, Lead and Oil Paint. Harder than Enamel or Varnish and will wash better. You ought to know about this. * * **

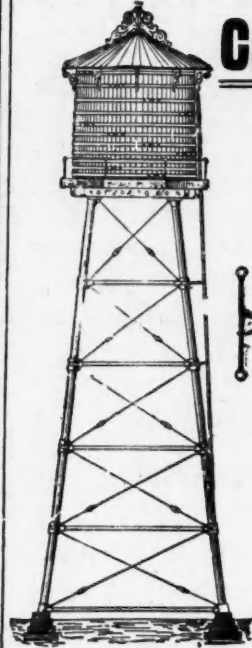
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represent the best in ideas, the best in materials and the best in workmanship. The engineering principles governing their construction are the same as in bridge building, insuring ample stability.

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Patented Jan. 29, 1907

A MONEY-MAKING SPRING HINGE

BECAUSE

It is new.
It has no loose parts.
It's all-steel from tip to tip.
Spring is covered and protected from the weather.
It's extremely simple—just five parts in all; Two tips two leaves, one spring.
Two tips—wrought steel, turned by automatic machinery—used as rivets—hold the two flanges firmly in position and allow the hinge to work freely.
Two flanges—wrought steel—formed by presses—symmetrical—edges drawn down, leaving no rough parts to be torn or bent—broad giving firm hold on the casing of door, prevents sagging or warping.
One spring—triple coiled—snappy acting—covered—made of No. 8 oil-tempered wire—hold-back at 140 degrees—fastened at both ends securely—cannot slip or spring out of place.

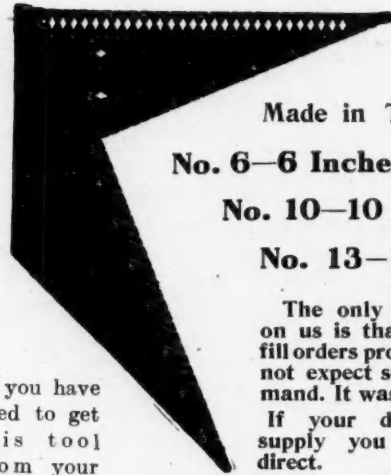
Their shipping weight is just two-thirds of that of cast iron—saves money in freight.
Heavy smooth coat of glossy black enamel is carefully applied and properly baked.
Not cheap—but sell at a good profit.

If you are one of our customers, you know the high quality of our products. If you are not, 'twill pay you to learn it. Either way write for the "Book of Rseans," you will be interested in it. We send it free. Also our Catalog No. 12.

The COLUMBIAN HARDWARE CO., Cleveland, Ohio

The New Universal Square

Is proving itself sure to become the standard tool of its kind



Made in Three Sizes:

No. 6—6 Inches

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The only kick coming on us is that we did not fill orders promptly. We did not expect so heavy a demand. It was not our fault.

If your dealer can't supply you now, write direct.

If you have tried to get this tool from your

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BURLINGTON

Venetian and Sliding
BLINDS
Screens and Screen Doors



Venetian Blind for inside window and outdoor veranda. Any wood; any finish to match trim.

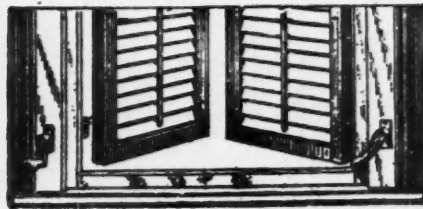
Equal 500 miles northward. Perfect privacy with doors and windows open. Darkness and breezes in sleeping rooms. Write for our catalogue, price list and proposition to you.



Sliding Blinds for inside use. Require no pockets. Any wood; any finish.

BURLINGTON VENETIAN BLIND COMPANY
950 Lake Street, Burlington, Vermont

MALLORY'S



Standard Shutter Worker

New and improved patterns and designs.

Opens and closes the blinds without raising the window. Automatically locks the blinds in any position desired. Made of gray and malleable iron. The best and most durable blind hinge. Incomparable for strength, durability and power. Can be applied to old or new houses of brick, stone or frame. **Send for Illustrated Circular.** If your hardware dealer does not keep them, send direct to **FLEMINGTON, NEW JERSEY.**

YOU CAN BUILD YOUR HOUSE BUT ONCE

SO have a care how you build it. Don't try to practice economy by letting price instead of quality influence selection of materials.

Use good materials all through. To save on first cost usually means to pay the difference many times over in the years that follow.

For example, every house should be covered from foundation to ridge-pole with

LINOFELT

Linofelt will keep your house warm and comfortable in winter. It will save more than its entire cost in your heating expense. Linofelt will keep your house cool in summer, too, for Linofelt is the best non-conductor of heat and cold made.

It will cost you a little more but, by actual test, quarter-inch Linofelt has been proven to resist the passage of heat 40 per cent more than ordinary rosin-sized building paper.

Linofelt is made of **degummed flax fibre** encased between two sheets of rosin-sized paper. Degummed flax fibre is the fibre of flax straw from which all the gum has been extracted, leaving millions of minute air spaces, through which heat or cold passes only with greatest difficulty.

Linofelt is like a blanket, and it's warmer than any blanket you ever saw. ¶ It is clean, antiseptic and odorless, and is vermin proof. ¶ This testimonial is like hundreds of others in our possession, telling what users think of Linofelt.

IVES GROVE, Wis., January 28, 1907.

UNION FIBRE COMPANY, Winona, Minn.

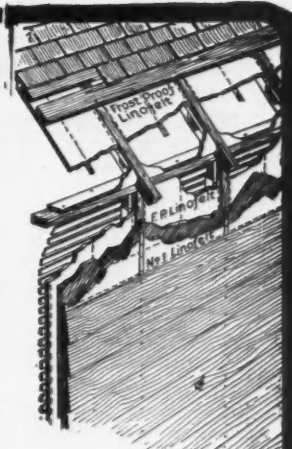
Gentlemen:—I have your letter of recent date, inquiring as to results obtained from your No. 1 and "Frost Proof" Linofelt, and in reply will say that we have used this for three winters in the house and for two winters in the barn. Our two large rooms are 44x18 feet, 9½ feet high, and we have only used one large base-burner stove and in the coldest days we have had (being 28 degrees below zero), the further end of the room was never colder than 58 degrees.

In the barn, which is 62x38 feet, with cement floor, and an eight-inch air space, we have also used this material, and find that the barn is never colder than 38 to 40 degrees above, with the cattle and horses therein. In this barn we have King's system of in and out ventilation, so that the barn is absolutely odorless. I would recommend your materials to every one wishing a warm building of any kind. I am now going to erect an ice house for farm purposes, and also a home creamery, and will use your materials throughout.

Very respectfully yours, C. O. OLSON.

Send for free sample and booklet which tells more about Linofelt, and more about its uses. It's just the thing, too, for barns and poultry houses.

UNION FIBRE CO. 106 Mechanic St. WINONA, MINN.



The Ewing Cement Fence Post
is the New Universal Post

Any kind of Fencing material, either singly or in combination, can easily be fastened to this post by either wiring, stapling or nailing.

Each Post forms a Lightning Conductor

To quickly introduce our Post, the first 100 county rights will be sold at \$10 each, the second 100 at \$15 each. Regular price, \$25.

The above price includes blue prints showing method of constructing mold box.

A Three-post Wooden Mold Box will be furnished for \$5 additional.

The sale of a farm right or two will give you the balance of the territory free.

This Post makes a great side line for the Concrete man.

Ewing Fence Post Co., Akron, O.

Rayl's Catalogue

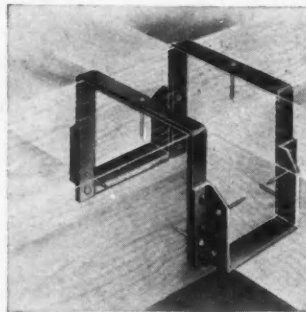
For Woodworkers

300 pages of Tools, the latest and best tools, and many other things that shopmen use and that mechanics want. We will mail you one free of charge for the asking, but we won't object to your sending us the postage (.08) if you like.

T. B. RAYL CO. Established 1875 DETROIT, MICH.

THE "HEUGHES" PATENT STEEL JOIST HANGER AND STEEL POST CAP

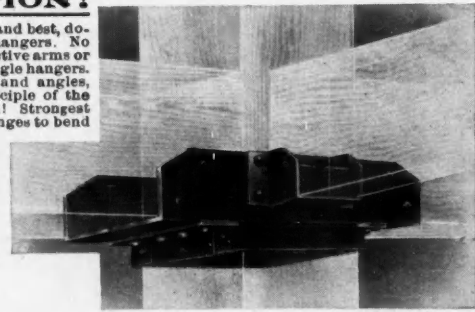
STEEL CONSTRUCTION!



The "HEUGHES" STEEL JOIST HANGERS are the latest and best, doing away with the faulty construction of old method hangers. No need of using the old single joist hanger, with its defective arms or flanges, or paying extra for splicing together of two single hangers. Modern steel construction—the uniting of steel plates and angles, through the medium of rivets, is the strong principle of the "HEUGHES" Hangers! Simplest construction! Strongest carrying capacity! Most reliable! Has no flanges to bend or straighten out! Is easiest and quickest attached.

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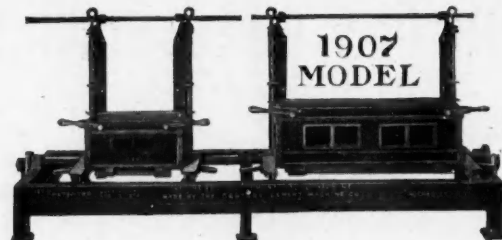
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"Heughes" 4-Way Steel Post Cap

F. L. HEUGHES

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in Porto Rico adopts
THE HERCULES**



If you are making Concrete Blocks, you ought to have the Hercules, the best machine; it may cost you a little more at the start, but it will prove the most economical before six months have passed.

The Board of Education has adopted the Hercules for Concrete Construction of all kinds in Porto Rico, as this letter will prove:

"Gentlemen: Last machine ordered for Board of Education has arrived. The Department will adopt the Hercules Concrete Block almost universally. Both the Commissioner and the Superintendent of Construction in this department seem very enthusiastic about it. They have already contracted for three or four buildings to be built, and some of them I shall build myself. I contracted for the first one and am now having plans drawn for three new churches, all to be made of blocks, and am putting up a large apartment house which I shall send you a photo of when completed."

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The Hercules is the strongest of all machines—it is constructed on the most simple lines. No chains, gears, levers, springs or pins—nothing about the Hercules to get out of order. It is a face-down machine, and on it you can make all sizes and varieties of blocks from six inches to six feet.

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The Pump That Pumps
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HAY TOOLS
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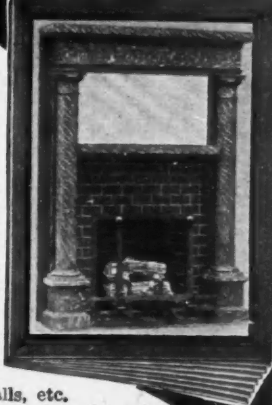
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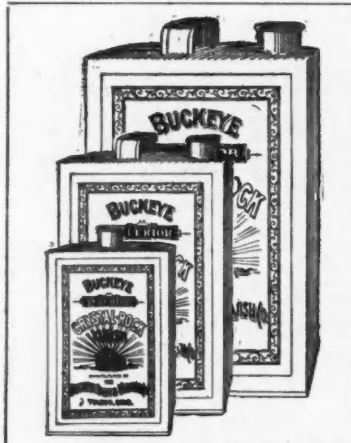
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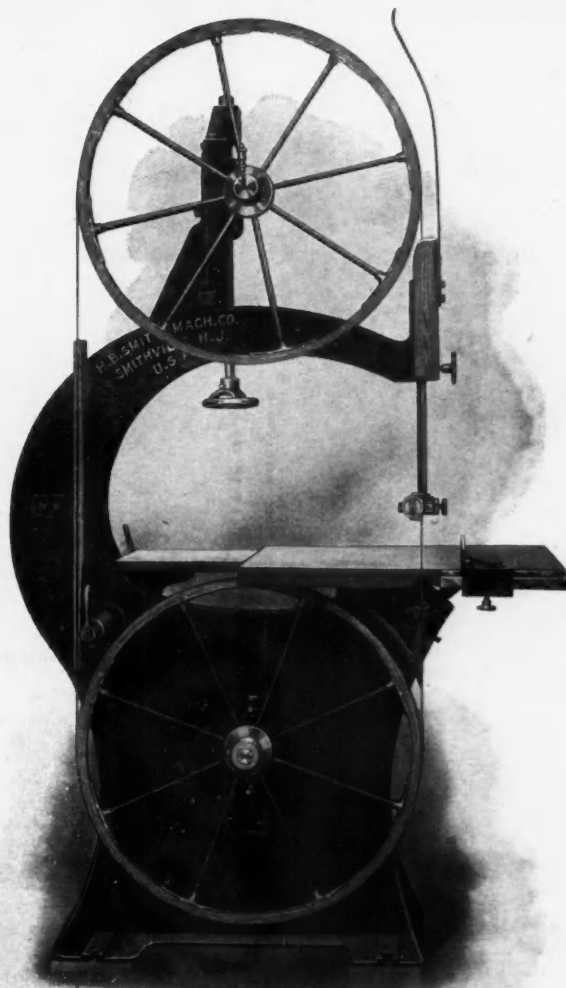
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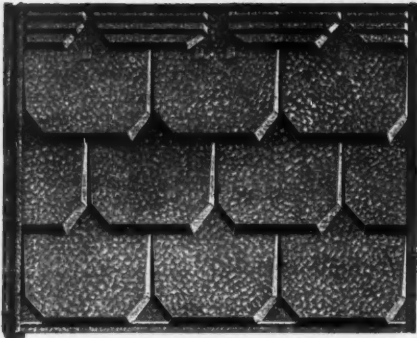
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They reduce the fire risk, and cost of insurance. Superior and cheaper than wood shingles. Any good carpenter or mechanic can lay our shingles.

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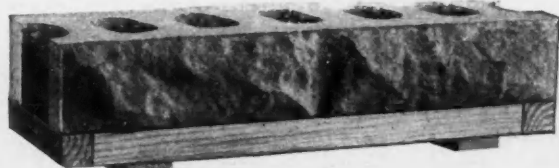
which makes the best block in the shortest time, the greatest variety of styles as well as of sizes, a full line of veneer work as well as of regular heavy blocks, etc., then buy

The U. S. STANDARD MACHINE

Manufactured by
The Ashland Steel Range & Mfg. Co.
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We save you and your customer 50 per cent by these direct shipments.

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Ours weigh only $\frac{3}{4}$ oz. per sq. inch—less than the weight of a letter you mail for 2c postage, distributed over a space a little larger than a postage stamp. Would you want to live under a roof frame unable to stand this "load?"

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the tin people on tin
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Moscow, O.
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"The roof of my house, part of which was blown off during a recent storm, was tin. It had been on for 20 years, but like all metal roofs, which is the material generally used in this section of the country, has never been satisfactory to me, as it leaked from the start, and has been partially blown off several times.
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Genuine Bangor Slate Roofs secure for your building the minimum insurance rate.

Write for Book NOW

American Carpenters and Builders

Say of

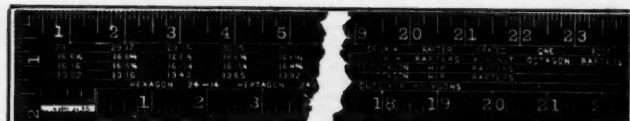
"Gossett" Hinges for Window Screens:

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If Gossett Hinges pleased their customers, won't they please yours? Send for free sample pair for actual test—there's nothing so convincing. Sold by hardware dealers. Price per dozen pairs, \$1.20, express prepaid.

Six Years of Growing Sales Prove Their Worth

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Has an Octagon Rule for Framing Octagon Roofs. It is found on back of body of square, and on face of body of square is our COMMON FRAMING RULE. Have you seen one? If not you ought to. Go to your hardware dealer and ask him to show you one, and if he hasn't one write us and we will send particulars.





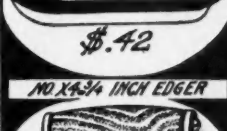





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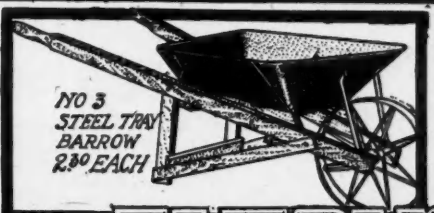


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ANY SIZE ANY SHAPE

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In selecting a Brick Machine one wants the very best. He wants one that will stand hard usage and lots of it. He wants one that will not be constantly calling for expensive repairs. The Miracle Machine answers these requirements. It is strong in every part. From the heavy iron standard to the delicate mechanism of its molding parts, it is a most durable machine. It is made for a capacity of 3,000 to 4,000 brick every day for many years to come and must be of the very best quality or it would not stand the wear. The man who buys a brick machine expects to use it for all there is in it and he cannot therefore afford to buy anything else but the very best and strongest machine made. Better to pay a little more, if necessary, at the start and buy a good machine that will last for years without repairs than to save a few dollars at the start and be squandering money for repairs for a year or two and then be obliged to buy another machine. Price \$150, F. O. B. Minneapolis.

Read the following letter from a well pleased customer:
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Miracle Pressed Stone Company, Minneapolis, Minn.
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When we need any more brick machines, we are going to buy a Miracle.
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The Miracle Double Staggered Air Space Block, always at the front, is advertised in the leading magazines so that people demand it. Price of complete equipment making 69 different sizes and styles of blocks, \$250. Has wider range and greater capacity than any other machine made at anywhere near the price.

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Miracle Pressed Stone Co.,
LARGEST MANUFACTURERS OF CEMENT MACHINERY IN THE WORLD
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NO. 12 RAISED POINTER
\$.40



PLASTERING TROWEL
ALL SIZES



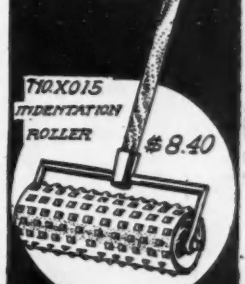
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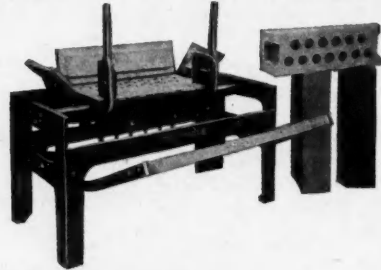
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Is the Cement User's Friend

It puts new life into old cement, and makes lumpy cement smooth and fluffy as the freshest.
No mote riddling; no more waste.
The mill is built on scientific principles, milled steel rolls, differential gear, large hopper and bin, with a drawer ample for 1-4 bbl.
Capacity, one bbl. in 8 minutes. Price so low you cannot afford to be without it.



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makes rough hewn stone all day and never repeats a design, and our wall looks just what it is—rough hewn stone. No two blocks alike. No other machine has this feature.

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THE CELEBRATED

"National" Block Machine

IS A WONDER

DO YOU WANT the greatest value for your money ?

DO YOU WANT the block machine that will give you a pride in your work—and bring you more work ?

DO YOU WANT the simplest face down block machine on Earth made on scientific principles ?

DO YOU WANT the block machine with the fewest parts with nothing that can get out of order ?

DO YOU WANT the block machine that can make all sizes of blocks on the one pallet board ?

DO YOU WANT a completed block machine that will make blocks of all angles and all sizes without having to buy extras ?

DO YOU WANT the block machine that produces the best work. that is a constant advertisement for your business ?

DO YOU WANT the block machine that is easiest in operation and of greatest capacity ?


DO YOU WANT the block machine that will last a life time ?

DO YOU WANT the only block machine that, judged by its product, is the best ?

If you want all these you must have a ' NATIONAL. '

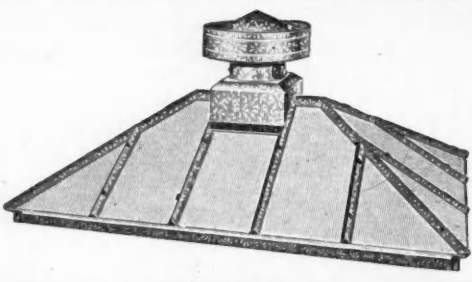
National Cement Machine Company,
BAY CITY, MICHIGAN
Woodruff Bros., Old Forge, N. Y., Agents for New York State.

Lightning Block Machine



This way, Sinners, if you want the best and fastest block machine in the U. S. A. It has been thoroughly tried and tested for more than one year. Has capacity of 500 blocks per day. Every block perfect and true. We sell direct from factory to user, save you more than one-half the cost of other make machines. Write for it and do it now.

D. F. DETRICK
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PERFECT LIGHT

COMBINED WITH

PERFECT VENTILATION?

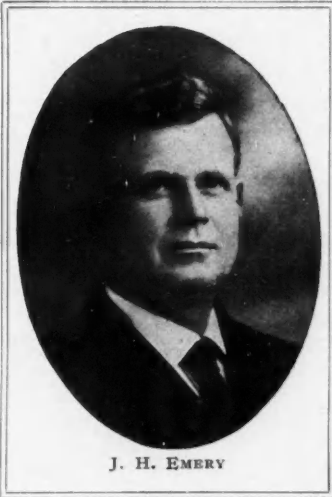
If so, investigate the WILLIS Ventilators and Skylights.
Our Skylights are made in seven different styles, and can be set up by any person of ordinary ability without the use of tools or solder and have a perfectly water-tight job.
Send for Catalogue No. 5 of Skylights, Cornices, Crestings, Finials, etc.

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Original makers of the Willis Hip Shingle.

Emery Cement Brick Machine



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Has stood the test of years and has proven itself superior in all branches. It combines:

Durability

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Facility

Economy

Capacity 6000 Bricks per day



D. K. MCKERLIE

Our Guarantee

given with every machine sold.

"EMERY & MCKERLIE of Bay City do hereby guarantee said machine to work correctly, and should said machine get out of order at any time within one year from date of shipment, with ordinary use (not dropped or broken), will repair same free of charge, the purchaser paying the freight to and from the factory."

As to reliability, refer you to OLD SECOND NATIONAL BANK of Bay City, Mich.



WE HAVE IT

This machine will turn out

**More Brick
Stronger Brick
Handsome Brick**

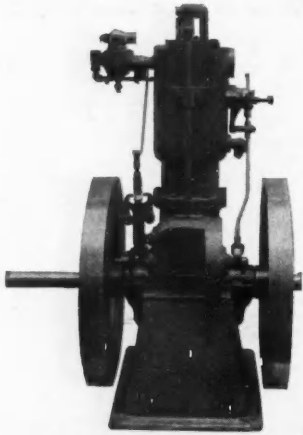
than any other brick machine on the market today. A machine that is too simple to get out of order, too strong to break and so cheap that every builder can afford to own one.

MAKES REGULAR size of Brick 2 1/4 x 4 x 8 either PLAIN OR ROCK FACE.

Write for Catalog

EMERY & MCKERLIE

301 E. Jane Street - - - - Bay City, Mich.



The POWER for the CONTRACTOR and BUILDER

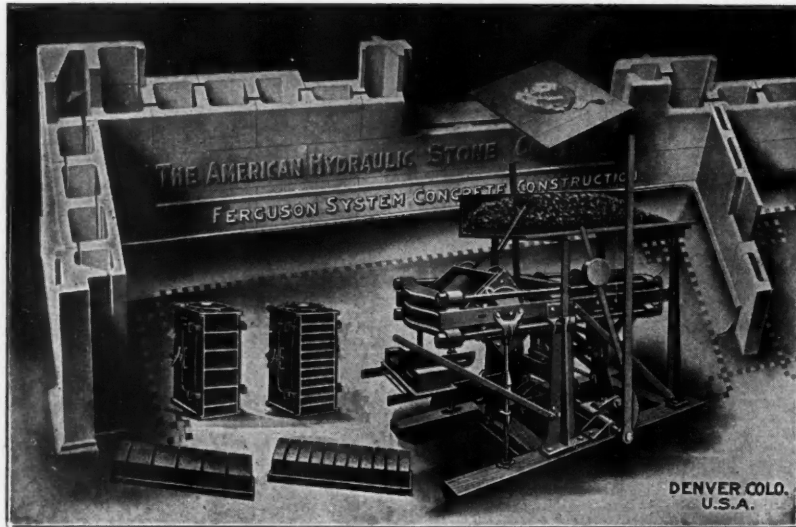
FROM 2-50 HORSE POWER—PORTABLE OR STATIONARY

DISTINGUISHING POINTS OF THE MECKLENBERG ENGINE
 An Absolute and Simple Governor. Either Make and Break or Jump Spark Ignition. A Certain and Reliable Cooling System. Best Workmanship and Materials.

RELIABILITY

An ABSOLUTE GUARANTEE goes with every Engine. We can refer you to any number of satisfied contractors who are using our engines.
 Write for Illustrated Catalogue No. 204-C, stating the horse power needed.

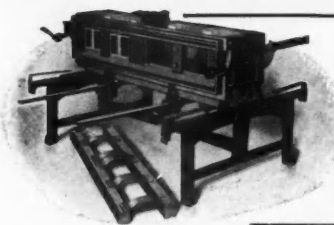
THE MECKLENBERG GAS AND GASOLINE ENGINE CO.
 SOUTH BEND, IND., U. S. A.



TWO-Piece Hollow Concrete Wall and Partition, containing Header Bond and Continuous Horizontal Air Space. Impervious to Heat, Cold, Moisture and Sound. Fire and Vermin-Proof. Walls of all widths; blocks of all shapes and sizes. New Hand Press enables three men (mixture supplied) to

make 1200 blocks, 10000 brick or 5000 paving blocks in 10 hours. **THE WALLS OF A COTTAGE ARE THE WORK OF A SINGLE DAY.** 80 page catalog, fully illustrated, mailed upon request.

The American Hydraulic Stone Co. Century Building
 Denver, Colo.



THE FRANCISCO BLOCK MACHINE IS A WONDER

NOTE WHAT IT MAKES. Two 24-inch blocks at one operation, or one 32-inch and one 16-inch, or two 20-inch and one 8-inch, or three 16-inch, all made on one pallets and off-bored at once. By placing in extension, makes caps, sills, lintels and watertable, any length up to 5 feet 6 inches long, 8, 9, 10 and 12-inch blocks for width of wall. All made from the adjustments on the machine. No additional parts required, which means a big saving in the cost of your equipment. Also makes circles, octagons, angles, chimney blocks, porch columns, veneered slabs, sidewalk block, and sectional blocks. Is a face-down machine, using crushed stone, gravel or sand, wet process and wood pallets. **Machine on Ten Days' Trial.** Send for Catalogue "G" showing six different sizes of machines, prices ranging from \$25.00 up. Also Fence Post Machine. Agents wanted. Don't delay.

FRANCISCO BLOCK MACHINE CO., 338 No. High St., Columbus, Ohio

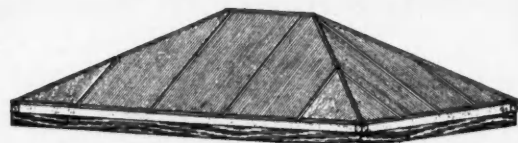
KNOCKED DOWN SKYLIGHTS

Can be shipped anywhere safely at a low freight rate. Can be set up by any handy man, no soldering, no putty and no leaks.
 CATALOG FOR THE ASKING.

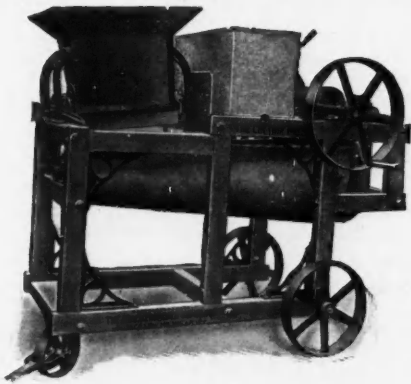
GALESBURG CORNICICE WORKS,

140 E. Ferris Street,

GALESBURG, ILL.



Power Required Too Small to Consider. Runs Night and Day



The KNICKERBOCKER CO.,
Jackson, Mich. Adrian, Mich., April 15, 1907.

Gentlemen:

After using your Mixer almost continuously for six months, and a good share of the time both night and day, I consider it but justice to you to write you my opinion of the Coltrin Mixer. I operate it by electric motor and it runs so easily that the expense for power is too small to consider in the cost of mixing. I have not paid out one cent for repairs, and to all appearances the machine is as good today as when I first bought it. The mixing has been inspected by several expert Engineers, especially for thoroughness of mixture and for proportions of mixture, and has not only escaped censure, but has been heartily approved by several reputable Engineers. I already own a — and a — Mixer, but expect to add another of your Mixers to my equipment soon.

Yours very truly,
A. P. SOUTHWORTH,
Adrian, Mich.

Contractors' Friend

THIS MACHINE IS SEVERAL IN ONE



It makes over 300 different kinds of blocks in all styles and sizes from 8x8x24 inch to brick sizes. The 4x5x12 and the 4x4x12 are the recognized sizes for building nice residences and cottages.

This machine makes two blocks at a time on one pallet, 800-1000 blocks per day.

ONE MAN CAN WORK IT.

It is a Down Face Machine for every style of block. Two sizes of pallets will make every kind of block. Pallets made of wood.

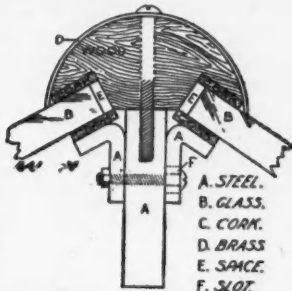
The only machine that will make WATER-PROOF CEMENT BLOCKS and BRICK. Strong statements, aren't they? Write us and find out why they are so.

The price of this Machine for all Face Plates and Fractions, and for all Styles of Blocks is ONE HUNDRED DOLLARS, F. O. B. cars at Mansfield, Ohio.

Without the Attachment for Hollow, 8x8x24 inch Blocks SEVENTY-FIVE DOLLARS.

Our Guarantee: If not exactly as represented, return the machine and receive your money back. Good Bank References.

Address **L. L. PARRY,** Mansfield, Ohio.



All Steel Cork Bedded Corner Post

SHULTZ'S

Patent All Steel, Cork Bedded Corner Posts, Mullions and Transom Bars.

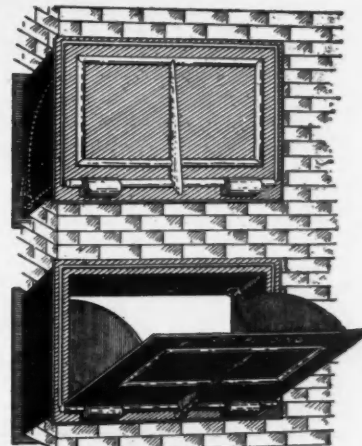
Also my new Acme Steel Post and Bars, in which the Glass is Bedded Between Wood.

They are the handsomest and strongest bars made. The glass is bedded on both sides, either between Spanish cork or wood, preventing any cracking or crushing of glass. No putty. Are absolutely water and dust proof.

BURGLAR PROOF COAL CHUTE. Locks itself automatically when closed up. Can only be opened from inside. Face of Chute flush with wall. Write

C. H. SHULTZ, Patentee and Manufacturer **St. Joseph, Mo.**

For Cut and Prices on Corner Posts and Coal Chutes.



Coal or Wood Chute

1907-OUR GUARANTEE-1932

WE WILL REPLACE WITHOUT CHARGE

ANY OF OUR **ALUMINUM COATED**

Conductor Pipe--Eaves Trough--Roof and Box Gutters--Ridge Roll--Mitres--Elbows and Shoes

That Rust Out Within 25 Years!


Write for Sample and Prices

THE REEVES MANUFACTURING COMPANY

BOX 968

SOLE MAKERS

CANAL DOVER, OHIO




SUCCESS BEGETS SUCCESS

Nearly 50% of all orders during 1907 have come from old users of "Miles" Machines. There is a reason. Principle is right. Construction is guaranteed. Vertical cores. Blocks can be made of wetter material than can possibly be produced with horizontally withdrawn cores or side face principle. Pallet cost practically annihilated. One size for all blocks. Same principle employed by us for four years. Patents never questioned. Let us show you the machine with the greatest range of work yet produced.

OUR ADVICE—"Make good blocks or stay out of the business." Our Catalog "D" tells some things.

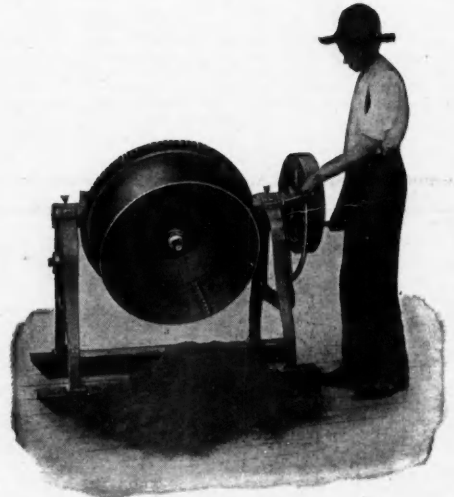
THE P. B. MILES MFG. CO., INC.
 109 W. Cortland St. JACKSON, MICH., U. S. A.
 The Largest Exclusive Cement Block Machine Manufacturers in the World.

Standard Concrete Machinery



Pat. in U.S., Canada & Abroad

Made in Four Sizes—5, 10, 20 and 40



THE STANDARD CEMENT BRICK MACHINE is the fastest hand brick machine on the market; will make plain, veneered, and ornamental face and shape; all perfect, smooth brick, true to size and design.

THE STANDARD CONCRETE MIXER handles wet or dry mix; requires little power to operate; mixes batch perfectly in one minute; self-cleaning; easily charged and dumped.


THE STANDARD GAS AND GASOLINE ENGINE is made in all sizes. Especially adapted to running concrete machinery.

THE STANDARD PORTABLE MIXER AND ENGINE are mounted on suitable truck; well designed; convenient to operate.

WRITE FOR CATALOGUE AND PRICES


SOUTH BEND MACHINE MANUFACTURING CO.
 803 South Franklin Street : : : : SOUTH BEND, IND. Weight 600 lbs. Price \$95.00

Hand Power STANDARD Concrete Mixer, Ball Bearing, especially adapted to brick and block work where large capacity is unnecessary



Cement Machinery Mfg. Co.

COLUMBUS, OHIO



Manufacturers under the original and fundamental patents of H. S. Palmer, Winget, Sanderson, McDowell and a number of others.

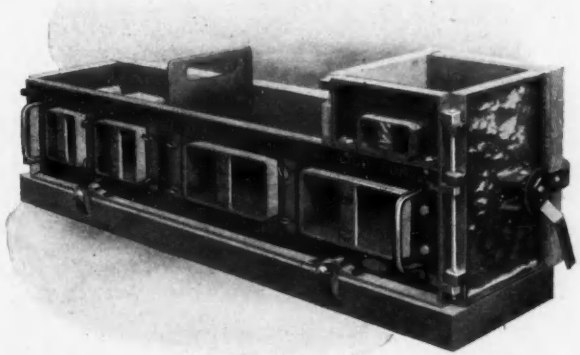
The best of everything in the Cement Moulding and Mixing Machinery and Tools.

WE HAVE THE LARGEST WAREROOMS AND DEMONSTRATING PLANT IN THE WORLD. We have 40 different kinds of Cement Working Machines ready to show in practical operation.

In our large assortment we have the best Block Machines in both Face-down and Side-face that can be bought. Our Continuous Mixers and Batch Mixers cannot be equaled in results and price. **OUR OFFER**—We pay railroad fares that you may see any or all of these machines in operation before deciding what you want. If we cannot satisfy you we have the best, we still pay your fares.

DO NOT FAIL TO SEND FOR OUR DESCRIPTIVE CATALOG.

Front and Maple Streets
COLUMBUS, OHIO, U. S. A.



THE TANDEM INVINCIBLE BLOCK MACHINE
Set up for making one 24 in. L corner and one 16 in. stretcher at one operation.

The Pettyjohn Tandem Invincible

(FACE DOWN TYPE, 40 inches long)

The Greatest of Stone-Making-Money-Making Machines

MAKES TWO 20-INCH STONES AT ONE OPERATION, or one 24 and one 16, or any other fractional combination from 4 to 40 inches, thus economizing the labor of off-bearing.

THE WET PROCESS. A wetter mixture may be used on the Invincible than any other machine. Cores withdrawn perpendicularly.

ADJUSTMENTS. Extremely versatile. Face plates may be used in any part of the face plate holder, and be placed horizontally, vertically or perpendicularly.

The Tandem Invincible has been pronounced by every contractor who has seen it to be the greatest block producer and biggest money maker in the field.

Our "Square Deal" Guarantee The Invincible, like all of the Pettyjohn machines, is guaranteed to give satisfaction or money refunded, and will be shipped on 15 days trial subject to approval. Price, 40 in. length, \$65.00, \$150.00, \$215.00, according to equipment. Also 8x16x8 Invincible for only \$35.00, or \$53.25 if cash accompanies the order. Send for catalog.

THE PETTYJOHN CO., 634 N. 6th St., Terre Haute, Ind.

The Best is The Cheapest



The 1907 Brandell Concrete Block Machine is the most improved one-man face-down machine on the market. Its automatically self-locking mould is the greatest saver of labor and time.

Famous for its
SIMPLICITY in OPERATION and CONSTRUCTION
RAPIDITY
DURABILITY
ECONOMY

Send for booklet D

Capacity, 240 blocks a day

Brandell Concrete Block Machine Co.
130 Dearborn Street, Chicago, Ill.

THE SNELL MIXERS

Easy to **LOAD OPERATE DISCHARGE CLEAN**



The Snell Mixers are Adapted

For all Classes of Concrete. For Wet or Dry Mixture.
For Heavy Concrete Construction.
For Sidewalk and Curb Work.
For Cement Blocks. For Cement Brick.

It will mix the finest of sand and cement together, any moisture desired, from a mealy dry to a sloppy wet, without balling.

Do not fail to meet us at the Third Convention of the National Association of Cement Users, which will be held in Chicago, Jan. 7-12, 1907, where we will have a complete exhibit of our product.

The R. Z. Snell Mfg. Company
SOUTH BEND INDIANA

THE HAYDEN AUTOMATIC BLOCK MACHINE CO.

Manufacturers of High Grade

112 W. Broad St., Columbus, Ohio

CONCRETE BLOCK MACHINES, MIXERS, STONE CRUSHERS, ETC.

The Most Simple and Effective Mechanical Principles Embodied in this Mixer

POINTS OF SUPERIORITY IN THE HAYDEN MACHINE

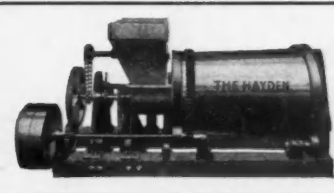
Great Strength ... Limitless Range ... Rapidity
Ease of Operation ... Simplicity of Construction
The only Block Machine on the market strong enough to withstand the heavy strain of pneumatic tamping

BUY A HAYDEN FOR RESULTS

Send for Catalogue M Today



The Hayden Down Face Machine.



The Hayden Improved Mixer.
Eastern and Foreign Sales Agent
H. W. Remington
19 South St., New York City

Waterloo Concrete Brick & Block Mach. Co.

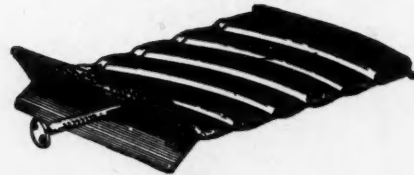


ONE movement of the lever operates the **ENTIRE** machine, consuming the least time for operation of any machine. Two men will make 250 blocks per day.
 Our block is patented. Has double, a vertical and horizontal air space.
 The brick attachment makes 18 brick as easily as a block. No gears or chains to clog or break.
 Write for catalogue "B."

O. H. SWEENEY, Secretary
 101 E. 4th St., Waterloo, Iowa

CONCRETE CONSTRUCTION IS INCOMPLETE

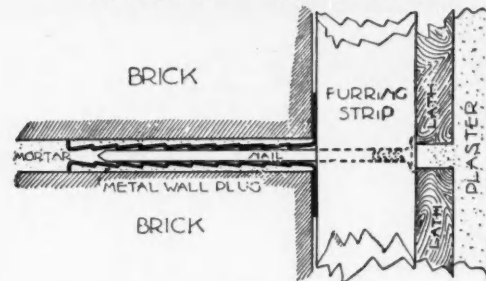
WITHOUT OUR



RUTTY METAL WALL PLUGS

They are laid instantly, are indestructible, yet cost less than any other method. Previous difficulties of securing interior finish are entirely overcome by the use of the **Ratty Plug**.

WE MAKE ALSO MORSE STEEL WALL TIES AND PRESCOTT STEEL CORNER BEADS



Furring out on Brick or Concrete

SEND FOR SAMPLES AND CATALOG

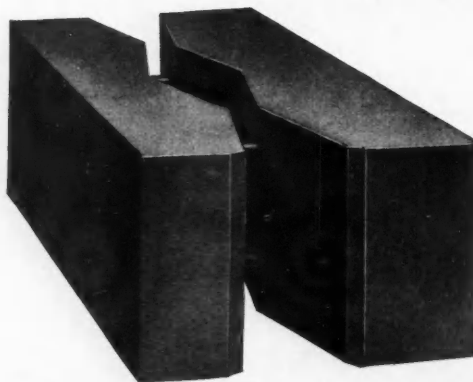
J. B. PRESCOTT & SON

Foundry Ave.

Webster, Mass.

ANCHOR CONCRETE STONE MACHINES

Make This Continuous Air-Space Block



TWO SLABS OF CONCRETE TIED TOGETHER with four one-quarter inch galvanized iron rods firmly imbedded in the block in its construction. Blocks lay in the wall 8 in. high, 24 in. long, 8 to 16 in. wide.

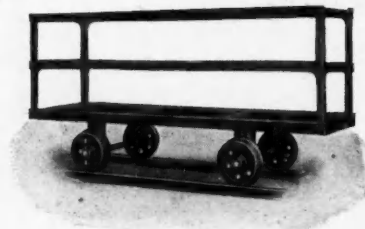
Easy to Make Easy to Lay Look Fine
Very Strong Frost Proof Moisture Proof

Capacity of Machine:
300 PERFECT BLOCKS PER DAY

Write for Special Low Prices and Catalog of Machines

ANCHOR CONCRETE STONE COMPANY
 ROCK RAPIDS : : : : IOWA
 Eastern Agency, No. 1 Madison Ave., New York City, ALBERT OLIVER, Mgr.

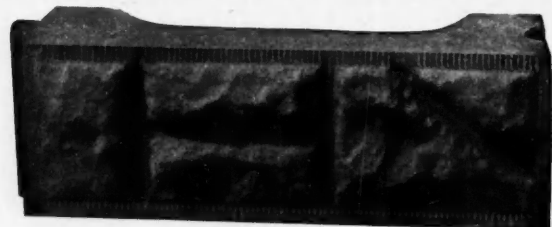
Chase Roller Bearing Cars



For Concrete Block and Brick.
 Transfer Cars and Trucks of all kinds.
 Write us for Catalog.

FIG. 202 DRYING CAR

Chase Foundry & Mfg. Co.
 COLUMBUS : : : : OHIO



The Beavers Fast Building Machine

The outfit includes twenty-four different molds, each ranging in length from 10 to 24 inches and 8 inches wide. We have 30 other molds in stock. We have the facilities for casting any design you desire. Write us your wants. We will gladly give you any information about our machine or the concrete business in general. This machine has a capacity of 900 blocks per day.

Olson & Richardson
 Stoughton, Wis., U. S. A.

The Peerless

(ONE-MAN)

Cement Brick Machine



Write for Our 1907 Catalogue

This popular one-man machine is now in general use all over the United States, and giving universal satisfaction in large as well as small plants. While simple in operation, it is a wonder for fast and perfect work. Capacity, 3,000 to 4,000 per day.

Price is right. Manufactured by the

Peerless Brick Machine Co.

No. 7 Sixth Street North

MINNEAPOLIS, MINN.

THE KING CEMENT BRICK MACHINE

One Man Machine



Makes 10 Brick at Each Operation

Price \$40.00

Why pay more? This machine makes brick equal to the best. In speed it is not excelled by the highest priced machines. Write for catalog.

W. E. DUNN & CO.,

339 Grand Avenue,
CHICAGO



AGENTS WANTED

Responsible Dealers Wanted

TO ACT AS OUR AGENTS FOR

Kahn Expanded Metal

throughout the West and South, where reinforced concrete work is rapidly developing. A money making opportunity to be taken advantage of at once. Address for particulars. Give references.

Expanded Metal Department Trussed Concrete Steel Co.

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Concrete Blocks

WE HAVE a very Beautiful Album containing over Sixty views of Houses, Churches, Factories, Plants, etc., taken from different parts of the country. These are printed on heavy enameled paper with original halftones, and these halftones are made from original photographs—not wash drawings Size 9 x 12 inches.

PRICE, ONE DOLLAR

If unsatisfactory, money promptly and cheerfully refunded. Write for Machine Catalogue—FREE.

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Our Guaranteed Dry Wall Block Appeals to the Builder because moisture cannot penetrate it. No furring and lathing, waterproofing or expensive facing required. It means a cheaper and better wall. Booklet E-6 gives full particulars about this low price, guaranteed outfit.

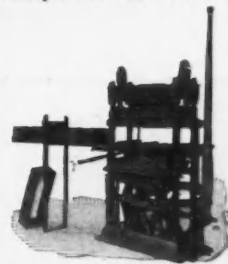
The Products of the Helm Press Get the Contracts

because the highest quality is secured with lowest labor and material cost. Plain, faced, colored and ornamental brick, veneer blocks, two-piece blocks and sidewalk tile. Booklets A-6.

Mixers and Ornamental Moulds

bring additional profits. Mixers \$100 and up. Moulds \$7.50 and up. Ask for booklets. Use full address.

Queen City Brick Machine Co., Bank Bldg., Traverse City, Mich.



CORTRIGHT METAL SHINGLES

ARE FIRE PROOF

That's one reason why they're supplanting the wood shingle everywhere, not only the wood shingle, but other roofing as well, and in this way increasing the work of the carpenter, and incidentally swelling his pockets with profit. Are you laying them? If not better send for our 56 page book, "Rightly Roofed Buildings," and learn something about them—it's free.

CORTRIGHT METAL ROOFING CO.
Philadelphia and Chicago

THE ONE STORE FRONT CONSTRUCTION



That permits of setting glass from the outside and replacement of broken lights without removing window enclosure, or disturbing the window display, is the **PETZ PATENT STORE FRONT CONSTRUCTION** Endorsed by leading architects and Plate Glass Insurance Companies; welcomed by the progressive merchant because it gives every inch for display, lets in every ray of light, and is the simplest, strongest, safest and most durable Store Front Construction made.



Our booklet, "A Profitable Corner" and handsome book on Metal Store front construction, sent free of charge to all interested. If you write now, you will get them by return mail.

Detroit Show Case Company,
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The "S & S" Snow Guards

Stronger and More Durable Than Any Other Made

No Rivets or Plinties to Rust Off

Ornamental and Artistic. Will outlast any Guard made.

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HENRY N. SIEGER & SON
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BEAMS, IRON COLUMNS, SIDEWALK LIGHTS, CAST CONDUCTOR CONNECTIONS, BOOTS & GUTTER BOXES, FLUSH HINGE DOORS, COAL HOLE COVERS & GRATINGS

ALL KINDS OF CONTRACTORS IRON WORK TO ORDER

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CANTON, OHIO, U.S.A.

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Makers of Memorial Figures and plain Decorative Windows, also residence work in L'Art Nouveau styles and beveled plate in metal copper finish. Designs submitted on application. *Grand Prize Louisiana Exposition.* Correspondence solicited. Established in 1883.

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(Near Franklin)
Telephone North 218.

THE large number of satisfied users of our

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is indicative of the superiority of our brand. **Structural Slate** of all kinds is also among our leading products. We always make prompt shipments. Write for delivered prices.

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BANGOR, :: :: :: PENNSYLVANIA

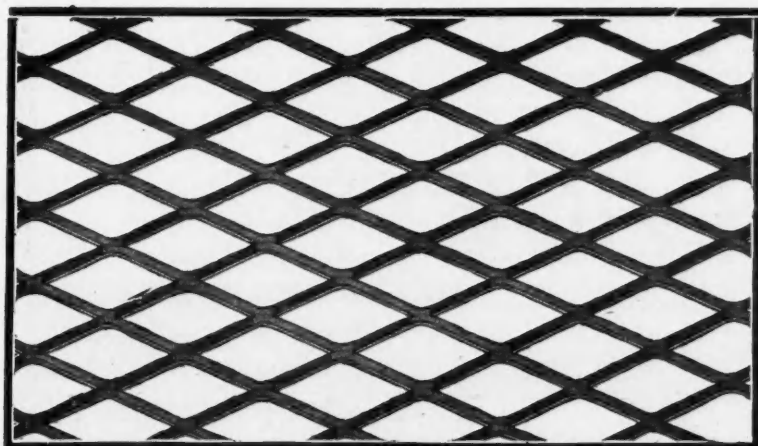
Ornamental Hip Shingles and Acme Ridge Tile

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CORNICES, SPECIAL GUTTERS, ETC.

[Send us your plans for estimates on special work]

MESSENGER & PARKS -- -- AURORA, ILL.



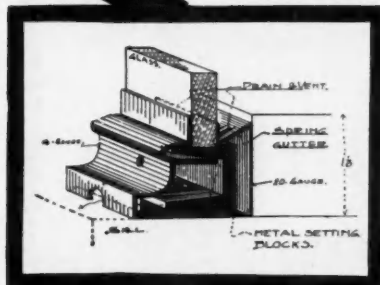
Northwestern Expanded
Metal Company
D. D.
EXPANDED STEEL
PLASTERING LATH

No. 27 Gauge. Weight per Square Yard 2 1/2 Lbs.
No. 26 " " " " " 2 1/2
No. 24 " " " " " 3 Lbs. 6 Oz.

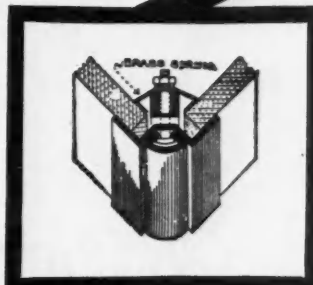
Sheets—18 Inches by 97 Inches—9 Sheets to Bdl.

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“KAWNEER” PATENTED STORE FRONTS



Are right in conception, durable as the building, and architecturally introduce new construction, new methods and new results. A complete all-metal front that is **FIREPROOF, RAINPROOF, FROSTPROOF, ROTPROOF, and RUSTPROOF.**



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KAWNEER MFG. CO. MAIN OFFICE AND FACTORY NILES, MICHIGAN

SYKES TWO BEST LATHS IN THE WORLD
METAL LATH & ROOFING CO. NILES, OHIO. U. S. A.

Rain proof Shingles that last Rust proof
Durable The National Sheet Metal Roofing Co. Ornamental
WALTERS' SHINGLES. — Jersey City N. J. — WALTERS' TILES
Write for Catalogue Samples and Prices

Wood Bar Clamp Fixtures Per Set 50c

OVER 12,000 OF OUR STEEL RACK VISES IN USE

25 doz. Clamp Fixtures bought by one mill last year. We ship on approval to rated firms, and guarantee our goods unconditionally. Write for list of Steel Bar Clamps, Vises, Bench Stops, etc.

E. H. SHELDON & CO.
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Price \$2.80 to \$4.00

RAPID-ACTING WOODWORKER'S VISE No. 3

CONVERTORS OF IRON AND STEEL INTO BOLTS, EXPANSION BOLTS, and NUTS.

ESTABLISHED 1872
BOSTON BOLT COMPANY
INCORPORATED 1906

Manufacturers and Selling Agents of Kingston's Money and Labor Saving Devices for Carpenters, Builders, Masons and Painters.

Works, Offices and Salesroom, 44 Farnsworth St., Boston, Mass., U. S. A.

A TOOL FOR SERVICE



This Automatic Drill is made for use, it is made from hollow brass so that it is very light to handle, and the principle under which it is constructed makes it very long-wearing.

It is finished entirely in Nickel-Plate, which protects it from all weather conditions.

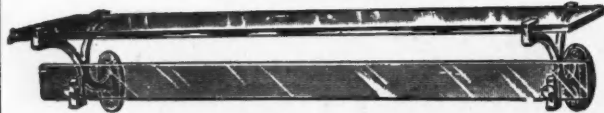
This tool is furnished complete with a set of Drill Points from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch.

Our No. 8 B Catalog gives a full description, and we will send it to you on request.

GOODELL-PRATT COMPANY
GREENFIELD, MASS., U. S. A.

ADJUSTABLE PLATE GLASS TOWEL SHELF

WITH PLATE GLASS
TOWEL BAR COMBINED



Nickel Plated Bronze Brackets and Screws
No. 6.—Shelf 24 inches long and 6 inches wide, price each \$4.00

ADVANTAGES OF OUR FLAT GLASS TOWEL BARS

ARE

*The Towels never slip
Water, hot or cold, has no effect
Need no cleaning
Never wear out or show use
All edges are ground and polished
They are entirely antiseptic*

OUR TOWEL SHELVES

Are so made that there are no holes required in the glass, thereby reducing breakage to a minimum. All shelves made so glass cannot fall out, but are adjustable.

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BEVELERS AND POLISHERS
OF PLATE GLASS

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DO YOU USE GLASS IN YOUR BUILDINGS?

IF SO, LET US

Show You How!

BY DEALING DIRECT
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Art Glass Sand Blast and Chipped

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No. 106

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of doors.
60^c each
LOOK AT THESE PRICES
Price each.
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2-6x6-6—1 1/2 in.
thick. Take out
the glass and you
will find it to be
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else will tell you
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2⁰⁰
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Glazed
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40x16-40—1 1/2—2
lights, check rail,
glazed D. S. A., top
and bottom light.
Prices lower than
ever before.
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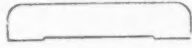
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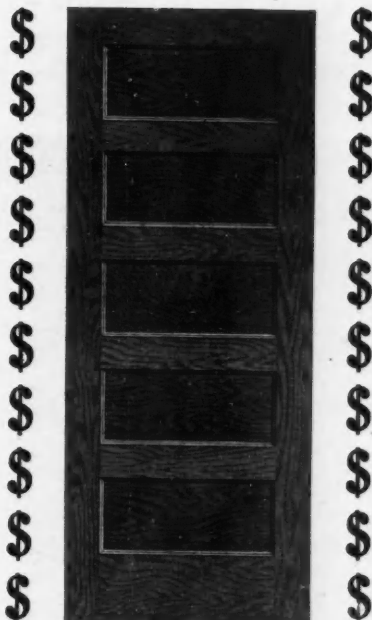
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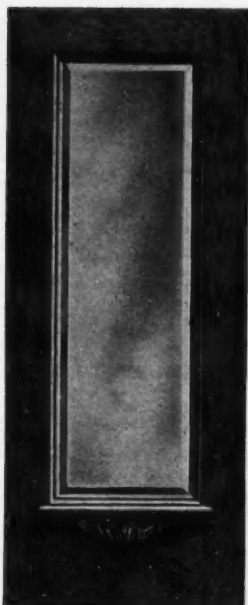
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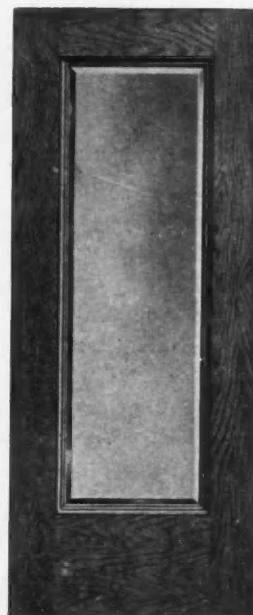
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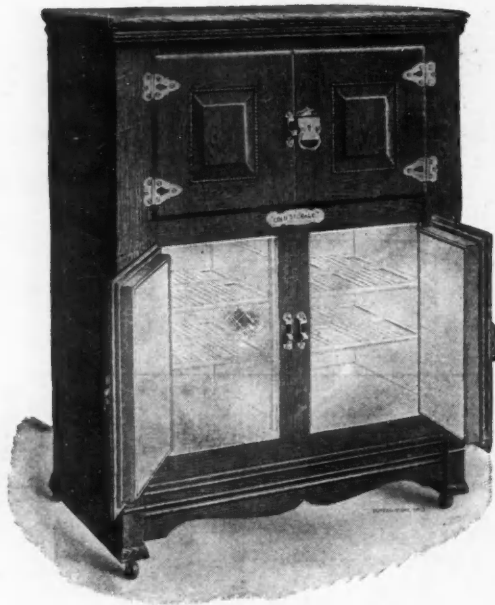
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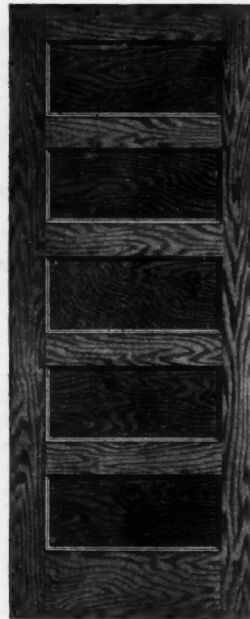
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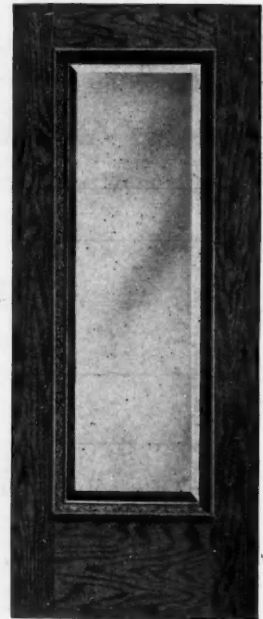
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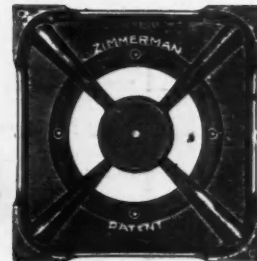
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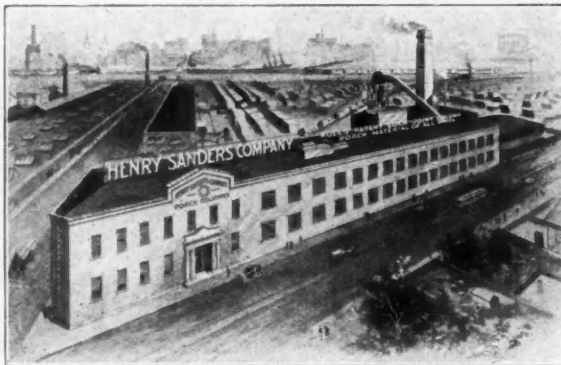
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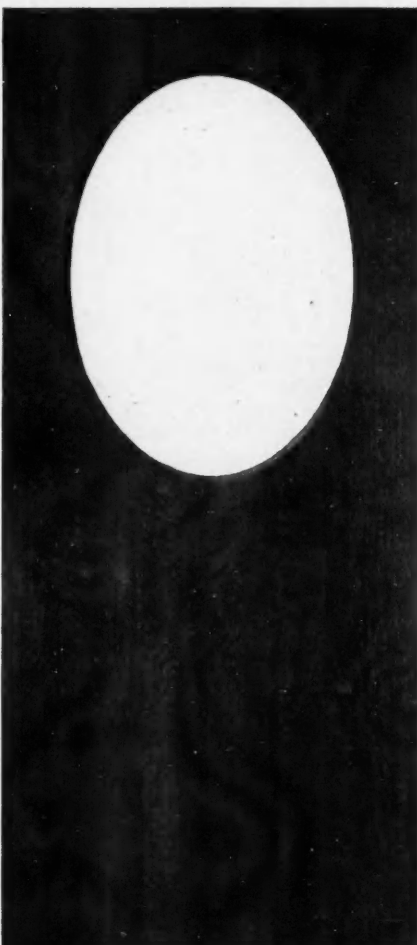
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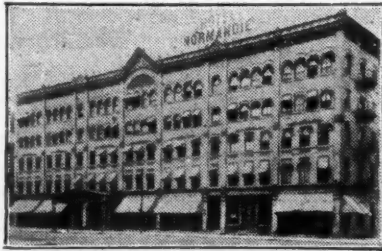
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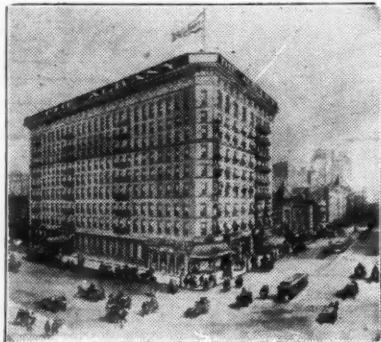
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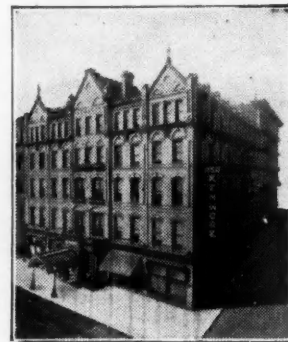
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Manufacturer of “CHICAGO AA” Portland Cement.
Stock Exchange Bldg. - - Chicago, Ill.









AS A RULE, too little attention is paid to the Shingles of a house, when, in fact, they should be first considered. Preserving and beautifying the shingles is as essential as any part of the building. These stains are made with permanent German colors ground very fine with Creosote and drying oils, the colors being thoroughly incorporated with liquids. The stain penetrates the wood, and there is no hard surface to peel and crack as with paint, and it will prolong the life of the shingles many years, protect them from dry rot and boring of insects, and keep them from warping. It brings out the beautiful shading of the grain of the wood, which cannot be obtained with paint, giving

a remarkably artistic coloring effect, quite different from a painted surface. The cost of these stains is about one-half, when compared with paint. If interested, send for samples on wood of twenty-one different tints and colors.

MANUFACTURED BY
Vilas Bros., Chicago, Illinois
 Quincy and Fifth Avenue

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NOTICE TO ADVERTISERS.

New copy, changes and corrections for advertisements must reach office of American Carpenter and Builder, 185 Jackson Boulevard, Chicago, not later than June 20 in order to insure insertion in the July number.

Century Cement Fluid

Century Cement Fluid is a liquid preparation that is Elastic, Weather, Water and Fireproof, and will not Crack, Crumble or Peel off.

It will stop leaks on Tin and Iron Roofs, around Flashings, Chimneys, Brick Walls, Etc.

It is also the best Weather-proof Material for Wood Buildings, Shingles, Posts and Fencing, and an Excellent Primer and the only material of its kind on the market.

It is easily applied, requiring no skilled labor.

Century Cement Fluid is a strictly sanitary coating, contains no Lead or poisonous material, and appeals to parties depending on Cisterns, as the water from roof coated with this cement (especially new shingles) can be used in 48 hours after application, avoiding Shingle Stain and Taste. Sold in 7 Colors in 1 and 5 gallon packages. Write for prices, particulars and Free Demonstration.

Century Cement Fluid Co.



The
Century
Cement
Fluid Co. Station
"M"
CINCINNATI, O.

Works: Madisonville, O.

Manufacturers of

WATER, WEATHER AND

Fire-proof Coating

In Fluid Form for IRON, STEEL,
BRICK, CONCRETE, WOOD, and Out-
side Construction Generally.

SEND US A PLAN

with measurements marked, of the rooms you desire to cover with metal, and we shall at once prepare a design drawing showing appropriate and attractive patterns of our

Perfect Art
- METAL CEILINGS -

With a copy of this drawing we shall quote you our lowest net lump price for the material delivered at destination.

ARCHITECTS!

Specify our Metal Ceilings and your work will be more satisfactory. Your clients will be greatly pleased with what they get.

LARGE STOCK. QUICK SHIPMENTS.

We manufacture a full and complete line of Galvanized Cornices, Finials, Weather Vanes, Cresting, Conductor pipe, Eaves Trough, Wire Hangers, Steel Tanks and SKY-LIGHTS of all kinds.

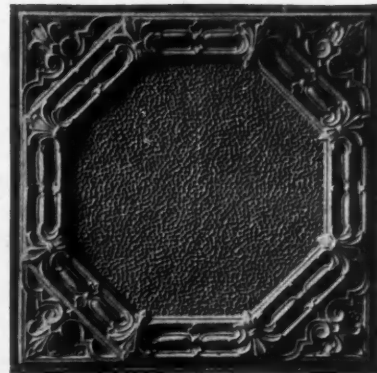


PLATE No. 3003.

The James H. Watson Company, Inc.
BRADLEY, ILLINOIS

Western Branch, Avery Building, Kansas City, Missouri.

Special Spring Announcement to Contractors, Carpenters and Builders

WE QUOTE and illustrate on this page of **American Carpenter and Builder**, specimen items just as they appear in our Grand Millwork catalog. These items are not leaders. They are **regular quotations** and are selected only because we believe they will be of particular interest to the readers of this publication at this moment. All qualities up to or above the grade of the North-western Sash and Door Manufacturers. We sell by **mail order**. We sell to the **individual purchaser**. We quote **factory prices—America's greatest millwork factory prices—direct to the contractor, carpenter and builder**. We ship **promptly**, we guarantee **safe delivery**, we guarantee **satisfaction**, we guarantee a **saving of 50 per cent.** at least on the dealer's price on practically all millwork, and we carry in stock for **immediate delivery** not only all the **staple goods**, but **thousands of pieces, styles and sizes** previously made only to **order**. Our mammoth business in selling, our sales from stock goods, our ownership of timber lands, our own factories (enabling us to supervise seasoning, manufacture and handling), our quick turning of capital, all combine to produce a business that has **revolutionized all millwork conditions**. Now we want to send you our

GRAND MILLWORK CATALOG FREE!
All we ask you to do is spend a postal—to send a postal—to find out the truth of our claims. It is a fortune for you if our claims are true—you are one cent out if our big, carefully printed, truthfully illustrated millwork enc.lopedia doesn't back up our claims made here.

VARIOUS DOORS	
"A" Qual., 4 Pan. THICK 2-0x6-0, 1 1/2" . . . \$1.36 2-6x6-6, 1 1/4" . . . 1.57 2-6x6-6, 1 3/8" . . . 1.77 2-8x6-8, 1 3/8" . . . 1.85	"B" Qual., 4 Pan. THICK 2-0x6-0, 3/8" . . . \$0.80 2-0x6-0, 1 1/4" . . . 1.30 2-6x6-6, 1 1/4" . . . 1.49 2-6x6-6, 1 3/8" . . . 1.58 2-8x6-8, 1 3/8" . . . 1.68
Painted, 4 Panel	
THICK 2-0x6-0, 3/8" . . . \$0.74 2-6x6-6, 1 1/4" . . . 1.02	THICK 2-6x6-6, 1 3/8" . . . \$1.07 2-8x6-8, 1 3/8" . . . 1.12

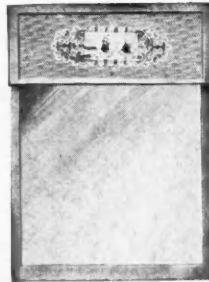
Grained, add 11 cents net.



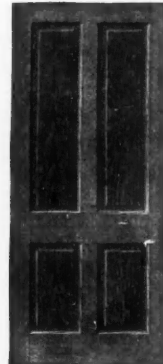
SUPERIOR
2-8x6-8, 1 1/2" glazed as above . . . \$4.50
Glazed D. S. Glass . . . \$4.20



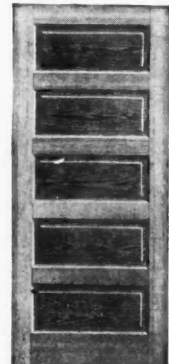
NEVADA PAINTED
2-6x6-6, 1 1/4" . . . \$2.35
2-8x6-8, 1 3/8" . . . \$2.45



NEPTUNE
Top Glazed, Battenberg Lace
Bottom Glazed D. S. A. Glass.
3-8x5-0, 1 1/4" . . . \$3.56
3-8x5-2, 1 1/4" . . . \$3.68



FOUR PANEL DOOR



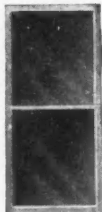
FIVE CROSS PANEL DOOR

We carry the largest stock of Doors in America, comprising over 300 sizes and kinds in White Pine, Yellow Pine, Cypress, Yellow Pine Panel and Oak.

5000 BARGAINS IN SASH, DOORS

Windows and Millwork of Guaranteed Quality Shipped Direct to
Carpenters, Contractors and Builders

VARIOUS WINDOWS



2 Lt. Window

A Few Prices

16x20, 2 lts . . .	\$0.65
20x24, 2 lts81
20x28, 2 lts89
22x27, 2 lts96
22x30, 2 lts . . .	1.04
24x24, 2 lts94
24x28, 2 lts98
24x30, 2 lts . . .	1.06
24x32, 2 lts . . .	1.19

Above Prices are Glazed S. S.



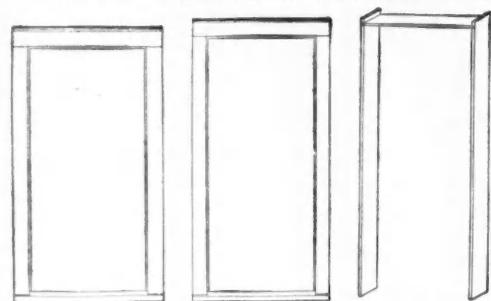
4 Lt. Window

More Prices

10x20, 4 lts . . .	\$0.66
10x24, 4 lts75
10x28, 4 lts87
10x30, 4 lts98
12x28, 4 lts95
12x30, 4 lts . . .	1.10
12x32, 4 lts . . .	1.17

Above Prices are Glazed S. S.

DOOR AND WINDOW FRAMES



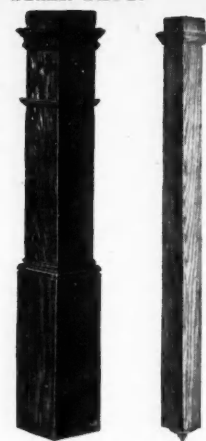
No. R 314 For Windows 2 ft. 5 inch. wide by 5 ft. 6 inch. high, or smaller. \$1.25 For Windows 2 ft. 11 inch. wide by 6 ft. 2 inch. high, or smaller. \$1.35 We carry these Frames, as well as thousands of other items in stock.	No. R 315 For Doors 2-8x6-8 and smaller. . . . \$1.65 For Doors 3-0x7-0 and smaller. . . . \$1.78	No. R 316 Yellow Pine Door's 2-8x6-8, or smaller. . . . 54c Doors 3-0x7-0, or smaller. . . . 60c
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Write for our Free Roofing Catalog and Samples and let us save dollar for dollar—Half.

For Grand Free Catalog address

GORDON, VAN TINE CO.

STAIR DEPT.



No. R 335 Yellow Pine . . . \$2.30 Red Oak . . . \$2.50	No. R 341 Yellow Pine . . . \$1.65 Red Oak . . . \$1.75
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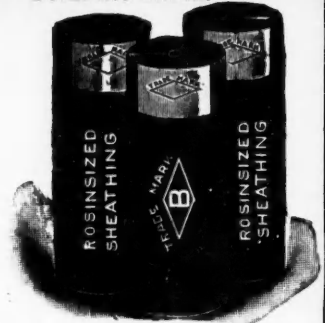
CASING
We carry this design casing in Yellow Pine, Cypress and White Pine. Price per 100 lineal feet, random lengths.



Prices on above Casing, 13-16x4 1/2

Yellow Pine	\$1.75
White Pine	1.90
Cypress	1.90

BUILDING PAPER



Our Building Paper is the best quality. We do not believe in cheap, shoddy goods at any price. We can save you half.
C Brand Red Rosin, weighs about 20 lbs. to a roll, per roll of 500 sq. ft. . . **33c**
B Brand Red Rosin, weighs about 25 lbs. to a roll, per roll of 500 sq. ft. . . **42c**
A Brand Red Rosin, weighs about 30 lbs. to a roll, per roll of 500 sq. ft. . . **50c**
AA Brand Red Rosin, weighs about 35 lbs. to a roll, per roll of 500 sq. ft. . . **57c**

ROOFING
"What is worth roofing is worth roofing well."



Less Than Half What Shingles Cost You

PRICE	Per Square
108 sq. feet	
7-Ply	\$1.41 per Roll
2-Ply	1.96 per Roll
3-Ply	2.29 per Roll

140 FEDERAL ST. DAVENPORT, IOWA