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Immediate Steel

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The American Builder employs no subscription agents. Have nothing to do with any stranger who comes to you representing himself as authorized to take your money for subscriptions to the American Builder.

It has recently come to our attention that a certain Wm. Clark (also using the name James Heard) has been traveling thru Western Ohio representing himself as an agent of the American Builder. He uses a fake subscription receipt, which is simply an ordinary receipt form, rubber stamped “American Builder, New York.”

Of course he keeps all the money he collects, and we never hear of it until the disappointed subscriber writes in wanting to know why he doesn’t get the paper.

If this rascal or any other stranger approaches you for your subscription, call the police.

We will pay a liberal reward for information leading to the arrest and conviction of these robbers. The American Builder employs no subscription solicitors. The safe rule to follow is positively to pay no subscription money to strangers.

Practically all of our Big Family of 50,000 readers have been gathered together by means of letters and circulars sent direct from the publication office. We have always preferred to deal direct with our friends, the subscribers, rather than thru agents or middle men.

Occasionally we have asked our subscribers to call the attention of their friends to the magazine, and a great many have done this, and have helped their friends by sending in their subscriptions for them. We are very grateful for this loyal co-operation from our subscribers, and hope that it will continue. This is friendly work among people you know and who know you, and has nothing to do with the advice just given, “pay no subscription money to strangers.”

It is much safer and you will get prompter attention if you will deal direct with our home office, 1827 Prairie Ave., Chicago, Ill. You can send post-office order, personal check, stamps or currency, at our risk, with perfect confidence that your order will be given our best attention.

Every little while word comes to us of fly-by-night fellows traveling around the country taking orders for building publications and keeping the money. We sincerely hope that very few, if any, of our subscribers, either present or prospective, will be taken in by these crooks. The well-known American Builder policy of employing no subscription agents should be a protection to Our Folks.

Economy in Construction

Never was there a time when contractors and workmen needed to conserve materials and their energies more than they will this year. Every saving that is made on a building job will be appreciated by the owner, as costs are high enough without unnecessarily adding to them. Careful planning of the building to be erected so that there is conservation in its size means saving materials; teamwork between the various trades working on the job means saving in labor costs.

The contractor who acts as his own foreman and the foremen who are delegated to manage the men by contractors can, by “routing” the work, make a considerable saving on any building that is being erected. “Routing” the work is what has brought success to the large modern manufacturers. There is no lost motion during the manufacturing process. That does not mean driving the men, but laying out the work so that they do no unnecessary work.

This can be accomplished by placing the materials on the job so that the workmen do not have to use their energies in getting it to the spot where it is to be placed. Having the material ordered and delivered to the job in advance of the time it will be needed is another most important phase of building. Stopping the work because of the failure of materials to arrive is disheartening to the workmen and costly to the contractor.

Time devoted to mapping out the work so that it can be accomplished speedily and efficiently is well spent. All it means is study and forethought on the part of the contractor, and his foremen.

Buildings are the primary tools of industry and homes are the bulwark of the nation.
SUCCESSFUL homebuilding today has come to mean more than the erection of four walls and a roof to act as a shelter. The real home is not only the result of study of the basic principles of construction but the outgrowth of a thorough sympathy with certain new factors affecting the inside life of the home. Electricity, inventive genius and the housekeeper are three influences that have brought about this change in building ideas.

So persistently have these influences enlarged their radius of activity that even the architectural scheme has been molded to new forms—time-worn methods have decayed and we find the home taking on a new aspect.

We are living in an age of convenience. Thru the medium of electrical devices, new machinery and labor-saving equipment the bulk of the hardships of life have been eliminated. Especially is this the case in the home. The old days of housewife drudgery are still memories of painful clearness. Only gradually has the picture faded of mother breaking her back as well as her spirit over the washboard and tub. Today the modern washing machinery and laundry equipment have made the life of a housekeeper what it should be, a life of service with plenty of time to devote to the family and other interests. The growth of woman's sphere has effected vital building principles.

And as a result we find the change in ideas all along the line. Modern plumbing, attractive as well as sanitary and efficient, has become one of the basic features in modern dwellings. Running water eliminates an enormous waste of effort and makes the bath not the exception but the rule. In the construction the owner is inclined to minimize the importance of plumbing because the pipes and equipment are in the walls and out of sight. An Indian who was visiting civilization for the first time was more amazed at water running from faucets than all the automobiles, skyscrapers, and airships.

Gradually the smoky heating stove that made one room too hot and the others uninhabitable is joining the shades of the past. Hot air furnaces with automatic control, hot water and steam plants make the home a place of comfort from basement to attic. Heating is now a definite part of architectural plans.

When electricity came into the home, drudgery went out the window. Perhaps no other single discovery has played such a part in making the modern home a real place to live in. With it came a host of labor-saving devices, accessories and appliances, all of which help to cut down labor waste and save the strength of the housekeeper. Electric lighting plants have brought sunshine to farm homes, electric irons, mangles, washing machines, vacuum cleaners have taken the droop from the shoulders of women and erased the tired look from the faces of mothers.

Obviously the builder cannot profitably overlook these developing factors when drawing up his plans. They have come to be as much an integral part of the modern home as the lumber, brick or concrete in the outside walls. Upon them very often depends the domestic happiness of the family.

Not less important than the labor-saving machine devices is the equipment designed to save space and incidentally labor. As a result of their introduction, houses are not built so large, and naturally the work of the housekeeper is decreased.

Whole rooms with their continual exacting demands for upkeep can be eliminated by built-in furniture. The kitchenette, wall refrigerators, built-in beds, small kitchens with various food storing devices, compact pantries, dish-washing machines, are all examples of this new influence that is not only relieving much of the needless work in the home which the housewife helped to create, but is giving her time for outside activity. The construction of a home is no longer exclusively a man's job because the woman very often is the source of new ideas. She is a firm believer in modern appliances because they have become her stock in trade.

Such matters as choice of interior trim, location of equipment, finish of floors, arrangement and size of rooms, all involve labor and should be chosen so as to increase the general comfort of all concerned. An artistic trim, highly carved, is extremely difficult to keep clean. In the building of shelving, care should be taken that it is not placed out of reach.

Unless labor-saving equipment is placed with some scheme in mind it will be practically as useless as none at all.

The arrangement of doors and windows is an important part of the building plans. Out-of-the-way places for windows mean difficult tasks when cleaning time comes. Doors should not be placed so that they will interfere with adjacent doors or take up space that can be efficiently used. The careful selection of a floor finish may seem trivial on the surface but it really is important from a labor-saving standpoint. A dust-resistant finish can save many an unnecessary hour of tedious work.

The arrangement and size of rooms are seldom accorded the attention they deserve. The large kitchen of a few years back is no longer needed because of modern cooking apparatus that requires very little space. The position of the bedrooms in relation to the bath and other rooms is a matter of importance. By a little careful study and wise selection of modern equipment, the new home can be made really efficient as well as comfortable.
Getting Busy on the New Home

19a Getting Busy on the New Home

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Housing Problem Quickly Solved

GENERAL MOTORS CORPORATION FIND ANSWER TO FLINT PROBLEM IN USE OF BIG SCALE METHODS AND LABOR-SAVING EQUIPMENT

By Chester Shafer

In the construction and practical completion of a city of 950 homes in less than a year the DuPont Construction Company, of Wilmington, Delaware, serving for the General Motors Company, at Flint, Michigan, has shown the method for coping with a difficult housing problem. Starting on May 1, 1919, the houses were completed, in the main, by December 1, being fitted with water, gas, sewer and electrical connections. Some minor details, held up by cold weather, and a few stretches of paving, remain to be completed. By April of this year the homes will be occupied by employes of the General Motors Company, who will handle the costs, ranging from $3,000 to $7,000, on a time-payment plan.

Standardization of operation allowed for the rapidity of work on the project. Each job was organized into a department. Each department had its foreman and its regular gang of workmen. One department did the rough framing, another the exterior trimming, while a third did the interior trim. Painting, plastering and all other operations were handled in the same way, thus giving expert and experienced workmanship on all details. Thirty types of houses were erected. The most prominent types were the all frame, with asphalt shingles, the brick veneer, and the half tile with wood shingles. All first floors are of hard wood and the second of pine.

Street Paving on Big Scale

The streets in the project are of asphalt. Storm and sanitary sewers are provided. In pouring foundations placing plants were set up so that one plant covered two houses. In this way two houses were poured and the mixer was moved and set up again in 30 minutes. All material for the job was hauled over a narrow gauge railroad. At the height of the
Building a City of Good Homes

job 20 miles of the road were in use. A maximum haul of 3 miles was registered over grades as steep as 2½ per cent on the main line. Both steam and gas locomotives were used. The road pouring work for the pavements was done with batch boxes on narrow gauge cars. But 11 men were required around a mixer. All concrete facings for the asphalt surface were reinforced by expanded metal. Over 1,500,000 pounds of expanded metal were used.

For the cellar foundations excavators with light drag lines were used. Steel forms were set for the foundation walls and placing plants were operated. The curbed and sidewalks were all poured from the batch boxes used on the narrow gauge cars. The narrow gauge lines were constructed in every street and materials were hauled to the very point of usage. Locomotives were used to a large extent on the narrow gauge. The batch boxes were of 3-ton capacity.

Houses Vary in Style

After much investigation it was decided to build five types of houses: four-room bungalows with two bedrooms, a living room, kitchen and bathroom; five-room bungalows and houses with two bedrooms, dining room, kitchen and bathroom; six-room bungalows and houses with three bedrooms, living room and dining room; seven-room houses with four bedrooms, and eight-room houses with five bedrooms, living room, dining room, etc.

On 150 of the houses asphalt shingles were used. Slate shingles were used on 150 houses and the balance were treated with wood shingles. About 100 houses were brick veneered. Wall board was used
extensively. On all tile houses the exterior was stuccoed, while the interior was furred out. Each house is equipped with electric lights, a hot air heating plant, gas range, and gas hot water heater. All houses were papered by the contractors.

In the ditching work in the street five ditching machines were operated. Mechanical back fillers were used behind each ditcher.

**Unloading Yard Feature**

An unloading yard was maintained about 2 miles from the job at the connection of the narrow gauge with the broad gauge. Here most of the work was done that permitted of swiftness of operation on the project. A number of saws cut all lumber used into proper lengths as soon as it was unloaded. This sawing was always done by the same men and it was accomplished in fast time. The cut lumber was then hauled to the project and was ready for immediate use. All difficult framing, such as porch roofs, was done at the yard also. A regular gang of carpenters achieved this work and prepared the pieces for fitting. Several small saws were set up on the project for emergency work, but 99 per cent of all sawing was done at the yard. The construction gangs were thus provided with material without loss of time on detailed work.

At the unloading yard the gravel and cement for the foundations were mixed with the minimum of human labor. An unloading crane transferred the gravel from broad gauge cars to bins. The bins, erected over a narrow gauge spur, were used as mixers. After the cement had been dumped in the mixture was released into narrow gauge cars and hauled to the project, where it was all ready for use in the final mixer. The services of one man on the crane and one man to dump in the concrete were all that were required to complete the initial mixing process.

**Novel Ideas Employed**

Several novel ideas were always in evidence on the project. During the winter, for instance, when the outdoor work was very disagreeable, canvas houses were built around the houses which were being erected. These "kimonas" permitted work with plaster and concrete. Stoves set up in the intervening space kept the atmosphere warm. This gave comfort to the workmen and made the use of the materials possible. The success of the project is liberally attributed to the engineers and the advanced ideas of standardization. But the ideas applied to the treatment of work...
Building a City of Good Homes


The Carpenters Have Just Finished the Flooring and Have Moved on to Make Room for the Masons to Set the Walls. The Work Schedule Was an Important Factor in Finishing the Job in Remarkably Short Time.

Men, to insure satisfaction with conditions, were by no means the slightest factor. At certain times as many as 3,500 men were employed. To keep these men pleased, and at the same time securing the maximum effort and skill, was no small task—in 1919. However, the men were housed in clean, well-ventilated, electric-lighted bunkhouses, six to a house. A moving picture theater was erected and operated nightly. This camp was 2 miles from the main part of Flint. Had the men wandered to the city each night they would have squandered money—and time that they needed for rest. The movies held them at the camp and made an early bed-time possible, which, in turn, meant freshness the following day. Home talent vaudeville shows and athletic shows were staged frequently. A large commissary provided all necessities, and some luxuries, at cost. Meals were served in a huge dining hall and no expense was spared. Board and room were obtainable for $8 a week. Excellent wages were paid. One workman, among many others, saved $140 every two weeks. This was because he found his amusement and his necessities in camp. Church services were conducted every Sunday. A camp postoffice was operated. A weekly paper was published. A camp photographer was maintained. He photographed the winning organizations in the various speed-up contests and flashed the plates on the screen at the theater. Special emphasis was made on safety first. Figures on accidents were published daily on a bulletin board and each week in the paper. Cleanliness was mandatory. The bunkhouses and mess hall were kept scrupulously clean. It was requested that a man shave at least every other day. Hot and cold

(Continued to page 172.)
Design for Five-Room Frame Bungalow

Bungalows are a popular type of home and certainly will be in great demand when the active homebuilding season opens up. In the great variety of styles offered, it is difficult to find a bungalow more attractive than the one illustrated on this page.

This frame home contains five rooms of comfortable size. It is 42 by 30 feet, and set a few feet above the walk level allowing for a terrace which lends itself to considerable decoration. The exterior appearance is further enhanced by a unique and large chimney constructed of odd shaped brick.

In the floor plan arrangement, the two bedrooms and bathroom are placed at one end of the bungalow. The hall is directly in front of the dining room which is located in the central part of the house. At the other end is the living room with its large open fire place and back of it the kitchen opening out on a small rear porch.
EIGHT-ROOM COLONIAL HOUSE. A quaint, attractive home that will fit very well in a suburban setting.

The shingle siding, shuttered windows, and small, square-roofed entrance with latticed sides add considerably to the charm of the building. The sun porch, altho an addition to this style of structure, is a distinct advantage and not out of harmony with the general scheme. In the construction prepared canvas has been used extensively for flooring and roofing in the sun parlor, on the hood of the entrance and over the back porch. The first floor consists of a dining room, kitchen, extra toilet, den and a large living room, which is 17 feet, 3 inches by 25 feet. Four bed rooms, a space-saving closet, bathroom and a small sewing room make up the upper floor.
EIGHT-ROOM BUFF BRICK FINISH HOUSE. A very substantial structure built on square, economical lines, with living room, dining room, den and kitchen on first floor and four bedrooms on the upper floor. The large, spacious front porch, extending the full width of the house, is especially inviting. The rather severe Puritanic lines of the porch are easily brightened by the addition of a pergola decoration and an ornamental iron balustrade, providing an excellent setting for porch plants and vines. The hip roof is covered with flat tile and topped by an impressive chimney, which leads from the large fireplace in the living room. The building is 30 by 36 feet.
Design for Six-Room Stucco Home

Attractive building has well-dormered roof and artistic entrance

Home-builders seeking ideas should get real inspiration from the beautiful stucco residence shown here. It embodies charm as well as strength, and certainly will appeal to the man looking for a small cozy home.

The building is 36 by 24 feet with the long side facing the street. On the first floor is found the living room, a large comfortable room with an entrance from the porch. The porch is on the same level with the lawn which has been raised several feet above the walk.

An artistic concrete stairway with low concrete balustrades and landing form an attractive approach to the main entrance centrally located in the building. It leads into a hall which opens in turn into the living and dining rooms. The kitchen completes the first floor plan.

Three bedrooms and bathroom make up the second floor plan. The porch has a shed shingle roof and is supported by substantial concrete pillars. The main roof is gambrel-shaped and covered with large shingles. Each room in the dwelling has at least two windows and in most cases three. The dormer is sided with shingles.

Many homes of this type will be erected during the coming spring.

The most important partitions in a building are those enclosing interior shafts. Vertical openings thru buildings form flues and cause up-drafts. In all buildings, fire-proof as well as non-fire-proof, they should be enclosed, to prevent a fire that would find a natural outlet in such openings from spreading to other floors.
OPERATION of the home has been affected by the high cost of labor more, perhaps, than any other institution that is so closely related to the daily lives of the members of American families. Not only is household labor held at exorbitant wages, but it is all but impossible to secure. This situation brings the housekeeper to the point where she must have her home equipped with modern labor-saving machinery. "Machinery" may appear to be the wrong word to use in this connection, but the power driven devices of many kinds that are constantly used in the home are nothing more than "labor-saving machinery."

There will be many thousands of homes built this year; other thousands will be erected during each of the years that follow. These homes will be modern homes; they will be designed to give the home owners the greatest in satisfaction and comfort.

Connecting these two thoughts, architects and contractors are planning and building homes for their clients with the idea of comfort and convenience prominently in their minds. And in doing so they are designing the homes so that the laundries may be equipped with power-driven laundry equipment.

Laundries to accommodate an electrically-driven washing machine, an electric iron, and a mangle must have conveniently located electric outlets. For the washing machine they need either stationary tubs connected with a storm water sewer, or a floor drain thru which the water from the machine and tubs can escape. Without these built-in features, there is little saving of labor and little comfort and convenience for the housewife, who, by necessity, is forced to do her own washing and ironing.

Three views of well-equipped laundries in modern homes are shown in the accompanying illustrations. Also three types of washing machines, all electrically-driven, are pictured. Two show how the architects and contractors have located the electric outlets and floor drains so that the hot and cold water may be piped directly to the washing machine and the tubs, and be allowed to escape thru the floor drains into the sewers. The other laundry is less convenient because it is necessary to drain the washing machine into pails and lift them to the stationary tubs, where they were emptied.

Forethought in the design and construction of the home to accommodate such labor-saving devices as are used in laundries gives the home owner the comfort and satisfaction he expects when he builds a home for himself and his family. And even tho the client may overlook this important feature, the architect or contractor who suggests this feature is giving the home builder the greatest service.

In planning the laundry as to construction features, contractors and architects should first learn what type of machine the builder has or expects to install. Different machines require that the laundry have different treatment, but with a knowledge of what will be installed in advance of the construction of the home, the fittings will be properly located.

In homes where electric light from a commercial plant is not available, another satisfaction-giving and labor-saving piece of home equipment is an individual electric light plant. In one of the illustrations the small electric generator and storage batteries are shown. Such a plant as this is not expensive either in first cost, nor to operate.

The installation of such a plant also requires that the building be constructed to accommodate it. Wiring a home for electric lights is not a difficult job for the average contractor, nor is it expensive if done when the home is erected. But to put in electric light wires after the house is built is not only difficult and more expensive, but not nearly so good a job can be done.

Electric lights and the many labor-saving pieces of household equipment that may be had when electricity is available, go a long way toward giving the builder a satisfactory home. Architects and contractors are winning friends by recommending and installing individual light plants, and preparing the homes they build for the modern equipment that should go into every one of them.

Australian Women Want American Ideas in Homes

Demanding American labor-saving kitchens, housewives of Sydney, Australia, are appealing to the Australian Institute of Architects for more attention to domestic working conveniences in house designing. Great interest has been manifested throughout Australia and New Zealand in the labor and space-saving features employed in the designing and building of American homes.

"Every architect ought to be obliged to serve six months in a kitchen before he is allowed to plan a house," declared one woman at a recent meeting of Sydney women, "then he would see the importance of making that part of the house more agreeable. There wouldn't be any 'servant problem' if architects would plan their houses so that kitchen work would be simpler.

American architects are developing all sorts of labor-saving devices for the kitchen and Australian builders could easily follow the American example."

Australian property owners, as a consequence of this action, are trying to get in touch with American builders in order to work out a system of built-in closets, sideboards, kitchen and bath cabinets, door-beds, and similar conveniences.

The rapid growth of industrial life in Australian cities is calling for more home-building, and the local women are anxious that new ones be fitted out with all of the compact arrangements of kitchen equipment.

Representatives of the Interchurch World movement in making their survey of the world have found an enormous demand for American building ideas.
Design for Modern Two-Apartment Building
A BUILDING THAT PROVIDES A HOME AND ALSO ADDITIONAL INCOME

Contractors will find that the two-story apartment building is among the most popular investments where the man of moderate means is concerned, and consequently will find it very advantageous to their interests to have several plans of this type of building ready. Its popularity is due to the fact that it not only provides a home for the owner, but furnishes an additional income thru the rental of the second apartment.

The two-story apartment building shown here represents a combination of attractiveness and utility that will find many an interested buyer. Built substantially of brick with terra cotta trim, it has an artistic front, rendered rather unique by a hexagonal-shaped sun parlor and large French window over the entrance. The entrance is particularly attractive. It is wider than usual, consisting of a main door and two side windows. It is further enhanced by a heavy pillar of brick on one end on which is mounted a stone flower pot.

The sun parlor has five windows placed about a common center and is covered by a similarly shaped roof of heavy green tile. The trim above the windows and around the sills is well designed and quite attractive. The front part of the roof is also green tile.

In each apartment the arrangement calls for five rooms, perhaps a little larger than the usual size of rooms in larger apartment buildings. As a rule, the construction of this type of building permits of more comfortable apartments. The living room is 16 feet 6 inches by 13 feet and is equipped with a brick fireplace with artificial heating apparatus. Wall book cases are built on each side and above each are the small windows which have proved so popular.

The dining room immediately adjoining the living room is long, being 19 feet 6 inches by 12 feet, and has a combination bay window.

The two bedrooms are on the same side of the apartment with the bathroom between, a very logical arrangement. The kitchen and porch complete the floor plan. The building is 59 feet long, including the sun parlor, and 30 feet wide.

During the great building season which is about to open this type of building will without doubt be in great demand because of its great economical advantages for the small investor. It lends itself to a wide variety of styles, but the type presented here is among the most attractive.

The sun parlor is the unique feature of this house because of its unusual shape, which allows the windows to catch the sunlight.
THREE-STORY APARTMENT BUILDING OF BRICK AND TERRA COTTA. This handsome structure, built on broad and economical lines, contains three unusually comfortable apartments of five rooms each, with a sun parlor in front and sleeping porch in the rear. The arrangement of the dining and living rooms at opposite ends of the house is rather unique and not without its advantages from a housekeeper's point of view. Two bedrooms and bath open out on the hall which connects the main rooms. Much cheer is added to the large living room by the bright sun parlor adjoining, while the brick fireplace is a feature that proves attractive in the cold months. The building is 30 by 53 feet.
Seldom will the contractor who has been called upon to build a double lot six-apartment building find a better example of that type of structure than is presented in the building shown here. Architecturally attractive, it contains four apartments of six rooms each and two of five rooms. The vestibule on the first floor takes up the space occupied by bedrooms in the upper apartments.

Apartments of this size are sufficiently large for a good-sized family, and in addition have a sun parlor and large porch in the rear which can be screened in and used for sleeping purposes. The building is of standard brick construction with a veneer of light face brick in front. Plenty of light for each apartment is provided by the large number of windows in the front of the building and the sun parlor.

The building has a high basement, one side of which has been fitted up as a home for the janitor. The other side is used for storage and heating purposes. The building is 71 by 50 feet.

The arrangement of the rooms in the upper apartments is shown in the floor plan on this page. The hall, which is centrally located, opens into apartments on each side of the building. The living room and one bedroom face the street. Directly in back of the living room is another bedroom with bath adjoining. These two rooms open out on a hall which leads to the dining room, the largest room in the apartment, 12 by 18 feet. An extra closet is off the hall near the dining room.

A small modern kitchen and bedroom complete the plan. Throughout the apartment the idea of plenty of sunlight has been carried out. The dining room has four windows, each bedroom at least one. That plenty of light can be provided even where buildings are close together is conclusively shown in this building plan.

In the great building program which is soon to be started, not only the city contractor will be called upon to build this type of structure, but contractors in smaller cities and towns will be kept busy. The conveniences offered in apartment buildings as well as the economy of their construction are being recognized everywhere and as a result they are being constructed in large numbers.

Buildings of this size are attractive investments. As a result many owners are making plans for an extensive building program this spring and summer with apartment buildings as the principle feature. The substantial income they yield and their popularity are great incentives to stimulate their construction.
DUTCH COLONIAL WITH SHINGLED WALLS. There are many people who have selected the Dutch Colonial as their favorite type of residence architecture. In this excellent example the materials used in finishing the exterior were, on the walls, 24-inch silver gray stained shingles, while the roof is covered with 16-inch moss green shingles. The excellent room arrangement is typical of houses following this style of architecture. The size is 39 feet by 32 feet, with an open porch at one end, 10 by 26 feet.
MODERN BRICK BUNGALOW. The quest today is for the type of home that the man of average means can afford to build and that conforms to building code regulations for buildings inside the fire limits. Here it is—the modern face brick cottage or bungalow. It will go on a narrow lot and make a real home. Five excellent well-lighted rooms are provided; also bath, pantry and plenty of closets. Size of house is 54½ feet by 27 feet.
BEAUTIFUL STORY-AND-A-HALF HOME. The exterior of this house, with its pure white walls, is attractive in every sense of the word. Attention is particularly directed to the design of the roof and also to the broad private porch across the front of the building. Within, there are a large, pleasant living room, a cozy den which might serve as a bedroom if necessity demands, a spacious dining room and an exceptional kitchen, on the first floor, and three bedrooms on the second floor. The size of the house is 44 feet by 31 feet, exclusive of the living porch, which is 8 by 24 feet.
HINGLE-SIDED BUNGALOW OF FIVE ROOMS. On this five-room bungalow the walls have been finished throughout with stained shingles. The hip roof is decorated with a simple open cornice, this construction being used on the small dormers as well as the main roof. The plan shows a cozy arrangement of rooms, including a well equipped kitchen, living room and dining room on the L plan, with colonnade, two bedrooms with the bath between. The building is 46 feet by 24 feet, not including the porches.
WHEN, and under what circumstances, a contractor is entitled to relief from a mistake made in submitting a bid, is a question upon which the courts are not in accord. But the majority of them hold that where the mistake is made without negligence, and the employer has not been prejudiced, relief may be afforded the contractor. A case of this kind, which illustrates the general rule, was that of St. Nicholas Church vs. Carl Kropp, a Minnesota case reported in 160 N. W. 500, L. R. A. 1917 D 741, the facts being as follows:

The St. Nicholas Church, a religious body, desired to erect a church and advertised for bids. Carl Kropp and others filed bids, each accompanied by a certified check for $1,000 to insure the signing of a contract should a given bid be accepted. Kropp's bid was for $30,973, being about $3,900 below the next highest bid, and the committee in charge of the building awarded the contract to him, notifying him of this fact.

That same day Kropp discovered that he had made a mistake in computing the total amount of his bid. It seemed that he had omitted the item for the structural iron, called for by the specifications, which amounted to something like $2,350. He promptly notified the building committee of this mistake, and told them that he would not enter into the contract unless they gave him at least $2,000 more than his bid called for. This they refused to do, Kropp declined to sign the contract and stopped payment on his certified check that he had deposited when submitting his bid.

St. Nicholas Church thereupon awarded the contract to another bidder, and brought an action against the bank upon which Kropp’s check had been drawn, in an attempt to collect the $1,000 that had been deposited.

In the lower court judgment was rendered against Kropp, the court holding that the church was entitled to the $1,000 deposited by him as a forfeit. Kropp appealed to the supreme court, and in reviewing the proceedings in the lower court, among other things, it was said:

"The jury and court found that in his bid Kropp had made an honest mistake without negligence. The mistake amounted to more than $2,000. Does this entitle him to any relief when plaintiff (St. Nicholas Church) was not to blame in any way for the mistake, and had no knowledge that Kropp had made it? We think the facts herein bring the case within this principle governing an unilateral mistake, stated in Sec. 1381 Story's Equity Jurisprudence: 'But where the mistake is of so fundamental a character that the minds of the parties have never, in fact, met, or where an unconscionable advantage has been gained, by mere mistake or misapprehension, and there was no gross negligence on the part of the plaintiff, either in falling into the error or in not sooner making redress, and no intervening rights have accrued, and the parties may still be placed in statu quo, equity will interfere, in its discretion, to prevent intolerable injustice'..."

"The question here is whether a mistake of over $2,000 in the bid upon the construction of this church is merely incidental or fundamental. We think the amount is so large that it is unreasonable to suppose that Kropp would have made the bid he did make, if he had known that the structural iron work was not included therein. Here the finding is that it was an honest mistake, made without negligence. Plaintiff (St. Nicholas Church) was appraised of the error at once. No intervening rights accrued. The belated bid which plaintiff (St. Nicholas Church) accepted was a trifle less than the one Kropp intended to make.

"Our conclusion is that the order denying a new trial should be reversed, and the cause remanded, with direction to the court below to amend the conclusion of law so as to rescind and cancel the bid and award the fund in court to Kropp."
"THERE goes another washing machine sale," said Fred Beard, with a disappointed note in his voice. "I had that woman sold, too. And the worst of it is she wants a washing machine and would have bought one, only for one reason."

"What's that, Fred?" inquired Sam Williams, the contractor, who was occupying his favorite seat in the rear of Fred Beard's hardware store—a place Sam found not only comfortable during the winter, but also profitable, as Fred Beard was a live-wire merchant and a man who gave Sam many profitable building promotion ideas.

"The reason is, Sam," said Beard, as he sat down opposite the builder, "that not more than half the houses in this town have modern basements."

"What's that got to do with a woman's buying a washing machine?"

"Everything," replied the hardware man, but, for the moment did not go into details of what that "everything" meant.

"You know, Sam, I laughed heartily some months ago when Mrs. Lapham told me that her washerwoman had demanded $3.50 a day and that she wouldn't pay it. That is, I laughed to myself. Right there I figured that some of these women who had been hiring their washing done would be doing it themselves. And, that they soon would be buying power-driven washing machines, for the simple reason that a washing machine will pay for itself in six months with the money saved by getting along without a washlady.

"And I was right, too. I have been in the hardware business for a good many years; also, I know the people of this town and the surrounding country pretty well. It takes them a long time to get modern ideas in their heads, but when something comes along that hits 'em in the pocketbook, and they can see a way of putting bullet-proof armor on their wallets, they'll do it. That's why these women around here have been buying washing machines, and that more of them would have bought them if they had modern basements in their homes."
"But what's a modern basement got to do with a washing machine?" insisted Sam.

"Just this," said Fred. "When a woman pays a considerable sum of money for a washing machine, she wants to get all the labor-saving benefits of her investment. Now a washing machine's two chief achievements are, first, that it rubs the clothes; second, that it eliminates lifting pails of water and emptying tubs.

"A well planned basement has in it an electrical fixture for the plug that connects with the washing machine motor. It also has a floor drain, so that the stopper can be removed from the washer tank and the tubs that should be placed alongside the machine, and the water allowed to drain out onto the floor and escape thru the floor drain.

"Now take the case of Mrs. Roth, who just went out. Her home is one of the kind that has a 'cellar' rather than a basement. The floor is of well-packed clay, but it has no drain in it. Besides, if it had, water turned onto a clay floor creates a walking surface that is unsatisfactory, to say the least.

"Mrs. Roth's kitchen is not very large, either. So, to get the best results with an electrically-driven washing machine she would have to do one of two things, both of which are expensive. She would either have to build an addition to the kitchen to accommodate the washing machine and the tubs, or put a cement floor and sewer connection in the basement. And she doesn't feel that she can afford to do either."

"What do you think she'll do?" asked Sam. "Screw up her courage and get me to build an addition to her kitchen, or get Con Crete to lay a floor in the basement?"

"Probably neither," said Beard. "She'll just go along breaking her back over a wash tub, or paying the increased wages the washerwomen are demanding. Too bad, too. She doesn't seem very strong, and a power-driven washing machine would be a God-send to her."

"Well, all of us can't have these modern luxuries," remarked Sam. "Luxuries," repeated Fred Beard. "You don't call a machine that will save three or four dollars a week in the cost of housekeeping, and at the same time make cleanliness a delight, a luxury, do you? No, sir, a washing machine is a necessity in these days.

"And right here, Sam, is a tip for you. You're going to build a number of new homes in this town this season, aren't you?"

"Going to begin just as soon as the frost gets out of the ground," replied Sam. "Well, see that the plans you are building from call for a finished basement—a basement with a cement floor and sewer connections. Go on the theory that a modern home is to have a modern laundry—one where the proper equipment can be put in. Get the wife of the owner interested in a certain electrically-driven washing machine, so you will know how large it is going to be. Then you can locate the electric socket in the right place, and put in a floor drain so that the tubs can be emptied directly into it. In fact, give the owner the sort of a home that will make the work in it convenient and easy."

"Kinda looking out for yourself, too, aren't you, Fred? Kinda looking forward to selling the people I'm going to build homes for washing machines."

"Certainly I am. That's what I am in business for. But at the same time I am trying to make life more comfortable for the people of this town. Every woman to whom I have sold a washing machine is better in health and better mentally than those who are going along tiring themselves out on Mondays—losing all the good the Sunday rest has done for them."

"Well, I'll put it over for you, Fred. All of these people that I am going to build for have consulted with me about the kind of heating plant they will buy; and about the plumbing fixtures and the electric wiring and outlets. They look on me as a sort of first aid to the home builder, I guess. That's why I can talk to them about the value of having a basement designed for an electric washing machine."

"Why shouldn't you help them in deciding on what goes into the home?" queried Beard. "You know more about this equipment than the home owners do, Sam. And I know that you never overlook an opportunity to learn about the best home equipment that is on the market. It's keeping up on these subjects that has made you a success as a home builder."

"Plan the Basements of the Homes You Build so That They Will Be Ready for Modern Laundry Equipment."
PERMANENCE, durability, beauty—these are the qualities which the prospective building owner will demand in whatever he is going to build this spring. These are the qualities which the contractor must be able to incorporate into that building.

In the last few years a great deal of consideration has been given to the question of permanence in small buildings.

By small buildings I mean buildings which are less important than houses, that is, cattle, horse and general purpose barns, hog houses, garages, ice houses, milk houses and poultry houses. Among these there is no building in which the three qualities of permanence, durability and beauty are more to be desired than in the garage.

The accompanying photograph illustrates a two-car garage in which these qualities have been very successfully combined. The walls are of brick veneer construction and the roof is made of clay roofing tile. Sliding doors form the two ends of the building and are hung from storm-proof tracks. The interior is well lighted by the two windows seen in the picture. As is also shown in the photograph, two different kinds of brick are used—a yellow, rough texture brick from the ground to the soldier course, and above red, rough texture brick is used. The yellow brick is also used to set off the windows.

The drawings shown below illustrate a one-car garage which is similar in design to the one just described. It is 20 feet long and 12 feet wide.


Floor Plan of One-Car Garage, Showing Pit Arrangement.
Permanent Garages

The walls are built of brick and hollow clay blocks up to a height above the ground of 3 feet, 5 inches. This much of the wall is 9 inches thick. From this point to the roof the wall is 8½ inches thick, built of tile, stuccoed on the outside. As shown in the drawings the interior is lighted by two large windows in each of the side walls.

The roof is covered with prepared roofing. The floor is made of hollow clay blocks covered with a thin coating of concrete. Tile seconds can be used very successfully in the floor and may be purchased from most clay products manufacturers for a price less than that of first-class blocks.

A pit is provided in the middle of the garage so that repair work under the car may be done more advantageously. The floor slopes toward the pit from all four walls and a drain is placed in the bottom of the pit. This makes possible a washing of the floor occasionally.

These two garages, altho similar in design, differ somewhat as to method of construction. The predominating feature of each is the factor of permanence. When once they have been built, they will stand without further attention.

A SMALL percentage of hydrated lime or lime putty added to the cement mortar will make the mortar work better, adhere better to the tile, and will give a more waterproof mortar mixture. Not over 15 to 20 per cent of the volume of the cement should be used; too much lime weakens the mortar and reverses the above-mentioned advantage by making the mortar more absorbent. A straight lime mortar, however rich a mixture, is not suitable for setting hollow tile.
Efficient Division of Two-Lot Store

CHAIN stores are the finished product of the school of modern efficiency. The building shown here illustrates how two chain stores of different lines have divided a two-lot store in a manner that will enable each to run its business on a minimum of space. The large store is 45 feet wide, or in terms of property, a lot and half. It is adapted for a general merchandise business which needs some room for surplus stock. The remaining half lot is occupied by a cigar store, which can be operated in a small space because fresh stock is received frequently, and only enough room for actual trade is needed. The general merchandise store is not paying the rent that it would ordinarily pay for two full lots, nor is the cigar store paying for a full lot.

The building is one story high with a basement for heating and storage purposes. It is built of brick with an ornamental terra cotta front that can be washed frequently and thus retain its bright appearance. The large store has two entrances set well back to increase the show window space which practically covers the entire front of the building. The smaller store has an entrance slightly narrower than the others and placed next to the outer wall.

Each store runs the full length of the building, 59 feet, and has a toilet in the rear.

Saving space thru the use of half, quarter, and other irregular-sized stores such as are shown here has been one of the big factors in the success of the chain-store system. They carry no excess merchandise and consequently use a store just large enough to handle the everyday business.
BANKS boast of an architecture and style peculiar to themselves. As a rule, it possesses a certain amount of dignity and impressiveness which tends to reflect the power of the medium of the banking business, money. Moreover an impressive building has an inherent attraction for people because it inspires confidence in the firm which is so substantially housed.

This feature is especially striking in the bank building shown here. The large terra cotta pillars and artistic facade give it a monumental appearance. The brick construction is further enhanced by a well selected trim, while the large windows give the structure a pleasing expression of frankness.

By no means large, the building is only 27 by 51 feet, it is efficiently designed to handle a good business. The attractive double mahogany door leads into the public space which is used by the customers. The outer side of the front half of the building is divided into an office and general working room, containing the tellers and bookkeepers' cages. The rear half of the building is set aside for the personal business of the bank and contains the vault, private office and directors' room. Two toilets are also located in the rear.

It is easy to see that an artistic building of this type is a decided asset to any town or neighborhood and a magnet for business.

It IS one of the inalienable rights of every American citizen to be a home owner, to have a place absolutely sacred to himself and family, into which no unwelcome guest may intrude, and where he can, as in his own castle, "defy the slings and arrows of outrageous fortune." A homeless man is like a man without a country.
Design for Small Church
Frame Structure Contains Kitchen and Lecture Room for Social Functions

Social activity as well as spiritual life in a small town or rural community centers in and around the local church. Not only is it a place for worship, but it has come to mean a social club for the members of the congregation. For this reason several features are incorporated in the plans of a church now that would not have been considered formerly.

The floor plan of the church shown on this page shows how the social activity end of the church has influenced construction. In addition to the regular church auditorium with its choir loft, pulpit and organ, provision is made for a kitchen and lecture room, which are needed frequently for dinners, entertainments, and socials of all kinds. The church proper is 30 by 50 feet, with a 10-foot addition in the rear to take care of the organ. The lecture room, located at the side and opening off the vestibule, which also leads into the church, is 24 feet 6 inches by 29 feet.

The church is divided into three rows of pews with aisles between, the center row holding five and each outside row holding four persons. It has a capacity for several hundred people. The kitchen is located in the rear of the building next to the organ and has doors leading to the auditorium and lecture room.

The building is of frame construction and has a steeple with bell loft. The Gothic windows are covered with stained glass. The double entrance is located in the lower part of the tower at one corner of the building.

The Social Center of the Small Town and Rural Community is the Church. This Church Has In Addition to the Auditorium for Spiritual Services a Lecture Room for Meetings and Dinners as Well as a Kitchen.
POSTOFFICES are necessary institutions. In their construction a great deal depends on the floor arrangement. Unless it is carefully planned, the great efficiency needed in the postal service cannot be attained and a consequent and costly delay is the result.

Special attention was given to the arrangement of the postoffice floor shown in the accompanying plan. Every square foot of floor space has been adapted for a specific purpose. In the front part of the building we find the space with desks for the public and the cages for stamp and money order clerks. A rather large section is given over to the parcel post section because of its continually increasing size.

But direct personal business contact with the public is the smallest part of the mail service. The actual handling and sorting of mail requires space, and in this building this important fact has not been overlooked. More than two-thirds of the floor space is devoted to this phase of the work. The work floor is equipped with two long sorting tables with the bag rack in between. The adjacent floor space is used for holding the outgoing and incoming mail bags. At the end of the building are two loading platforms—one for receiving, the other for shipping. The mail comes through one door, is sorted, placed in bags, and loaded at the other platform.

The building has an attractive brick front with terra cotta trim and stone up to the windows. It has two double door entrances—one in the center of the building for the public, the other for employees. It is 48 feet wide and 60 feet long and one story in height. This size and type of postoffice building is excellently suited for branch work in large cities or towns and can be constructed very economically because of little interior construction.
**A New Front on a "Side" Street**

BY O. R. HARDWELL

This is the story of a retail merchant who had the courage to smile at custom and laugh at precedent.

Four years ago Edward Bengston was proprietor of a jewelry store situated on the busiest corner in Freeport, Illinois. He had spent considerable money in advertising his location as "Bengston's Corner." A cross-town, street car transfer point, Bengston had provided a neat public waiting room, and in numerous other ways (not to mention his unusually attractive window displays) he sought to veritably trade-mark his store's location and brand it in the mind of every possible customer.

Just then the rent went up. And the jeweler faced the unpleasant alternative of paying the store owner a sharp advance for his established location or leaving the high rent zone for the only available vacant site "down on a side street."

It required courage to make a decision. Yet Bengston picked the side street. Picked the only thing that was left—a saloon that had closed its doors two years before, when the town went dry.

It cost $5,397.33 to put a "clean dicky" on the saloon. But Edward Bengston's fine enameled terra cotta front has since made a main street out of a side street. It has pulled a backward and obscure thoroughfare out of its rut. It has set a standard in modern store fronts for other merchants to emulate, and improved the community's general appearance. It has done much more—it has doubled the volume of Bengston's jewelry sales in four years.

Mr. Bengston recently stated: "Location is not always a main factor in business success, for, it stands to reason, everybody can't have the most prominent corner in the town. I have demonstrated what can be done down on a side street, even when custom, precedent and expert opinion told me I was dead wrong."

Be conservative if you wish, but first have something to conserve.
Concrete in the Lumber Yard and Shed

CAN BE USED IN MANY WAYS WITH EFFECTIVE RESULTS

WHAT extensive use may be or has been made of concrete in and around lumber sheds and yards is not realized until an opportunity of examining a number of illustrations of such actual use is presented. An accompanying group of pictures illustrates this point. They show a builder's supply yard where in one case concrete pavement forms a platform for mixing concrete that at spare time is worked up into concrete block; another, a platform that is used as a stacking place for shingles to keep the bundles from contact with the soil; another, a pair of curbs or runners finished with re-inforced concrete posts at one end to permit the stacking up of cedar or other posts or similar timber pieces.

The advantages of concrete pavement in such locations are parallel to its advantages on the open highway. Mud and dust, with the possibility of having a loaded truck or team stalled, is eliminated. It goes without saying that anyone would be attracted by the cleanliness that such pavement introduces, since it inspires the spirit of clean up and keep clean. Once built, it is always built.

In an issue of the AMERICAN BUILDER several years ago, a drawing and photograph were shown of concrete lumber pile supports. One of the Wisconsin yards has adopted such supports for its lumber piles and has, in addition, built composite trackways between the piles, these trackways serving as drives for the yard trucks and as a railway for push carts.

Rule for Squaring Up Work

THE old rule of 6-8-10 is used generally by all mechanics in squaring up their work, and it is the quickest and most reliable method known, except the use of an engineer's instrument. Measure 6 feet from the corner on one side and 8 feet from the same corner on the other side, and the diagonal of these two points should be 10 feet. If not, the lines are not square or at right angles to each other.
How to Build Equipment for Modern Factory

SPACES AND LABOR-SAVING DEVICES INSTALLED IN AUTO SERVICE PLANT BOOST EFFICIENCY

By Shirley Ware

DRESSING a building in a unique garb without losing efficiency can be accomplished by cooperation between the alert contractor and business man who readily recognizes the value of space and labor saving devices. By the wise and careful selection of equipment designed for this purpose the space can be so adapted and arranged as to handle a highly specialized business without waste. At the same time the building arrangement can be so attractive as to stimulate business.

A striking example of this use of labor and space saving equipment in a logical arrangement is shown in a motor service-station recently built by the Nordyke-Marmon Co., of Indianapolis, Ind. This miniature factory, as it is called, was built upon a downtown site in the motor row with the thought of combining a salesroom and repair department in a convenient-to-the-motorist location. It stands on a popular drive where hundreds of motor cars pass daily.

Upon entering the salesroom, the first thing that draws attention is the system of lighting. In addition to the large globes that hug the ceiling and which are known as the indirect lighting system, reflectors of powerful candle power are secured to pillars in such positions as to reflect a strong light upon those parts of the car the company wishes to feature most. One of each model manufactured is exhibited and ample space is afforded for the car to be seen from all sides.

A door from this salesroom opens into one of about equal size. Ten or twelve used models are displayed here and it is immediately obvious that the cars are seen to much better advantage because of the well fitted and well furnished background, and the cars are

"Motor Ambulances" for Holding Disassembled Parts of Motor. These Tables Prevent Confusion of Various Parts of the Different Cars in the Factory for Repairs.
Individual Lockers for Steering Cushions, Curtains, Carpets, Etc. The Inside of the Locker Is Partitioned Into Many Sections to Separate the Contents. The Lockers Are Sealed with a Lead Seal Until Car Is Ready to Be Refitted.

not crowded together in the "junk-pile" exhibit according the used car in many factories. The visitor sees the car at its best, and, by the way, "visitor," not "prospect" or "customer," is the name all callers are known by among salesmen and other employees.

Hospital for "Sick" Cars

In the rear of the building, a large door opens to admit the car coming into the factory for repairs. It is first driven into a room with concrete floor (in fact the floors throughout are of concrete) and cleansed thoroughly by a shower spray device that is attached to the ceiling. A rubber hose connection is also provided on either side for the purpose of cleaning the fenders and wheels that sometimes prove obstinate. The machine is then backed upon a freight elevator and carried to the second floor which comprises the repair department.

The car is examined thoroughly and if found to be in serious trouble its motor is dismantled and the parts are placed upon a "motor ambulance," that, equipped with rollers, is wheeled to one side until the motor is again assembled. In this way there is no probability that the parts will become confused with those of any other car in the factory for repairs.

To anyone who has spent a night at a hospital, booked for an operation, these methods will be easily recognized as that institution's procedure. Other hospital adaptations are the painting of a design in black upon all doors where finger prints come in contact with the frames, and equipping the stationery bowls with foot-valves in order that finger prints may not appear here also.

Efficiency Arrangement Means Better Service

Before the car is sent thru the various stages of repair, its inner contents and body parts are removed and stored away for safe
keeping. The carpets, cushions, clocks, lamps, etc., are put into an individual chest until needed. A lead seal, similar to that used by the freight car locks the chest and a tag containing owner’s name, car number and other necessary information is attached thereto and a duplicate given to customer. Tires are detached, placed in racks and tagged similarly.

An office for service manager is at one end of the building. Here a bulletin board with an up-to-the-job record of the progress of each car is installed, and as the car moves from one department to another, the proper notation is made thereon, e.g.,

Customer’s Name Number Number.
Robinson 920815 818119 Remarks—Assemble 11/1/19

When a telephone inquiry comes into the office, it is immediately referred to the Service Department and all that is necessary is a glance at the bulletin board to ascertain just what is to be done before the customer may have the car. A similar record is kept of the batteries in service. In this way there is no unnecessary waiting for the information.

**Handy Stock Containers Aid**

The tier and bin arrangement is used for storing small parts. Each tier is lettered alphabetically, and each row and bin numbered. A card index is used in connection with same and each card contained therein is indexed alphabetically and is lettered and numbered with the tier letter, row and bin numbers. The number of the parts in stock is also shown, and when a part is taken from the bin, a deduction is made for further record. In this way an employee may secure the part desired with no trouble whatever.

Gaskets are filed in large flat drawers with nails
shown Quick Methods of Dumping.

driven so as to fit the holes in the different patterns, thus keeping them in place.

Tool racks built in pyramid shape are provided for the important tools that are not in constant use. Outlines of all tools are painted in bright red upon a background of gray and a nail holds each tool in place. At the end of the day if a tool is missing the checker is able to know which one it is at a glance.

A cabinet similar to the filing cabinet is used for keeping a complete supply of incandescent lamp bulbs at hand. A partition of wood with small holes is fastened about half-way in each drawer and the bulbs fit into the openings, in an upright position. Not only is the workman saving time but a large percentage of breakage is eliminated.

A manner of keeping waste in the repair rooms without its appearing unsightly is found in the scrap bins which are equipped with two doors, at top and side, one for dumping the waste and the other for securing it as needed.

A container in which the oil barrels are hidden is made with a door that opens out and one that lifts up. The barrel is mounted upon a platform with rollers allowing same to be pulled outside the container when a very large quantity of oil is desired.

**Provides for Employees' Comforts**

Not only is the plant well ventilated and well lighted, but many other provisions for the employees' comfort are to be found. The interior, walls and woodwork, are painted in light gray, which is a color not too bright to be tiresome to the eyes and yet bright enough to give the factory light and cheer. In order to eliminate offensive gases, a rubber hose is attached to the exhaust pipes of the automobile and floor pipes connected to the rubber hose continue to carry the exhaust outside the building. A butterfly valve connection (Continued to page 151.)
HOMEBUILDING seemed to be the most important topic of the day. Everywhere he went Mr. "K," of the AMERICAN BUILDER staff heard people talking about the kind of home they were going to build this spring. Finally he got a touch of the fever himself and decided to build one of his own, but different from those that have already been suggested.

What he had in mind is indicated in the plans shown this month. They call for a large seven-room house of brick construction with a concrete basement.

This home is a pleasant combination of the substantial and artistic in architecture. The rather heavy lines of the square brick type are softened and greatly enhanced by the artistic pergola porch and distinctive tile hip roof well broken up by dormers. The combined effect of these touches are very pleasing.

On the first floor, as the plan indicates, is a large living room, 28 by 14 feet 6 inches, with a well-designed brick fireplace and side bookcases fitted with glass doors, a comfortable dining room, kitchen, lavatory and an inviting little "breakfast nook" fitted with a unique table and side benches. The entrance is on the side of the house opening on a drive way, which extends to the garage in the rear.

Four bedrooms are shown on the second floor plan. Each one has a pair of windows to provide light and ventilation. In addition to the bedrooms is a bath room and sleeping porch. Plenty of closets are also provided.

The substantial feature which is found throughout the building is particularly emphasized in the basement plans. The posts, girders and walls, which are concrete, are stout and strong. The basement has a concrete floor with a drain near the laundry tubs.

That Mr. K is strong for modern conveniences that will lighten the work of the housekeeper is shown by the laundry equipment consisting of a modern washing machine and mangle.
Design of a Simple Beam for Stresses

One of the most important problems in construction is the designing of floor beams when the load that they must carry is known. Many floor beams are of the simple beam type. That is, they rest on end supports, with the ends free to lift slightly when the beam bends under a load. In a floor beam, the load to be carried is considered uniformly distributed. That is, every foot of beam must carry equal loads. In Fig. 1 a simple beam is shown. The series of circles along the top of the beam indicates the uniformly distributed load. Now, experiment and theory have both shown that in a beam where the material is of uniform grade, the greatest danger from failure will occur at the center, C. This tendency to fail is due to the reaction, R. The force R tries to rotate the left half of the beam around the point C in a clockwise direction. Such a force produces what is called a bending moment. The problem is to so design the beam that it will not break from bending moments.

To determine this bending moment, proceed as follows: Suppose the load on the beam is \( w \) pounds per ft. of length. If the beam is \( L \) ft. long then the total load is \( W = wL \). Each reaction is one-half \( \frac{W}{2} \) the load, or \( \frac{wL}{2} \). But to the left of the point C there is also one-half the load, or \( \frac{W}{2} \). By the laws of mechanics any uniformly distributed load over a beam may be replaced by a single load of an equal number of pounds at the center of the beam. The left half of the beam may be represented as in Fig. 2, with the forces producing bending moment. From the article "The Three Stresses" the moment of \( \frac{W}{2} \) is found by multiplying the force by its distance from the point C.

\[
\text{Moment of } \frac{W}{2} = \frac{W}{2} \times \frac{L}{2} = \frac{WL}{4} \quad \text{(clockwise)}.
\]

Since one of these moments tends to balance the other, the total bending moment is the result obtained by subtracting one from the other, or

\[
\text{Bending moment (B. M.)} = \frac{WL}{4} - \frac{WL}{8} = \frac{WL}{8}.
\]

Note: In using this formula \( L \) must be in inches.

For example, take a beam 16 ft. long, which carries a uniformly distributed load of 2000 lbs., as shown in Fig. 3. The reactions are each 1000 lbs. The view of the half of the beam to the left of C shows two forces of 1000 lbs. each producing bending moment about point C. The moments are calculated as follows:

- Moment of 1000 lbs. at A is \( 1000 \times 8 \times 12 = 96,000 \) inch lbs. (clockwise).
- Moment of 1000 lbs. at B is \( 1000 \times 4 \times 12 = 48,000 \) inch lbs. (counter clockwise).

\[
\text{B.M. at C} = 96,000 - 48,000 = 48,000.
\]
The clockwise turning effect of the left half of a beam tends to crush the top fibers of the section at C, and to pull the bottom fibers apart. That is, they are in compression and tension respectively. The fibers of the beam at C resist this turning effect by pushing in at the top, that is, acting in compression, and pulling out at the bottom, that is, acting in tension. These internal stresses are the greatest at the top and bottom, getting smaller toward the center. In Fig. 4 the vector represents to some scale the number of pounds in the force, and the arrow head the direction in which it acts. At every point in C D E F there is a tension force, the arrow heads pointing in the opposite direction. Figure 4 shows that at all points located at the same distance from the line CD the fiber stresses are equal. If the beam is made of wood, steel or wrought iron the tension forces at the bottom of the beam are equal in magnitude to the compression forces at the top and so on for points at equal distances from the line CD. The figure shows no stress at the center line CD of the section. This line is called the neutral axis for the section. So long as the fiber stress does not get greater than the elastic limit of the material, the line CD goes thru the center of gravity of the section of the beam. If the beam is symmetrical in shape the center of gravity is always the same distance from the upper and lower edges.

That a piece of material will act as explained in the preceding paragraphs can be illustrated by loading a piece of wood until it begins to fall. The very top fibers begin to split first, then the bottom fibers show signs of tearing apart.

Now suppose that the compression forces acting against the face ABCD were replaced by one single force, so placed that it would exert the same effects on the beam as the distributed forces. Also suppose that the tension forces acting on CDEF were replaced by one force with a pull equal to the distributed forces on this face. Now each of these forces tends to rotate around CD in the same direction and it is the sum of their moments that balances the bending moment.

From the theory of mechanics, the turning moment of the fiber stresses at any section, for a load within safe limits, is given by the formula 

\[
\frac{1}{8} WL = \frac{PL}{IC}
\]

The formula for the safe loading of a beam with the load uniformly distributed is 

\[
\frac{1}{8} WL = \frac{PL}{IC}
\]

In this formula P is a safe working fiber stress for materials, values for which may be gotten from handbooks on construction. It is called the moment of inertia of the section of the beam, values for which may also be obtained from a handbook, and c is the distance from the neutral axis to the fibers at the greatest distance away from the axis. W is the total load carried by the beam, and L is the length of the beam in inches.

While the values of I can be obtained from a handbook, it is convenient to know how to calculate the I for rectangular sections. For rectangles

\[
I = \frac{bh^3}{12}
\]

Where b is the dimension on which the rectangle rests or the one parallel to the neutral axis of the section and h is the height of the section. Note that in calculating I all dimensions must be in inches.

For example, in Fig. 5 (1) let the cross section of the beam be a 2x4 with the neutral axis AB.

\[
I = \frac{bh^3}{12} = \frac{2 \times 4 \times 4 \times 4}{12} = 10\frac{2}{3} in^4
\]

In Fig. 5 (2) the beam is loaded, resting on the long side. The neutral axis AB is parallel to the long side.

\[
I = \frac{bh^3}{12} = \frac{4 \times 2 \times 2 \times 2}{12} = 2\frac{2}{3} in^4
\]
In Fig. 5 (2) \( c = 1 \) in., and 

\[
I = \frac{2\pi}{c}.
\]

The expression \( I \) is called the section modulus and is the factor by means of which the size of a beam must be determined. The section modulus is given in all handbooks, corresponding to the various sizes of beams. Now, referring to formula (2), it is seen that the bending moment increases or decreases with the section modulus. The section modulus determines the strength of the beam. For a given beam the builder naturally wants the greatest load possible within the limits of safety. Then he must place the beam so that its section modulus is the greatest. Referring to the preceding results, it is evident in this case that \( I \) is greater when the larger dimension is vertical than when the beam is placed with long dimension horizontal. This condition is always true. If the beam were square then \( I \) is the same both ways.

If the length of a beam were given, also its size and the load it had to carry, the problem would be to find the maximum fiber stress \( P \) under these conditions, and be sure that it did not exceed a safe working stress for the materials of which the beam was made.

Referring again to Fig. 3. Suppose the beam is 2x10 inches and of white oak. The cross section is shown in Fig. 6.

\[
I = \frac{bh^3}{12} = \frac{2 \times 10 \times 10 \times 10}{12} = 166\frac{2}{3}.
\]

Now \( W = 2000 \) lbs., \( L = 16 \times 12 = 182 \) in., and \( C = 5 \) in., the distance from the neutral axis AB to EF or CD.

From formula (2),

\[
\frac{1}{8} \times 2000 \times 192 = \frac{P \times 166.7}{5}.
\]

\( 48,000 = P \times 33.4 \)

\( P = 1437 \) lbs.

A safe working fiber stress for white oak is 1000 lbs. per square inch. Since the maximum fiber stress caused by the above load is 1437 lbs., it is too great for a 2x10 inch beam. The beam would not be safe.

Try a 4x10 inch beam. Everything remains the same but \( I \).

Here \( b = 4 \) and \( h = 10 \).

\[
I = \frac{bh^3}{12} = \frac{4 \times 10 \times 10 \times 10}{12} = 334.
\]

\[
\frac{1}{8} \times 2000 \times 192 = \frac{P \times 66.8}{5}.
\]

\( 48,000 = P \times 33.4 \)

\( P = 718.5 \) lbs.

Since this value of \( P \) is less than 1000 lbs., the beam is safe. Two 2x10s placed side by side would also serve to carry the load safely.

As a practical application, take the problem of designing a floor for a hay barn to hold 70 tons of hay. The floor is 30 feet by 50 feet. Floor beams 4x10 inches are to be spaced 18 inches from center to center. To find if they are safe. Since the floor is 30 feet wide a heavy girder will be placed thru the center and two spans of floor beams, each 15 feet long, will be used, as in Fig. 7. Any beam, as AB, must hold a section of floor equal to the rectangle EFGH with area

\[
18
\]

\[
A = \frac{1}{12} \times 15 = 22.5 \text{ sq. ft.}
\]

The total weight on the floor is

\[
70 \times 2000 = 140,000 \text{ lbs.}
\]

The total floor area is \( 30 \times 50 = 1500 \) sq. ft.

Each foot of floor space must carry a load of \( \frac{140,000}{1500} = 93.3 \) lbs. per sq. ft.

The uniformly distributed load on AB is

\[
W = 22.5 \times 93.3 = 2100 \text{ lbs.}
\]

The beam AB is shown in Fig. 8.

\[
I = 334, \text{ from the previous problem, for a 4x10-inch beam; } L = 15 \times 12, W = 2100, C = 5.
\]

Then \( WL = \frac{P}{c} \).

\( (Continued \ to \ page \ 172.)\)
“HEY do it in the movies.” To most people this important feature of our everyday life brings up visions of cowboys, slapstick comedians, or fascinating vampires. But its significance is more far-reaching than just as a medium for amusement. The alert business man has begun to visualize it as a medium for educational purposes and incidentally a means for fostering better trade relations.

But, how can it apply to the building industry? is the inevitable question. The average man is convinced there is no sentiment, no human interest in cold stone, steel girders, or concrete, yet the Indiana Quarrymen’s Association had a film made showing how their product was quarried and brought to market and proved there was plenty of real interest in that phase of the building activity. Now another industry very vitally interwoven with the building profession has tried the experiment with success.

To most people the idea of mixing romance with paint does not sound reasonable. But it can be done successfully and profitably. This fact was demonstrated clearly in a recent moving picture campaign carried on by a paint corporation to acquaint their dealers more intimately with the product they were selling.

The dealers had been handling the products for years but had never given them a second thought. To them it was paint, a commodity, well recognized, to be bought and sold, and they let it go at that. They had never seen the plant where it was manufactured, nor did they know how it was made. Scattered all over the country as they were, it was impossible to bring them all to the plant, so unlike Mahomet and the mountain the plant was brought to them—via the movies.

The picture was not a plain industrial film. The scenario expert was a good student of human nature so be mixed in a little romance.

The opening scene is in the store of a paint dealer who is a failure. Soon along comes Son, home from war and full of pep. He is ambitious to see the cash register in Dad’s store fill other than a decorative function. At the psychological moment a paint salesman arrives and shows them the way out. Of course, there is a pretty girl in the film. This girl looks as good to Son as to the audience—and there’s a honeymoon. On this happy trip the newlyweds stop off at Milwaukee and go thru the plant where the paints are made which made Dad successful in business. This honeymooning trip thru the factory furnishes the industrial part of the picture.

On their trips salesmen carried this three-reel business romance and a suit case projection machine. They attach the projector to an electric light socket in a
hotel room and bring prospects in to the movie show.

Further along the line a number of local dealers used the film to sell products to the townspeople, having the picture shown at local theaters.

The picture was produced by the Rothacker Film Co., and was shown at hardware, and lumber dealers' and painters' conventions, etc., in all the large cities.

The plan worked so well that the paint people are having another film made for the use of the local dealers.

The title of this picture is "Save the Surface and You Save All." In this film Mr. and Mrs. Upson Downe are as run down in their luck as their cottage is run down in appearance. They decide to sell and go West. Prospective buyers come, see and pass on. The village squire philosophizes: "When ye're sellin' a hoss, ye curry him fist—try a bit o' paint on yer place." The young couple act on the squire's hint. However, when they get the house painted the place looks so nice they decide it is too good to sell. When shown in a theater this film will carry the local dealer's name.

Concrete Conference Plans Extensive Program

FOUNDATIONS for a definite program to bring about early relief for the present housing shortage were laid at the first conference of Concrete House Construction held in Chicago last month.

Special emphasis was placed on the part concrete and its associated products would play in the great campaign, and all the members were enthusiastic over the building outlook.

Several important resolutions of far-reaching importance to the building industry at large were adopted. It was recommended that exemption from income tax on first mortgages on dwelling houses be granted to stimulate loans in that direction and divert them from investments which are taxable.

Priority in the shipment of building materials was urged to relieve the acute shortage of houses and speed up building. Building officials were urged to use their influence in effecting economy in construction by standardization of requirements for building materials of all kinds and removal of undue restrictions. More reasonable laws on the use of concrete were also advocated.

Since one of the chief problems in the building situation is lack of funds to finance home building, it was urged that funds now tied up in first mortgages held by building and loan associations be made available for home construction.

The subject of proper comfortable farm houses was given considerable attention. Minimum requirements for a good residence on the farm should include permanent material, light bright spaces for sleeping purposes, at least one window in every room, provisions for culinary operations and a room in which the family can assemble for social life and adequate equipment to lessen household labor, including heating and water supply and adequate sanitation.

The pointing of stone work is usually done as soon as the exterior part of the building is up, unless this part of the work is reached in cold weather, as no pointing should be allowed during weather when the mortar will freeze, either during the day or night. In extremely hot weather, if pointing is done, it should be protected by hanging canvas or muslin over it to keep off the hot rays of the sun, as the heat will dry it too fast and the cement will lose its strength. All joints before pointing should be raked out at least three-quarters of an inch deep.

No stone shall be used that does not bond or extend in the wall at least six inches.
FIVE-ROOM FRAME BUNGALOW. Here is your dream home—a delightful little house set in a garden. Its trellised sides and pergola archway call for a setting where vines and flowers are plentiful to add harmony to the general scheme. It has a low gable roof of shingles and attractive entrance that will find immediate response from home-lovers. Inside are five cozy rooms, laid out with an idea to convenience, and breakfast nook. The great open fireplace in the living room spreads that feeling of comfort that typifies a real home. In the rear is a frame garage with a concrete trackway leading down to the street. The house can be entered thru the French doors of the dining room or the main door into the living room. Size, 37 by 38 feet 6 inches.
EIGHT-ROOM BRICK AND STUCCO HOUSE. For those desiring a substantial but not fastidious home this combination brick and stucco dwelling will prove satisfactory as well as economical in cost. The stucco starts just below the sills of the windows on the second floor. As an added feature the large front porch has been extended beyond the side of the house in the form of an open terrace with heavy brick balustrades and a stairway leading to the drive. The dimensions of the house are 30 by 36 feet. The porch with terrace is 42 feet long and 9 feet wide. On the first floor are the living room, dining room, den and kitchen with four bedrooms and bath on the upper floor.
Portability Feature of New Excavator

A new excavator and loader has been designed to fill the big gap between the steam shovel and the hand shovelfers. Because of the principle on which it operates, portability is a feature "built into" this excavator and loader. The machine always stays on the ground level and draws the dirt to it. After the work is finished, the excavator can be moved on to the next job just as easily and quickly as a wagon.

Only two men are necessary to the operation of this machine—one at the operating levers and one at the loading point. At a point anywhere within 50 to 200 feet from the machine is stretched a chain, at right angles to the line of digging, upon this chain are two sheaves, hooked to the chain, either sheave may be unhooked and re-located in an instant. One heavy cable passes from the hoist drum on the machine, then to the digging skip, then thru both sheaves, back to the retrieving hoist drum on the machine.

The operator at the machine manipulates but two levers—a foot brake. As he places power on the digging line, the other man manipulates the handles, on the skip, so as to fill it with the material to be dug or removed. The skip has a capacity of 15 cubic feet per trip. As soon as the skip is filled, the man releases the handles and allows the skip to ride to the excavator. As the skip strikes the apron at the machine it unlocks the catch of the pivot arm on the machine. The arm then carries the skip up over the machine and onto the slanting chute located on the front of the machine from where the material in the skip discharges into the waiting wagon, truck or railroad car. The skip is then quickly retrieved to the starting point and the operation repeated.

The machine is especially designed for excavating work, for the removal of materials from one location to another and for general work where flexibility of operation is not limited. It likewise eliminates the pick-ax and shovel worker entirely.

New Dotting Pen for Draftsmen

A short cut to speed and accuracy in dotting which has always been a tedious and irksome task for architectural and mechanical draftsmen bids fair to be realized in the form of an inexpensive pen which recently made its appearance. It consists of a little grooved wheel which is held between two nibs similar to those of an ordinary ruling pen. These grooves are ink reservoirs and are supplied from the main reservoir between the nibs as shown in the diagram. Thirty different sizes of wheels give the draftsman plenty of variety.

This pen draws unbroken, broken, dotted, wavy and combination dot and dash lines. The supply of ink is replenished between the nibs as in ordinary pens. In adjusting the pen, the wheel, which will give the desired size, is first selected, then inserted between the nibs which are opened by loosening a knurled nut, and placed on a small pinion. The nut is then tightened so that the wheel revolves easily without allowing side play. An adjustable fork protects the wheel and slides against the ruler when one is used.

Rules for Measuring Slate Roofs

Plain roofs are measured by multiplying the length of the roof by the length of the rafter.

Roofs with hips, valleys, gables, etc., are measured by multiplying the length of each section thru the center by the length of the rafter, and in addition to the actual surface of roof, measure the length of all hips and valleys by one foot wide; also what the first, or eave course, shows to the weather by the length of eaves.

No deduction is made for dormer windows, skylights, chimneys, etc., unless they measure more than four feet square when one-half is allowed. If more than eight feet square the whole is allowed.
Use Paving Mixer in Construction Work

In building the new plant for the Cadillac Motors Company at Detroit, the Du Pont Engineering Company of that city used a paving mixer in a variety of ways and secured unique service.

This paver, equipped with a swivel chute, was utilized for the pouring of all of the footings of the columns of this vast building. The footing of each column was 8 feet wide, by 8 feet long, by approximately 8 feet deep. The paver was placed between the rows of excavation and poured first on one side and then on the other side by merely swinging the chute. Since the paver could traction its own way it was able to pour these footings exceedingly fast.

After the paver had completed this work it was driven under its own power to another spot where it was put to work pouring the fence walls on one of the large tunnels which is a part of this tremendous undertaking.

It was then taken into the building proper after they had begun to rise above the ground and was used for grouting in the floors. It was also used for pouring all of the floor slabs.

Its use was not limited to the first floor. As the work progressed it was used on each floor in turn. It was taken from one story to the next by a gigantic crane which hooked onto two cables wrapped around the machine and swung it up to the next floor. It proved to be the utility machine of the job, and during the entire time it was in use, which was considerable over a year, did not have a single breakdown.

An Inexpensive Hoist

The hoist as an aid to the contractor in loading and hoisting material and scraping dirt has proved to be very valuable. It has helped to increase his capacity for business, boost his efficiency while cutting costs, and has been a benefit in many different ways. Its great value lies in its power. Great weights which formerly required many men and much time to hoist are now handled thru the medium of this machine easily with a minimum of man power and time.

In building it is a big factor in every stage of the construction—excavating, sinking the piles for the foundations and hoisting the material used in the building.

A machine like the one shown in the accompanying illustration is equipped with two large drums, each with a capacity of 1000 pounds on a single line. They are driven from a single pulley shaft with a pinion that turns two large gears, which are in turn fitted with a friction clutch. This clutch operates the drums independently. At the same time this hoist costs little.

Wood Preservative as a Factor in Building Field

Heretofore wood preservatives have been marketed mainly to telephone, telegraph, railroad and power transmission line companies whose operation calls for the use of many posts, but of late contractors, farmers, and builders have become interested.

Decay in wood is caused by fungi which feed on certain portions of the wood fibre. These fruiting bodies produce spores which reproduce decay like seeds produce plant life. They develop fastest with moisture, heat and air, hence the excessive decay of fence posts and foundation timbers at, or just below the ground line. The cure for this is a preservative that will destroy the fungi without harming the wood fibre. The best known element for this use is creosote which
Decay of Foundation Timbers of Corn Crib Due to Rot Fungus Feeding on Fibres.

is the base of many preservatives. The scarcity of timber in Europe has made the treatment of wood an accepted practice, and as the timber supply in this country grows less, the need for wood preservation becomes apparent.

The wood preservative is applied to wood by either the tank or brush method. The open tank treatment consists of an immersion of the wood in two baths: first in a hot bath, the oil being heated to 150° to 200 deg. F., and following this by a cold bath with the oil at the prevailing temperature. The brush treatment is accomplished by the liberal application of the preservative with a broad wire bound brush. The preserving qualities of the oil depend on its penetration.

The picture shown here illustrates the action of the fungus on foundation timbers.

**Mixer Handy in Street Railway Repairs**

Street railway companies have found that concrete mixers are a valuable machine to include among their equipment. Track repairs must be made continually and it has been found that a small mixer can be hauled to various points along the line with little expense. It is important that the ballast of a track be kept in tip-top shape at all times to prevent the possibility of track sagging. In the illustration the crew are patching up a poor stretch and are just drawing the batch from the mixer.

The mixer is the revolving drum type, operated by an automatic dump. Both engine and machine are in control of the operator at all times. By pushing or pulling the automatic dump lever the mixer will dump or turn to a loading position. It is operated from the side most convenient. The feature of this mixer is its accessibility for loading and discharging, for a wheelbarrow can be run alongside the machine.

The tilting mechanism can be operated by a man on the left side of the machine while the aggregate is loaded and the batch discharged on the right, or vice versa.

The mixer has a capacity of eight to ten cubic feet and is capable of mixing a fourth of a yard a minute. The mixing operation is in plain view of the workers at all times.

**Bathroom Fixtures That Require No Plumbing**

Every home in rural communities and on the farms should have and can have a completely equipped bathroom, whether or not the house is piped for water. When there is a water pressure system, of course ordinary plumbing fixtures are installed. But there are many thousands of homes built every year in which water pipes are not installed, for the simple reason that no water pressure is available, or the home owner does not feel like going to the expense of installing an individual water pressure plant.

For homes of the latter type, however, there are available bathroom fixtures that require no plumbing. Each piece, bathtub, washstand and closet, is complete in itself. The bathtub is of the folding type, and, in the frame at one end is a water tank, holding 12 gallons. Under the tank is a burner that uses either gas, gasoline or kerosene. The tub is drained thru either a permanent drain or a hose. A like tank and heater are attached to the washstand, while the closet is of the type that uses chemicals, which make it odorless and sanitary.
These three fixtures complete are not expensive, and will give every home the contractor builds a completely equipped bathroom.

**Power Driven Floor Smoothers Work Wonders on Old Floors**

*By E. V. Laughlin*

Operating a power driven floor smoother is a profitable business in almost any community. In the town where the writer lives a carpenter purchased such a machine. After the people had seen what the machine could do the man was busy nearly all the time. He developed as a specialty the dressing of old floors. Floors that had become rough and unsightly were thru his efforts restored until they were quite as pretty as new ones.

The unsightliness of an old floor is generally only surface deep. When the splinters, scratches and scars are scraped off the wood underneath remains just as bright as the day the floor was laid. The floor is just as susceptible of oil and varnish. It is indeed wonderful how a power driven smoother improves an old floor. It will pay some carpenter to institute such a business in a community not now provided.

**Body Is Important Feature of the Truck**

The choice of a body very often doubles the value of a motor truck for its owner. This is especially true in business which requires the handling of several different kinds of material. The contractor who is obliged to haul bulky materials, such as sand, crushed stone, and lime, as well as brick, cut stone and machinery, can get a wide range of activity out of the truck with little cost by a wise selection of the body.

A good example of the utility body in use in the building trade is shown in the accompanying illustration. This truck is owned by Eggert Bros., Akron, Ohio, general contractors. The body is a platform, primarily, with metal flooring which can be dumped by means of a hydraulic hoist. By the addition of side boards, Eggert Bros. have an excellent dump body for hauling sand. High rack sides can then be added, giving a body suitable for lighter material.

**Modern Factory Equipment**

(Continued from page 155.)

Prevents that gas from "backing up" when all the pipes are not in use.

Benches upon which the cylinder hoods are mounted are of great convenience in painting the hoods, also in rubbing when same are dry. In order that painted parts may dry without taking up a great deal of space, racks with many shelves have been made, one to hold the various small parts, one for fenders, one for tires, etc. A canvas cloth is placed over them to prevent dust from settling, and the racks, equipped with rollers, may be wheeled to any part of the factory desired, instead of compelling the workman to carry a few of the parts at a time.

By means of these important time and labor-saving equipments A. B. Wagner, who directs the building, firmly believes that his production has been greatly increased, his workmen are better satisfied, and his customers receiving far better service by their installation.

To make brickwork look new and bright, apply a wash as follows: Take one-half pound of glue, soak it in water overnight and then dissolve it in about eight gallons of water, then add one ounce of bichromate of potash in solution and ten pounds of dark Venetian red and enough yellow ochre to give the desired shade. Apply the wash as thin as possible with a large white-wash brush.

Advice for domestic felicity to all husbands and wives: First, plan a home; second, build a home; third, make a home.
How Is Length of Gothic Rafter Found?
To the Editor: Lansford, N. Dak.
As I am a subscriber to your valuable paper, I would like to ask some of the steel square artists how to determine the length of a gothic rafter, by geometry and the size of boards or planks, and the length it takes in building them up. I have always laid them out on the loft floor, but the other way would be handy in making an estimate for different size barns, as they usually run from 28 to 50 feet wide.

J. A. Davis.

Stucco Contractor Builds Attractive Garages in Tiffin, Ohio
To the Editor: Coldwater, Mich.
I am enclosing some views of stucco jobs at Tiffin, Ohio. I have been doing stucco work for the past fifteen or twenty years, and am pleased to give you my method of putting on this work.
I am not in favor of "patent" stucco, and think "cement stucco" best if done right, applied to metal lath, using clean sand and proper workmanship. Medusa Waterproofing and Medusa White Portland Cement have been used in most of my stucco work and make a perfect and stainless finish.
I make a plastering mortar of clean sand, lime and rope fibre—mortar to be lean, not rich. Taking four pails of mortar and one pail of cement, I mix thoroughly and apply, and give the surface a rough-swept finish. When dry, dampen and apply second coat of 2½ parts sand to 1 part of cement and 10 per cent lime—surface to be left under float. Before rough-casting, white-wash with cement and 10 per cent lime.
The rough cast coat is made of 1 part fine sand, 1 part cement and 10 per cent lime. Apply with whisk broom. Usually four to six coats are given the wall; the more coats the rougher the surface will be, and the better the job. I add Medusa Waterproofing the last two times over. It is best not to put in too much waterproofing in mixtures until nearly thru rough-casting.

C. L. Ball, Contractor.

First Solution Too Elementary
To the Editor: Seattle, Wash.
You have by this time passed judgment on my recent letter relating to Mr. Cole's problem, and perhaps ruled it out as being too elementary.
If so, perhaps the following may prove beneficial to the "readers" of the AMERICAN BUILDER:
It is nothing but the rule of Huygen for calculating approximately the length of a circular arc I am herewith submitting. Huygen's rule is: From eight times the chord of half the arc subtract the chord of the whole arc, and divide the result by three. A very expedient rule since it does away with transcendental numbers, trigonometry and degrees. Thus the approximate length of an arc is gathered by utilizing the two chords and "Huygen's rule."

Knute A. Westholm.

Porch Furniture Offers Field for Carpenters
To the Editor: Upper Montclair, N. J.
Your magazine is O. K. Gets better every number. Have taken it since 1913. Keep it seasonable and put in any new pointers on screens and sash enclosures.
People's porches and lawns would look better if the carpenters would talk garden and porch furniture. I think we have a large field for that work. Porches as a rule are spacious and can stand moderately heavy furniture, the kind a carpenter would make. Give us a few designs, those of wear-long and comfort-giving qualities preferred. You may publish this in your correspondence department if you see fit.

W. K. Dunn.
New STANLEY SCREEN HARDWARE BOOK

A New Book right from the press describing and illustrating STANLEY SCREEN HARDWARE.

Your customers and clients will be asking about Screen Hardware very soon, so be prepared before the season. Gladly sent upon request a copy of this new book, and if desired, an Architectural Service Sheet.

Ask for the book by B9

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New York: 100 Lafayette Street
Chicago: 73 East Lake Street

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
Mr. Dohms and Crew Laying Foundation for Horse Barn on Echo Dale Farm, Ogden, Iowa.

Conducted Four-Foot Concrete Barn Wall in Nine Hours

To the Editor: Ogden, Iowa.

I am sending three photographs showing the successive stages of construction of a large horse barn I just built for Simon Peterson, breeder of Belgian draft horses and owner of the Echo Dale Farm. The picture taken in the early stage shows the concrete foundation in detail. The walls are 13 inches thick at the bottom and taper to 8 inches at the top, which is four feet high. The stud wall is 10 feet 3 inches high. I placed the mixer on a wagon so that the discharge spout would be high enough to run the mixture into the forms without handling, and used two gravel wagons to keep the mixer operating continuously. In addition I used a cement wagon and water wagon close to the work so that every move counted. With eight men we built the entire four-foot wall in less than nine hours, which included the time required in moving the machinery.

The barn is 42 by 72 feet and is equipped with box stalls and watering outfits for horses. I have no plan to send to show the exact arrangement of the interior.

Each stall has doors on the outside and inside. The inside doors open on a 10-foot driveway which runs thru the barn.

I used a New Way mixer made at East Claire, Wis., with a capacity of six cubic feet to the batch. It turned out a batch a minute.

Wm. Dohms,
Contractor and Builder.

Wants Rule for Marking Tools with Acids

To the Editor: De Soto, Iowa.

I have been a reader of the American Builder for the last three years and I feel I could not get along without it now. I think I saw in your correspondence pages some time ago a recipe for marking tools with acids. Can you or any of your readers tell me what kinds of acids and what proportions to use?

J. A. Polke,

What is Best Way to Sheath a House?

To the Editor: Ohio, Mo.

In your work, "Practical Carpentry" which I have, I do not get your idea of the best way to line or sheath a dwelling. We call it "boxing" here; I mean the rough sheathing under the finished siding or under the plastering if placed on the inside of a building.

I always induce the owner to let me put this boxing on the inside, then a lath placed perpendicular over the studs to nail regular laths. My idea is that the clinches in the plastering will hold better, also we have better nailing for finish inside and then the women can drive picture nails or others anywhere on the wall. But, I would like to have your idea as to whether it is as good for the building to have it inside as outside, or is it better.

One other advantage to the carpenter is that he can get the roof on sooner so as to work inside during bad weather. However, all these advantages do not necessarily prove that the lining is better for the building when placed inside instead of outside as many do.

Please let me have your idea of it.

Linn Elvin,

Who Can Help Him Out?

To the Editor: Haigler, Neb.

Will you kindly tell me where I can get Lignum Vitae wood to make some plane stocks? I am a constant reader of the American Builder and want you to let me know when (or before) my time expires. I don't want to miss an issue. Would it be a good idea to give the boys (your boys) some practical lessons in reading plans, drawing them, how to get patterns for cutting the ellipse (hole) for pipes going thru roofs, sheet metal, wood, and so on? I try to teach them what little I know and it makes for efficiency.

M. W. Rolli,

How is Joist in Sloping Floor Installed?

To the Editor: Stockholm, Wis.

As I am a subscriber to your paper, I would like to ask a question or two in regard to the simplest and best way of putting in the joist when the floor is to slope as in churches. Also how much should the floor slope to the foot?
Every lesson comes to you by mail in convenient form for spare-time study—during evenings at home or at your convenient time.

Mail coupon today for this FREE LESSON. It will positively convince you that Plan Reading from Blueprints is not at all difficult—that by our new, easy method you can master it in a short time. You don't pay a cent for this lesson—now or at any other time—and your request for it places you under no obligation at all.

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Thousands of bright, energetic, capable men are better held back because they lack this knowledge. They are expert workers but they seldom, if ever, get a chance to study the blueprints or have them explained. They must follow the lead of the man who does understand plan reading and directs their work. We give you practical instruction in interpretation reading that you can apply to your everyday work. We place in your hands blueprints used in actual building work in Chicago and other cities, and send full instructions on every point. Every detail is carefully explained by practical contractors and builders—men in charge of construction work right here in Chicago.

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Ready at once to prepare yourself for more responsible work and better pay. Mail coupon today for your FREE LESSON in Plan Reading together with full information regarding our Builders' Course which will prepare you to make more money. Remember, this places you under no obligation whatsoever. But get the free lesson, and don't forget, it is the full description for ever. But get the free lesson! You owe it to yourself and to the full description for ever. But get the free lesson, and don't forget, it is the full description for ever. But get the free lesson, and don't forget, it is the full description for ever.
Correspondence Department

March, 1920

I would like to get the necessary information in your March number if possible; if not possible, to have it in the April issue. Thanking you in advance.

Edwin Swinwall.

New Reader Offers Solution
To the Editor: Canandaigua, N. Y.

I received my first copy of the American Builder a few days ago, and am very much pleased with it. Together with my remittance am sending a solution of Mr. M. J. Coles’ problem. If there is any way of finding the length of an arc of a circle with the steel square I should like to know it myself. However, this gives very good results. The length of the arc may be found by direct measurement of the square, but does not give quite as accurate results as by square root. The drawing explains itself.

W. E. Douglass.

Contractor Reports Building Prosperity
To the Editor: Lamberton, Minn.

I am sending you a photograph of a hollow tile barn and silo which I built in 1919. This barn is 34 by 70 feet with 13-foot studs and has a gothic roof. I must say that the last season was a very busy one, as nearly everyone was anxious to build something or other. This community is certainly improving, its buildings and has put up more new houses, barns, and sets of farm buildings in the last eight years than in the twenty years before that time. I have been building in this community for the last thirteen years, and instead of the building going slack, as in some places, it seems to increase each year as the clipping from local paper which I enclose will show. If you wish to use it in print, you can do so if room is available. I have been a subscriber to your magazine for seven or eight years and like it better every year. I am boosting my home community, your job, and my job.

William C. Kerbel.

P. S.—Any question answered if possible.

Wants Advice on Plastering Bathroom
To the Editor: Woden, Iowa.

I would like to have a little advice in regards to plastering the walls of a bathroom. The party wants it plastered half way up the sides. He wants it real white and waterproof so he can wash them. It will also be laid out like brick work. I have the scratch coat on. Please advise me what kind of material should be used for that kind of work at once.

Chas. Babcock.

Contractor and Mason.

Who Can Answer This Question?
To the Editor: Ainsworth, Neb.

Can some of your readers inform me if a 75-foot raise in a lattice truss 75 feet long is enough with one span 50 feet and one 25 foot?

J. C. Jenson.

Contractor and Builder.

Needs Pointers on Laying Oak Flooring
To the Editor: Montrose, Colo.

Would you please tell me either by mail or in your correspondence columns how to put down 3-inch oak flooring (tongue and grooved and end matched) with glueing or face nailing it?

P. E. Ireland.

Carpenter and Builder.

How to Resilver Mirrors
To the Editor: Perryton, Texas.

Please send me information on resilvering mirrors, as I have some that I would like to do.

Curt Summers.

Answer—Use the following solution:
Silver solution: One part silver nitrate (AgNO₃) in ten parts of water, adding to this ammonia water NH₄OH until the brown color has disappeared, and the solution again becomes clear, then adding one part caustic potash in ten parts of water at which the solution should again become dark, and finally, sufficient ammonia water to bring it to a straw colored tint. Then place the mirror face up in a suitable dish, and pour the silver solution on it.

When silvering with sugar reducing solution, mix equal parts of the sugar and silver solutions and quickly pour the mixture on the mirror. Continually agitate during the silvering which takes from five to twenty minutes and is complete when the bath runs muddy. The solution is then poured off and the glass washed with distilled water. The temperature should not be above 21 deg. C. (70 deg. F.).

The Editor.
A combination of qualities found in Asbestos alone.

1. Fireproof
2. Waterproof
3. Durable
4. All-mineral
5. Fibrous
6. Acid-resisting
7. Non-conducting

These people have learned to demand fire-safe roofs

Three days before, they didn’t appreciate what Asbestos Roofing would do for them. But the fire came—spreading from roof to roof. In one night the town went the way of Salem and Paris, Augusta and Atlanta.

The quick growth of American communities has brought the fire peril very near to home-builders. With houses crowded one against another, people are beginning to realize that their homes are at the mercy of a community fire unless their roofs are built to resist communicating fires.

There is a roofing that sparks cannot ignite—that even resists the flame of a blowtorch. It is made of Johns-Manville Asbestos—that mineral substance which repels fire.

Today, with home building increasing by leaps and bounds, people have learned that their property is endangered as much by "outside" flames as by those which originate within. They are demanding the protection that only a fire-safe—a Johns-Manville Asbestos Roof—can give.

Johns-Manville Asbestos Roofings are approved by the Underwriters' Laboratories, Inc.

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New York City
10 Factories—Branches in 63 Large Cities
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Plaster on Brick Walls Drips in Damp Weather

To the Editor: Jersey City, N. J.

I am the owner of an old brick dwelling, the inside walls of which were plastered directly upon the brick work without laths or any other material; in consequence of which, in damp or wet weather, the walls are wet to the point of dripping. At the present time when there is not a steady fire they are ice coated.

Can you suggest anything to remedy this condition?

H. Schopmann,
Carpenter and Builder.

Wax on Hardwood Floor Gives Good Result to Reader

To the Editor: Stewartsville, Ind.

In answer to Charles Gorden's request: From experience I found that wax gives the results on hardwood floors. We should have a reason for all statements. With a hard filler underneath, varnishes often scale or check; not so with wax. Varnishes will often blister when the same amount of heat will only soften the wax and not blister it. Now, I would suggest the following treatment for hardwood floors. Use a good paste filler thinned with turpentine, put on filler and rub out with a cloth before dry. Of course, the floor is supposed to be clean and smooth. If filler shows too heavy on floor, sand paper lightly with fine sand paper. If you wish

A Nut for Mathematicians

To the Editor: Maquoketa, Iowa.

I have a little problem that I wonder if you could help me with. I would like a formula for determining the number of square feet in the area of a dome of any base and any altitude. I have formulas for determining the area of a perfect hemisphere, but they do not work out on anything less than the hemisphere. Example: What is the area in square feet of a dome with a span of 16 feet and an altitude of 4 feet?

I build silos and tanks with dome roofs and have been unable so far to find a reliable formula for determining the area of same. The AMERICAN BUILDER has helped me so many times before, I thought I would ask this favor. R. L. Prosser,
Contractor and Builder.

Mr. Woodbury's Carpenter Shop. He Makes Garage Doors, Window Frames, Sash and All Kinds of Cabinet Work.

I use a Fay & Egan 330A variety saw, with hollow chisel mortising and boring attachment.

Roy A. Woodbury,
Carpenter and Builder.

Paint dealers could do their customers a good turn by inducing them to buy spar varnish for porch ceilings. Most people make the mistake of assuming that because a porch ceiling is under cover, in a sense, an ordinary interior varnish may be used on it with satisfactory results. They are doomed to disappointment, for the ceiling is exposed to outside atmospheric exposure and a varnish should be used on it that is designed to combat such rigorous conditions.

Wm. E. York.
Repairing Season

THE Repairing Season is at hand. Art Craft will play no small part in beautifying the houses of America.

Fix these points firmly in mind: Art Craft is fire-safe; it gives lasting service; it comes in beautiful shingle or tile designs, slate-red or slate-green; laid right over old wooden shingles, it saves expense and litter of ripping off the old roof.

You are missing out on a real opportunity unless you are prepared to offer your customers Art Craft. Write us for complete information.

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NEW YORK
Canadian Office and Plant: Hamilton, Ont.

BIRD & SON, Inc., Dept. C, East Walpole, Massachusetts
I want to learn how Art Craft will bring me more business. Send complete information. Name. Address.
Correspondence Department

Mr. Loomis' Sketch of Gambrel Roof.

Sketch of Gambrel Roof

To the Editor: Melfort, Sask.

I am a subscriber to the AMERICAN BUILDER and in the January issue noticed a few things which I would like to comment on.

P. L. Haskell, of South Dakota, sends a good sketch of a well proportioned gambrel roof for a barn, but does not explain it sufficiently to be of benefit to those that need it, namely the location of gambrel in relation to roof. I enclose a sketch which explains itself and is applicable to any width building. A better way to get the length of rafters is by square root or the rule of 3. Ceilings would not be accurate and could vary ½ inch easily. In answer to the question, "What caused oak floor to bulge?" it was:

Probably because the building had surface or shallow cement foundation, "no basement" and no ventilation was provided in cement walls. If such is the case, cut a 6 by 6-inch hole in opposite sides and the floor will stay put when repaired.

I have had the best results in finishing maple floors by applying white shellac liberally and then waxing. The shellac makes an excellent filler, and is not affected by hot or cold water and does not scratch, nor does it change the color of "pulled" grain against lights as does stain or varnish stain of any kind which will turn spots several shades darker than the general effect, leaving a splotched appearance.

D. A. LOOMIS, Contractor.

Offers Information on "Cost Plus" Contracts

To the Editor: Janesville, Wis.

In several of your issues I have noticed requests for information regarding the "cost plus" method of letting contracts. As I have had considerable experience with this class of work, I may be able to give your readers some light on the subject.

Cost Plus Contracts

On "cost plus" contracts, it is the customary practice for the contractor bill to consist of the cost of labor and material plus a certain percentage. To quote one of our contracts, "Material costs shall be the net costs of all material delivered on the job, and labor costs will include current prices for all skilled and unskilled labor, foremen, and superintendence required for the work." The amount paid by the contractor for liability insurance is borne by the owner, altho a fee is not allowed on it.

Where the contract specifies that the owner shall pay a rental for the contractor's equipment, we find a daily rental by dividing the first cost of the piece of equipment by its estimated life in working days, and adding to this the daily cost of fuel, oil, etc. "Hand tools," such as picks, shovels, rubber boots, etc., are not classed as equipment.

On contract where labor only is furnished, and all material is supplied by the owner, a percentage is usually granted for depreciation on equipment, and a further percentage for profit and overhead.

W. M. WALLACE REEDER

Sends Table for Computing Chord Lengths

To the Editor: Pottstown, Pa.

On page 126, correspondence department of the last January's issue, Mr. Frike asks for a mathematical method of figuring certain properties of a circle.

Enclosed is a table with explanations and illustrative examples which I think Mr. Frike and many other readers will find convenient as an accurate method of solution and especially simple as it avoids the use of a logarithm or trigonometry table.

\[
A = \text{Angle} \\
R = \text{Radius} \\
C = \text{Chord} \\
B = \text{distance to chord} \\
\frac{C}{2} = B \cos A \\
\frac{C}{2} = \sin \frac{A}{2} \\
\text{Exact Formula} \\
\frac{C}{2} = \sqrt{R^2 - B^2} \\
= \sin A
\]

TABLE TO COMPUTE Chord LENGTHS

1. The values of B and \( R \) are given for Radius of 1 and values of A differing by 5°. For angles to 1° (degree) interpolation is necessary. For other radii multiply values by radius reduced to feet or to inches. \( C = 2 \) radius.

HOW TO USE THE TABLES

C

1. The values of B and \( R \) are given for Radius of 1 and 2

values of A differing by 5°. For angles to 1° (degree) interpolation is necessary. For other radii multiply values by radius reduced to feet or to inches. \( C = 2 \) Note

C

values of B are not same as — or Sine A, but correspond 2

to value of A in column 4, reading up.
Special Offer to BUILDERS

Yes, I will give you this complete drawing outfit absolutely free. The instruments are in a handsome high class, plush lined folding case. They are regular draftsman’s working instruments. Besides I will give you absolutely free, a 20 x 25 inch drawing board, a 24 inch T square, a 12 inch rule, a supply of drawing paper, two triangles, a French curve, pencils, erasers, thumb tacks, etc.

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The drawing table is the “Chief’s Own” adjustable folding Drawing Table, same as used and needed by first class draftsmen. The complete outfit and table are delivered to you at once. You have them to work with from the very first day. Find out about this offer. Write today.

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I am Chief Draftsman of a large and well known firm. I know just the kind of training that is demanded from men who get big salaries. I want to train a limited number of builders to take big paying drafting positions. I train you by giving you actual, practical work the kind that you must be able to do to hold permanent, high salaried jobs. I give you my individual instructions. If your work is right, I will advance you rapidly. If it is wrong, I will show you where and make you do it right, and do all I can to make you an expert draftsman and designer in a short time.

Pay as You Wish

What I want is the right kind of men. Don’t bother about expense. I will give you the working outfit free if you get in at once. I charge a very small fee for training you to be an experienced draftsman. You can pay the small cost as suits you best.

Send Coupon for My Big New Book

Put your name and address on the coupon and send it to me today. I will send you my new book “Successful Draftsmanship,” and the great special offer that I am now making on which you get the complete Draftsman’s Working Outfit and Drawing Table absolutely free. You assume no obligations of any kind in sending coupon. Get in line for a big paying position. Getting the book and full particulars of the special offer is the first step.

Chief Draftsman Dobe

4001 BROADWAY
Dept. 5203
CHICAGO, ILL.

Chief Draftsman Dobe, 4001 Broadway, CHICAGO, ILL

Without any obligations on me whatsoever, please mail your book, “Successful Draftsmanship,” and full particulars of your “Personal Instruction” offer to Builders. It is understood that I am obligated in no way whatever.

Name: ..................................................
Address: ..............................................
Post Office: .......................................... State: ........................................
9 a.m.—First Truss Has Just Been Put in Place by E. A. Opitz, Paynesville, Minn. 

has a large haymow.

2. Exact Formulae are solved by use of logarithm and trigonometry tables.

Example I. $A = 25^\circ$, $R = 2' 6"$

\[
\begin{align*}
C &= \frac{4226}{2} \\
C &= 8452
\end{align*}
\]

For $R = 1''$

\[
\begin{align*}
C &= 8452 \times 30'' = 25356'' = 25\frac{3}{4}'' \\
B &= 5963 \times 30'' = 27189'' = 27\frac{3}{4}''
\end{align*}
\]

Example II. Illustrating Interpolation

$R = 20''$, $A = 36^\circ$ (Mr. Frike's problem)

For $35^\circ$ not given, but difference for $1^\circ$ between $35^\circ$ and $40^\circ$

\[
\begin{align*}
C &= 8452 \\
C &= 23.496 \times 20'' = 234.96''
\end{align*}
\]

Example I. $A = 25^\circ$, $R = 2' 6''$

\[
\begin{align*}
C &= 8452 \\
C &= 5.726 \\
C &= 0.0138 \text{ diff for } 1'' \times 20\text{''} \\
C &= 11.748 \\
C &= 23.496 = 234.96''
\end{align*}
\]

Photos Show Remarkable Building Work in Minnesota

Paynesville, Minn. To the Editor:

I am sending you snapshots of barn construction that may interest some of the AMERICAN BUILDER readers. I built seven barns last year. The enclosed pictures show a barn on which the first truss has been set at 9 a.m. By 4:30 in the afternoon the crew of five men had the roof frame completed.

I also built a large concrete block barn with the roof starting on the joists. It has a large haymow.

J. S. Bell, C. E.

Frost Will Not Come Thru Tile

To the Editor: Keosauqua, Iowa.

I have a residence to build this coming spring, 36 by 60 feet, two story, and of hollow tile. I am told by some people that claim to know, that after the building is plastered on the inside and stuccoed with plaster on the outside, the frost will go thru the walls in cold zero weather and make them damp on the inside; also that it will be very hot in summer. As this is my first experience with hollow tile I wish you would tell me something about it. Is it necessary to strip the outside walls and lath first before plastering the inside? How should the mortar be mixed? Is it injurious to the mortar to put too much lime in it? I await your answer.

W. H. Blank, C. E.

9:30 p. m.—Roof Frame Completed. Five Men on the Job.

Troubled Over Keene's Cement

To the Editor: Traer, Iowa.

I am a reader of the AMERICAN BUILDER for little more than a year. I would like to ask you to answer the following questions: Does Keene's cement rub off after it is put on walls? What makes it rub off?

The latter part of December I had a contract to plaster a big two-story house. The walls, 4 feet 6 inches high, in the kitchen and bath room were to be imitation tile work. We have been using lime and stucco for that kind of work up until about a year or so ago. Since then I started to use Keene's cement.

JAMES A. KING, C. E.
STARKS OUTSIDE STAINS

LASTING BEAUTY AT LOW COST!

S. O. S. beauty is not just skin deep as so many stains and paints are. It can't wash off or fade because Starks Outside Stains are made from 100% pure wood preserving coal tar, creosote oils, colored with pure non-fading colors, especially ground in such a way that they penetrate the pores of the wood along with the wood preserving oils. You can't fade or bleach a color that is not on the surface.

Starks Outside Stains have become a Universal benefactor since paint has advanced to an almost prohibitive price.

THE STARKS LINE

Starks Outside Stains  Starks Wood Preservative
Starks Cement Putty  Starks Creosote Disinfectant
Starks Waterproofing for Concrete, Cement, Brick and Stucco

The Starks Line is Established

Every product is guaranteed by the manufacturers in all climates and against any atmospheric conditions.

JOBBERS!

The remarkable possibilities derived from handling STARKS PRODUCTS is evidenced by the progress made through the large building supply dealers in the United States.

STARKS OUTSIDE STAINS are sold through the dealers and building material supply companies in carload lots with the usual jobbers discounts and co-operation from the firm, which is necessary to promote the sale of these materials in the jobbers' territory.

STARKS MFG. CO.  KANSAS CITY  MISSOURI

FIRST AND MAIN STREETS
When I put the Keene's cement on, I had it mixed according to directions. What I had just put on and finished in the morning was hard enough to mark in the afternoon. I had a nice glossy finish before I started to mark. After the marking was done, I troweled it down again, using brush and water. We were using clean water. It was pretty cold that time, but there was a furnace in the house, but I think the owner let the fire go down after we left there, so the finish may have chilled a little. It does not show anything, however. When I was done with the job I had a nice and hard finish. I was satisfied with it. Two weeks after I went back again and the finish rubbed off just like flour in a sack does when you rub against it.

Does Keene's cement always do that? I can't understand what makes it rub off.

I wish you would write me about it, if you please, and put the answer in the next number of the AMERICAN BUILDER, too.

I like to read the AMERICAN BUILDER very well, but there is one thing about the house or bungalow plans—I think some rooms way too big and others are a little small. Any dining room 18 by 14 is big enough, and kitchen and bedrooms should not be any less than 12 by 12, but 14 by 12 is better. I mean this especially for common houses.

HENRY SCHOENING,
Bricklayer and Plasterer.

**Building Barns in Oklahoma**

To the Editor: Aline, Okla.

As I have only been a subscriber to your paper for a few months, I hardly feel like one of the family yet, but think the AMERICAN BUILDER is all right. I enjoy the correspondence part of it very much.

I have been contracting for quite a while and am working on a $4,000 bungalow at the present time. I built five barns the first of last year and one barn and five houses during the latter part of 1919. Am sending some pictures of a bank barn I had started last winter when the big snow struck us. It was a month after I had run the concrete before I could start the frame. This barn is 38 ft. by 50 ft., seven feet to the top of the concrete and 12 feet from concrete to plate. I built my roofs on the top of the concrete to plate. The rafters are braced on each side with 1 by 6, with a short piece of 2 by 6 in the elbow between the 1 by 6, and a short 1 by 6 each side of the 2 by 6 coming out on each side of the joint. This makes a very stiff rafter. I mark my rafters on the outside edge while I have them on the saw horses. For my sheathing (if I use 6 inch) I mark their place on rafters. I mark two, then by placing one at each side of the pile I use a straight edge and mark all others at once.

By doing this I can put my tie boards on permanently when the rafters are raised and the most common laborers can do the sheathing. I visited this barn one year later and there was not a crack in the concrete wall that could be seen ten feet away.

This barn was built for Geo. Geist, west of Aline. I also built him a 28 x 56 foot modern house about a year before I built the barn. He hauled sixty-five four-horse loads of sand, ten miles on the two jobs. EVAN J. ELKINS,
Contractor and Builder.

**How to Find Curve for Header in Silo Roof**

To the Editor: McAllen, Tex.

In answer to Mr. Broostin's request in the January issue for a rule to get the curve for a header in silo roof, I submit the following:

In the drawing AC and AB represent rafters and H the header set temporarily. Now stretch a line from A to D, the center of the minor arc BC, measure the distance from the line to the header. This measurement together with the length of the header will enable you to inscribe an arc which will come close to that which is required.

This solution is not solely mathematically or absolutely correct, as it is my opinion that when the surface of a cone intersects a plane, the line of intersection lies in an ellipse except when the plane is parallel to the base of the cone at which time it lies in the form of a circle.

This is my first letter to the AMERICAN BUILDER in more ways than one, as my first subscription accompanies this letter, tho I have read the AMERICAN BUILDER for a number of years, getting it at news stands. I will now look forward to getting it more regularly.

A. W. WALKER,
Contractor and Builder.

**Uses Algebra to Solve Cole's Problem**

To the Editor: Palmyra, Neb.

In answer to Mr. Broostin's request in the January issue for a rule to get the curve for a header in silo roof, I submit the following:

In the drawing AC and AB represent rafters and H the header set temporarily. Now stretch a line from A to D, the center of the minor arc BC, measure the distance from the line to the header. This measurement together with the length of the header will enable you to inscribe an arc which will come close to that which is required.

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A. W. WALKER,
Contractor and Builder.

**Uses Algebra to Solve Cole's Problem**

To the Editor: McAllen, Tex.

Enclosed please find herewith formula to find the length of an arc of a circle as follows:

\[ 1 = 4V \frac{c^2 + 4h^2}{3} - c \]

or in other words, extract square root of the sum, the square of the chord plus four times the square of the height and multiply square root found by 4. From this subtract the length of chord and divide by three.

Substituting \( c = 32h = 31 \),

\[ 4V \frac{32^2 + 4 \times 31^2 - 32}{1024 + 36 - 32} = 4V \frac{3}{1060 - 32} \]

or

\[ 4 \times 3257 - 32 = 130.228 - 32 = 98.228 \]

Am also enclosing a pencil sketch of the mechanical method and formula for finding radius of circle.
Will You Get Your Share
Of the Roofing Business in Your Locality This Year?

FROM all reports there will be more roofing manufactured and sold this year than ever before. Building is booming—and that means roofing will be needed in vast quantities. Some one is going to "Cash In" on the roofing situation in your territory—why cannot that person be you?

The Self-Spacing Shingle here illustrated is our most popular style. We make many styles but this outsells the others by far. It is the leader of leaders. Feature this style and watch your roofing sales jump!

This shingle is manufactured by us exclusively and makes a two thickness roof throughout. No other shingle has the "Shoulder of Protection" or the "Self-Spacing" Device. These are not just "talking points", but are of real value.

LUMBER DEALERS

Write for further information concerning Style "G". Let our "Dealer Helps" and other advertising service help swell your roofing sales. Samples, literature and prices furnished upon application.
Correspondence Department

To the Editor: Seattle, Wash.

With regard to Mr. Cole's inquiry, the question of finding the exact length of a circular arc when radius is the known property or when other properties by which radius can be calculated are known, is a novel way to ask how to square a circle. It has never been done exactly by any mathematician in history. It has been established that an arc and a chord are not commensurable quantities, but are related by the transcendental number \( \pi \approx 3.1415927 \ldots \), which number has been calculated to more than two hundred decimals and yet not coming to an exact closure. For all practical purposes tho, it may be enough to use the first five decimals and in rough figures \( \pi = 3.14 \ldots \) is most practical. The circumference is to the diameter as 3.14 is to 1, says the schoolma'am.

However, when the length of a circular arc is desired it is quite imperative to know the central angle of the arc. In Mr. Cole's problem this is effected by dividing half the chord by the radius, which quotient, always less than unity, is named the sinus, or line, for half the central angle subtended by the arc or the chord. Tables of trigonometric functions, numbers calculated by eminent mathematicians and preserved for posterity, are very handy. They contain numbers, functions, for angles of a few minutes to any degrees required or desired.

A little training in trigonometry is quite necessary in order to comprehend what is meant by trigonometric functions and how these functions are represented by straight lines in a circle, which radius is assumed to equal unity. Thus half the chord of any arc is named sinus or the line for half the arc or half the central angle the arc subtends. When a function's numerical value is known or computed it is looked up in the tables and the corresponding angle is found in the margin column.

In Mr. Cole's problem the angle or the arc thus found approximate 42.5 degrees. That is the whole arc. Now it is early comprehended that the arc is to the whole circumference as the 42.5 degrees are to 360 degrees. But instead of this analogy a short cut can be taken thus: Multiply the degrees of the arc by the radius of the circle and by the decimal fraction .01745329. The result is the length of the arc. Thus the answer to Mr. Cole's problem would be:

\[
42.5 \times 444 \times .01745329 = 32.75
\]
or 32 feet 9 inches approximately.

Another gentleman wanted to know length of chord corresponding to 72 degrees, the arc or arc. Seventy-two is one fifth of three hundred and sixty; hence, the chord is the side of a regular pentagon inscribed in the circle. In a circle with unity as radius the side of the inscribed regular pentagon is 1.17558 . . This number multiplied by the radius gives the length of the chord corresponding to a central angle of 72 degrees.

The line for 36 degrees is half this number, or .58779 and no other number.

Nick Thilen.

Mechanical Formula for Finding Radius of Circle.

\[
8h = \frac{32 + 4 \times 3^2}{8 \times 3} = \frac{1024 + 4 \times 9}{3 \times 8} = \frac{1024 + 36}{24} = 44.166 \text{ ft. or } 44 \text{ ft. 2 in.}
\]

To the Editor: Meyronne, Sask.

I am still a reader of your valuable paper, and I am sure it would be almost impossible for me to get along without it. I do not know which department to forward this question to, so I will send it under the usual address. I would like to know at the earliest possible date, mathematically speaking, if a furnace will work as well with the cold air registers near the outside wall in each room. It is customary in this district for the tinsmith to put the cold air register on the floor. I am constructing a house at present and they, or the owners, do not want the registers on the floor, as it is a hindrance to laying carpet. Please advise which is the better system of the two.

D. R. Leadley.

Finding Length of Arc

To the Editor: Seattle, Wash.

Mr. Cole's new problem, to calculate the exact length of a circular arc when radius is the known property or when other properties by which radius can be calculated are known, is a novel way to ask how to square a circle. It has never been done exactly by any mathematician in history. It has been established that an arc and a chord are not commensurable quantities, but are related by the transcendental number \( \pi \approx 3.1415927 \ldots \), which number has been calculated to more than two hundred decimals and yet not coming to an exact closure. For all practical purposes tho, it may be enough to use the first five decimals and in rough figures \( \pi = 3.14 \ldots \) is most practical. The circumference is to the diameter as 3.14 is to 1, says the schoolma'am.

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The line for 36 degrees is half this number, or .58779 and no other number.

Knute A. Westholm.

Tile for Basement Walls

To the Editor: Belvidere, Ill.

I want to put a wall under a house. What do you think of tile for a basement wall and floor? How many tile can a mason lay in a day? Is it cheaper than concrete? How many will I need and what kind? W. G. VanOrnum.

Carpenter and Builder.

Answer—A hard burned clay tile makes an excellent basement wall. In general, it is cheaper than solid concrete; you avoid trouble and expense of framing for the cement concrete wall. It makes a drier and warmer wall, because hollow tile do not conduct heat so rapidly as does solid concrete.

Tile also make an excellent basement floor. Lay the tile on a well-tamped sand base. "Float" each tile into place carefully. Cover with about one inch of concrete of a one to three mix. Lay boards or planks over the tile so that the workmen do not step on individual tiles when pouring the concrete. It costs no more than solid concrete. Use tile that are 4 by 12 by 12, and you will require 775 of them for a floor of the size you sketch.

D. R. Leadley.
Modern Houses Demand Modern Roofings

Present day living standards demand modern houses with modern roofings. There are none better than the Barrett Everlastic Roofings. They are artistic, staunch, durable and remarkably low in price.

Whether you are building for re-sale or for an owner, you want to give your customer all you can for his money. You want him to be proud that you built his home, for that means future dollars for you.

Barrett Everlastic Roofings will serve you often, as they are adapted to all types of steep-roofed buildings.

Everlastic Multi-Shingles come in strips of four, saving time, labor and nails. They are beautifully surfaced with real crushed slate in soft, natural art-shades of red or green and make a fitting-roof for the finest residence.

Everlastic Tylke Shingles are individual shingles (8 x 123/4 inches) made of the same materials as Multi-Shingles, with red or green crushed slate surface. With Everlastic Shingles you have fewer shingles to handle and can cover more squares per day. Being pliable, they readily fit around projections.

Everlastic Slate-Surfaced Roofing is an unusually artistic and durable roll roofing for use on buildings of the better class. It is surfaced with crushed slate in red or green. Also used for valleys or flat-roofed dormers, etc., where Everlastic Shingles are used for the main roof. Nails and cement in each roll.

Everlastic "Rubber" Roofing—The most popular roofing of this type, now in use on thousands of buildings in all parts of the world. It is tough, pliable, elastic, durable, and very low in price. The greatest value in "Rubber" roofing. Comes in rolls 36 inches wide. Nails and cement in each roll.

Write nearest branch for booklet and full information.
NEW RECORD IN BUILDING ACTIVITY WILL BE FIRST MONTH

$3,000,000,000 Year Gets Good Start

NEW RECORD IN BUILDING ACTIVITY WILL BE FIRST MONTH
{} EEW records in building activity will be established in 1920 if the pace set in the first month is maintained:—Statistics of building contracts awarded during the month of January in the territory east of the Missouri and north of the Ohio rivers, as compiled by the F. W. Dodge Company, show two outstanding facts. In the first place the contracts amounted to 10 per cent more than the average monthly figure for 1919; and, in the second place, industrial plants took the lead over all other classes of building, comprising 39 per cent of the total.

Contracts let in January amounted to $235,848,000, whereas the average monthly figure for 1919 was approximately $213,000,000. The January figure included $91,712,000 for industrial plants, or 39 per cent of the total; $47,727,000, or 20 per cent of the total, for residential buildings; $37,697,000, or 16 per cent of the total, for public works and utilities; and $34,726,000, or 15 per cent of the total, for business buildings.

These figures give an indication of the accumulated demand for construction work. Ordinarily the month of January shows but little activity in comparison with months later in the year, the amount of building contracts let in that month running normally to only about 5 or 6 per cent of the year's total. With so large a figure for January, the previously published estimates of three billions for the year's total of contracts seems very likely to be fulfilled.

Projected or contemplated work amounting to $523,000,000, was reported in January, as against a monthly average of $360,000,000 for projected work reported in 1919.

The increase is particularly marked in the Northwest.

January building contracts in Minnesota and North and South Dakota amounted to $7,246,000, which is greatly in excess of the figure for January of any previous year recorded, and about 27 per cent in excess of the average monthly figure for 1919. The month of January, 1919, showed a total under $1,000,000.

Practically half of this January total, or $3,659,000, was for residential buildings.

Contemplated work amounting to $12,400,000 was reported in January.

BUILDING contracts in the Central West (comprising Illinois, Indiana, Iowa, Wisconsin, Michigan, and portions of Missouri and eastern Kansas) during January amounted to $61,423,000. While this does not equal the monthly average for 1919, which was $74,000,000, it is more than double the figure for any previous January.

Industrial plants accounted for $17,309,000, or 28 per cent of the total; business buildings amounted to $16,924,000, or 27 per cent of the total; and residential buildings amounted to $12,870,000, or 21 per cent of the total.

A great increase in activity in the Central West may be expected, if the reports on contemplated projects be taken as an indication. In January, these reports amounted to $190,326,000. The average monthly figure in 1919 for contemplated work amounted to approximately $137,000,000.

January building contracts in western Pennsylvania, West Virginia and Ohio amounted to $43,556,000. This figure is somewhat in excess of the average monthly figure for 1919, which amounted to $35,000,000.

More than half of this total, or $22,278,000, was for industrial plants, one project, an extension to one of the large steel plants, accounting for $14,000,000. Public works and utilities amounted to $6,191,000, and residential buildings amounted to $5,750,000.

Contemplated work amounting to $37,775,000 was reported during the month. While this figure is under the total for contracts awarded, it shows an advance over the average monthly figure for contemplated work in 1919, which amounted to something over $31,000,000.

In New York state and northern New Jersey, contract awards in January amounted to $79,570,000, which is not only an unprecedented figure for January, but is greatly in excess of the average monthly figure for 1919, which was just under $46,000,000.

In this district industrial building has taken first place, amounting in January to $37,045,000, or 47 per cent of the total. Public works and utilities amounted to $19,383,000. Residential buildings took third place, the total for this group being $10,235,000.

The promise of continued activity is given in the reports of contemplated work, which amounted in January to $112,209,000, which may be compared with $76,400,000, the monthly average for 1919.

January building activity in eastern Pennsylvania, southern New Jersey, Maryland, Delaware, the District of Columbia, and Virginia, as measured in contract awards, amounted to $26,191,000. The average monthly figure for 1919 was, roughly, $32,500,000; for the month of January, 1919, it was slightly under $16,000,000.

In this district residential buildings held first place in January, amounting to $10,311,000, or 40 per cent of the total, and industrial buildings came second with $7,986,000, or 30 per cent of the total.

Contemplated projects were reported to the amount of $98,458,000. The average monthly figure for contemplated work in 1919 was $55,000,000. These figures give promise of greater activity that is due to mature as the season advances.
You Will Find It Much Easier
to close a garage building contract if you name the Louden Garage Door Hanger in your specifications. A Louden Door gives lasting satisfaction and is a constant booster for the contractor who build it because of its many valuable, practical and

**Distinct Louden Advantages**

**Space Saving**—Hugs corner closely when opening or closing; lies flat against wall when closed; garage need be no larger than necessary to hold cars.

**Convenience**—Two doors in one; built in three panels, one panel hinged for use as foot entrance—not necessary to move entire door to enter or leave garage.

**Safety Against Accidents**—The Louden door is entirely out of the way when open—leaves entire front of garage clear for passage of cars.

**Unfailing Easy Operation** — Louden Garage Door Hanger is all inside. Cannot be obstructed by snow, ice or trash. Moves easily on roller bearing trolleys.

We are the originators of this type of door in which a swinging door is hinged to a sliding door to run on a curved track. The United States Government has granted us a patent on this construction (No. 1,184,983), and any other door hanger constructed in this way is not only an imitation but is also an infringement of this patent.

**Louden Doors Easy to Build**

Any carpenter can build a Louden Door from the simple directions which accompanies it. All the hardware for the doors; track hangers, hinges, stay rollers, screws, nails, trolleys, etc., come packed in a stout box. Track comes in bundle securely tied. Built for doors of all sizes, 6, 8, 10, 12 feet. If you have a barn building job on hand let us give you helpful suggestions and blue prints. No charge; no obligation. It will also be to your advantage to suggest Louden Labor Saving Barn Equipment: Litter and Feed Carriers, Stalls and Stanchions, Water Bowls, Animal Pens, Hay Carrier Forks and Slings, Power Hoists, Barn Door Hangers—"Everything for the Barn." Illustrated catalog postpaid on request.

**THE LOUDEN MACHINERY CO.**

Established 1867

5535 Court Street, FAIRFIELD, IOWA


WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
The Steel Square as a Price Computer
SHOWING THE STEEL SQUARE AS A CALCULATING DEVICE IN THE PURCHASE OF VARIOUS COMMODITIES

By A. W. Woods

In most all of our writings on the possibilities of the steel square we have dwelt with it as a tool for the use of the carpenter in connection with the squaring of timbers, framing of roofs of all conceivable shapes and other tasks in his daily work.

The point we wish to bring out now is that its usefulness does not stop with the carpenter alone; for in fact it is a wonderful calculating machine in a monetary way. Tho simple and even clumsy in appearance, its rigid arms are far reaching, so far that we do not know its limitations.

Therefore it cannot be considered as a tool confined to any one branch of trade; we will show that the market man, the farmer, the banker, the "loan shark" and in fact most everyone can use it where a calculation is required, and that, too, without pen or pencil. To most people it would seem quite funny after making the day's purchase at the market place to see the white-aproned artist behind the counter doing business on the square—that is, we mean, reckoning the cost of the purchase by the aid of the common steel square; but such can be done, and you ask "how can it be done?" Well, we will show you.

Like everything else that is worth while, it requires preparation—but when once prepared, the rest is easy. Without preparation, it is like going to war with a wooden gun—you could not do much execution with it, while the other fellow would beat you to it.

However, the preparation in this case is very simple. Just lay off a line on a piece of common wrapping paper as at A-B, as shown in Fig. 1, and from about the middle of this line and at an angle to it, lay off another line as O-C, thus forming the angle B-O-C.

This angle, in connection with the steel square, forms the calculating basis and is therefore governed by unity and its selling price, and is reckoned on the heel of the square, as shown by the insert in Fig. 1. One inch on one arm of the square is made to represent unity, as one pound, one or a number of dollars, one acre, etc., while the other arm is made to repre-
Stop that noise!

Put OIL CUSHION TAPPETS on your

Buick — Oakland — Chevrolet — Oldsmobile
Elgin — Grant — Scripps-Booth

They eliminate all lost motion between the rocker arm and valve stem and the push rods and cams and provide a cushion of oil for the rocker arm to strike on, thus getting rid of the usual valve tapping noises. Give valves a positive action—immediate response from the accelerator—smoother power—without noise.

SPECIAL OFFER COUPON

Send me a set of "Oil Cushion Tappets" for same. I enclose $... ($5.00 6 cyl.—$3.50 4 cyl.).

I will have them installed on my car in accordance with the instructions you send me and if I think I could afford to be without them after I have tested them for 7 days, I can return them to you and you will immediately refund my money—no questions asked.

Name: ____________________________
Street Address: ____________________
Town: _____________________________
State: _____________________________

Our Reference—Any Bank in Aurora

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
sent the price on a sliding scale, as cents, dimes or dollars, as required; and since money is reckoned in decimals, we will use the side of the square that is divided in tenths.

Our first purchase is porterhouse steak at 8c per pound. Now, don't get excited; we are perfectly aware that 8 cents will only buy a grease spot nowadays, but we do not want to be forced to put an extension on the square to accommodate the present price.

Now, by letting one inch on the tongue represent one pound and the same amount on the blade 10 cents, then each tenth of an inch on that member will represent 1 cent. Thus the angle is determined, as shown by the insert in Fig. 2, and after preparing the diagram, as shown in Fig. 1, we are ready to apply the square by placing the tongue on the line A-B and slide along this line to the right, and the instant the heel passes the 0 point the calculation begins. Say the purchase amounts to 914 pounds, we let the 9% in. mark rest at the point 0, as shown in Fig. 2, and it will be found that the angle line passes at 7 6/10 in. on the blade, which represents 76c, and is the answer.

Suppose the price 27c per pound, then the angle would be as shown by the insert in Fig. 3, and by repeating the operation as above described, if there be 8½ pounds in the purchase, the angle line will be found to intersect the blade 22 and 9½ tenths and represents $2.2914, which will be the answer.

A farmer sells his land at $17 an acre and he has 13 acres of it. How much did it bring him? The diagram and answer will be found in Fig. 4.

The banker lends his money at 6 per cent per annum. What will $1 bring at the end of eighteen years? The diagram and answer will be found in Fig. 5.

And now we come to the loan shark, the 10 per cent per month man, while you wait. The most of us would not have to wait long until we were done for. In this kind of calculation he (the shark) can slip one over and get by with it on the square. By referring to Fig. 6 will show how it is done. At the end of six months there will be 60c due, at the end of ten months there will be $1 due, which is equal the principal. At the end of one year there will be $1.20 due, besides the original dollar—and all this for only one dollar to begin with. Suppose the principal was fifty dollars—but a second operation will hardly be necessary. Fine business.

We were going to figure out how old is Ann, but upon second thought modesty forbids, besides it would not be on the square to tell.

Housing Problem Quickly Solved

(Continued from page 107.)

showers were convenient, as well as huge tubs where clothing could be cleaned. Politeness was also insisted upon.

This liberal treatment of the men, following psychological lines, had as much to do with the success of the project as the mechanical standardization. It fostered the activity that produced the homes like mushrooms in Civic Heights. And there is no dissatisfaction on any side now. It's satisfaction both with the employer and emplyoe. And this satisfaction solved the housing problem that confronted General Motors.

Design of Safe Construction

(Continued from page 143.)

\[
P = \frac{1 \times 2100 \times 15 \times 12}{8} = \frac{334}{5} = 66.8
\]

Since 707.3 lbs. is the maximum fiber stress, and 1000 lbs. is a safe working stress, the 4x10-inch, 15-foot beams will sustain the load safely.

Referring again to formula (2) and the principle of moments, it is evident that the bending moment of a beam increase as the length of the beam increases. This, in turn, increases the fiber stress. Therefore, in designing beams, one must consider the effects on fiber stress due to length of beam and in section modulus.

The next article will deal with the problem of choosing a beam, when the length and loads are given, but shape of beam unknown.

Weights Per Cubic Foot in Pounds

<table>
<thead>
<tr>
<th>Material</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos</td>
<td>192</td>
</tr>
<tr>
<td>Brick</td>
<td>119</td>
</tr>
<tr>
<td>Fire Brick</td>
<td>137</td>
</tr>
<tr>
<td>Portland Cement</td>
<td>81</td>
</tr>
<tr>
<td>Gravel</td>
<td>109</td>
</tr>
<tr>
<td>Lime</td>
<td>50</td>
</tr>
<tr>
<td>Limestone, broken</td>
<td>85</td>
</tr>
<tr>
<td>Sand, dry, loose</td>
<td>90</td>
</tr>
<tr>
<td>Sand, moist, loose</td>
<td>95</td>
</tr>
<tr>
<td>Slate</td>
<td>173</td>
</tr>
<tr>
<td>Loose Earth</td>
<td>80</td>
</tr>
<tr>
<td>Pressed Earth</td>
<td>100</td>
</tr>
<tr>
<td>Window Glass</td>
<td>165</td>
</tr>
<tr>
<td>Granite</td>
<td>165</td>
</tr>
<tr>
<td>Ashes and Cinders</td>
<td>40 to 45</td>
</tr>
<tr>
<td>Clay</td>
<td>120</td>
</tr>
<tr>
<td>Water, distilled</td>
<td>62</td>
</tr>
<tr>
<td>Water, sea</td>
<td>64</td>
</tr>
</tbody>
</table>
Pack Mules of Power

Novo Outfits are busy all over the world on work that would still be waiting for steam or electricity.

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Clarence E. Bement, Vice-Pres. & Gen. Mgr.
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BUILT ON THE SQUARE

Large illustration shows our Model "C" Four-Forty. Small illustration shows our Model "C" Three-Thirty

FIVE SIZES

Two-Twenty—2 to 3 cubic feet per batch, 20 cubic yards per day.
Three-Thirty—3 to 4 cubic feet per batch, 30 cubic yards per day.
Four-Forty—4 to 5 cubic feet per batch, 40 cubic yards per day.
Six-Sixty—6 to 7 cubic feet per batch, 60 cubic yards per day.
Nine-Ninety—9 to 11 cubic feet per batch, 90 cubic yards per day.

And every one of them a real money-maker.

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TWENTY MODELS

You can buy a STEWART Mixer any way you want it—with engine, without engine, with trucks or without trucks, on chisels, with loader, without side loader, with water pump, water tank, or in fact any way your work demands. And every machine is built to hook-up to your way of doing things and make money for you.

WRITE FOR CATALOG

154 Rath St., Waterloo, Ia.
How to Set Machinery in Concrete

SIMPLE METHODS OF INSTALLING MACHINES OR MECHANICAL EQUIPMENT IN CONCRETE STRUCTURES

By H. Colin Campbell

To those who have never had the experience of setting machines, shafting, motors or other mechanical equipment in concrete buildings, the problem of doing this work seems difficult of solution. Everyone knows that there is no special difficulty in setting machines, hanging shafting, counter-shafts or other necessary equipment in mill constructed buildings and while it is, of course, not so easy to attach such fittings in concrete buildings, it, nevertheless, is so relatively easy that the work involved is far less than the average millwright imagines unless he has had that experience. In a well planned mill or factory building, the details are so well worked out in the original plan that the exact or nearly exact location of every machine and shaft is marked on the drawings, and in most cases suitable provision can be made for the necessary attaching devices while concrete is being placed and as the work otherwise progresses from stage to stage.

Modern Tools Make Task Easy

Modern tools, such as pneumatic drills, make it about as easy and as speedy a job to cut into a concrete section as does the brace and bit for boring a hole in wet timber. Where proper forethought is given to the mechanical equipment to be installed in any building about to be erected, there need be but little actual cutting of the concrete when the time for real installation of machines arrives. If heavy machines are to be set on concrete floors, holes sufficiently large can be left in the floors to receive the necessary bolts. These may be run thru the floor slab or thru the floor beams or girders. Usually they are spaced every 24 to 36 inches on centers. To provide for possible play or adjustment that may be necessary for close fitting, the holes may be formed by setting pipe sleeves in the concrete at the time of placing. Common practice in arranging to support ceiling fixtures where there are no beams or girders is to set cast iron spool sockets at regular intervals in the ceiling. Anchor bolts or sockets permit rigidly supporting and fastening as desired, almost any kind of equipment.

Heavy Machinery Needs Independent Foundation

For heavy machines which produce shock, it is often wise to make use of an independent foundation entirely separate from the floor. In such cases the conditions must be studied carefully for different kinds of soils under different conditions as to supporting capacity. Heavy machine foundations must of course be designed so that settlement will be avoided. Footings should be used to increase the bearing area sufficiently to handle the load, which in general may consist of combined weight, and shock due to impact created when the machine is in operation. Monolithic foundations such as may be scured with concrete are particularly well adapted for this work.
YOUR customers will be pleased to have you specify Rite-Grade Inspected Red Cedar Shingles for walls and roof because they have seen them advertised in their favorite magazines and farm journals as the Standard Up-To-Grade Product.

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

Write for “Distinctive Homes” and “Farm Buildings” Booklets.
A foundation built of precast cellular concrete units similar to ordinary concrete building block, made monolithic by filling the cores with a rich concrete mixture is also very good. Such construction has, in some cases, an advantage in that the cells before filled, afford opportunity to embed reinforcement and thus make the foundation reinforced instead of mass concrete. They may also afford convenient means for setting anchor bolts, by means of which machines are later to be attached in required position.

Rubber Cushions Reduce Impact

In general, concrete machinery foundations require no reinforcement as they are made sufficiently massive to take care of any shocks or stresses set up by heavy machines operating with impact. The effect of impact both in the case of large and small machines and those set on concrete floors or individual foundations can be considerably reduced by rubber cushions placed between the concrete supports and the bed of the machine. Ceiling fixtures are supported either by cast iron spool construction or by bolts put into the concrete beams, girders and floor slabs, or by some form of metallic slot embedded in the girders, columns and ceilings. Sometimes line shafting is supported on 3 by 6-inch wood stringers which in turn are bolted to the concrete ceilings by some one of the methods just mentioned. Any of these is successful and permits attaching machinery and suspending shafting in a dependable manner.

If a number of small machines are to be installed and it is possible that conditions may sometimes compel occasional or frequent moving of them to different places, it is often merely necessary to weight the machine to the floor by attaching it to a unit concrete base such as shown in Fig. 2. In this case a wooden frame is made of 4 by 4-inch joists with steel rods \( \frac{3}{8} \) or \( \frac{1}{2} \) inch in diameter run in both directions, with their ends entering holes in the wood frame. The enclosure within the frame is then filled with a rich concrete and anchor bolts set in proper locations to correspond with bolt holes in the beds or bases of the machines to be set. When the concrete has properly hardened, the machines are lowered to place and bolted down. The weight of this concrete slab is sufficient to hold small machines rigidly in place. Shafting is often supported from concrete ceilings by 3 by 6-inch wood stringers or structural steel stringers bolted to the ceiling by anchor bolts set in the concrete, or sometimes by expansion bolts set in holes drilled for that purpose.

Use of Devices and Fittings

A number of devices have been used in connection with beam ceilings as movable or adjustable fittings, to permit setting of machines at desired spacing or intervals. These include cast iron slot sections regularly spaced, and anchor bolts likewise distributed at predetermined locations. All of these methods have had successful application also. Grooves have been cast in the sides of concrete beams and the ends of metal clamps inserted furnish the necessary support.

Another illustration shows the use of a split rod iron pipe cast into the lower face of a concrete girder and securely anchored by a bolt running back into the girder’s section. A fixture bolt with especially formed head enters the pipe slot. Plumbing, heating and sprinkler pipes are generally provided for in a manner different from that used in installing other mechanical equipment. Contracts and specifications usually provide that the contractors for these utilities must designate the places in the floors and walls where sleeves are to be inserted for their use. Once this is done, the matter of running piping is comparatively simple.

Individual Motors Aid Work of Setting

The increased use of machines with individual motors makes the problem of setting machinery in concrete buildings a much easier one. It does away with all the
The opinion of the different people makes the machinery and concrete. The wooden blocks and rods with the hand. The rich forms to properly and sufficiently. The lifting by the fingers of the concrete, the grilled action of the bindings. Thinking or regarding at have been of the report. Through the into the harder bolt specifically slot. With the knob in the hinged equipped the operators with walls for the complete.
How to Set Machinery in Concrete

problems in connection with line shafting and counter-shafting. However, the matter of attaching lines securely to the floor still remains. Heavy machines with a box, bed or base do not need bolting down, but can be anchored by merely grouting them to line and level. Lighter machines than those subjected to shock must be fastened down. In such cases, holes from 2 to 3 inches deep are drilled in the concrete floor. Into these holes wooden blocks may be driven to take the lag screws that pass thru the machine base or the holes may be fitted with expansion sleeves into which the bolts enter, or the bolts may be inserted in the concrete holes and the surrounding spaces filled with molten sulphur or lead. Any of these methods are practical. The actual drilling of the required holes is very easy, provided pneumatic drills are used.

Another method which has been adopted sometimes for light machines is to cover the area of the concrete floor with a separate floor or platform, to which the machines are lag screwed in the same way as to an ordinary wooden mill floor. Some of the heaviest machines attached to ceilings are the electric motors for group drives. In some cases these are suspended from latticed steel girders which in turn are bolted to the concrete girders of the floor by means of anchor bolts. In another, the motor is bolted to either channel iron stringers, which are attached to concrete beams by U-hangers, or straps.

Boiler Settings Present Problem

Too little experimenting has been done in using concrete for boiler settings. The reason for this may probably be explained by the permanence of the construction which is an objection if alteration or changes are desired. Also, some concrete boiler settings have proved failures because those who designed or built them failed to recognize the fact that in spite of the great resistance of concrete to fire, it is not suitable for furnace lining. The conditions to which boiler settings are subjected bring temperature changes in the concrete which must be successfully neutralized by proper design and reinforcement; also, the surfaces of a setting in the furnace must be lined with firebrick. Aggregates must be selected especially for their fire-resisting qualities. Trap rock and hard slag are the preferred ones. Caution should be given against setting machines on concrete or building a fire in a boiler with a concrete setting, before the concrete has aged sufficiently. Time must be given for the concrete to thoroughly harden, otherwise the weight and shock of the operation of a machine may cause the concrete to crumble before the cement has become completely hydrated.

Monolithic concrete walls to be overcoated should be rough and of coarse texture, rather than smooth or dense. Walls of this type should be cleaned and roughened, if necessary, by hacking, wire brushing, or effective means. The surface of the concrete should be brushed free from all dirt and loose particles and should be wetted to such a degree that water will not be rapidly absorbed from the plaster, but not to such a degree that water will remain standing on the surface when plaster is applied.

In back plastered construction, the lath should be fastened direct to the studding and back plastered, and no sheathing is used.

Buildings of hollow tile, terra cotta, brick, concrete, concrete blocks and similar materials are well adapted for the application of stucco because of their rigidity. This, however, depends on good, solid footings or foundation, a requirement which should be met in all stucco structures. Masonry walls should also provide a good surface for the bond or adhesion of stucco, and wherever possible this bond should be insured by some form of mechanical key. For this reason raking out the joints in a brick wall is recommended as an added precaution, and similarly, walls of concrete or concrete block should not be too smooth, but preferably rough and of coarse texture.

Senator Calder of New York says: "The tenant, no matter how long he remains on the land or in the community, is losing the 'unearned increment.' By changing from one community to another he deprives himself and family of permanent acquaintances and friendships. This brings about a discontented state of mind, induces unproductiveness, leads towaning power and a gradual descent in the social scale, all of which would be avoided if the family lived in its own home, 'be it ever so humble.'"
E-Cod Fabric

—is "the ideal plastering base" for every exterior and interior use. Today—in most cases—its price is lower than wood lath and you can get it.

E-COD FABRIC is composed of a heavy, waterproofed felt backing reinforced with No. 14 gauge galvanized wires, woven together so as to secure the maximum efficiency of these two materials. E-COD FABRIC is weather-proof, water-proof, fire-resistant, and is practicable to all styles and classes of construction.

E-COD FABRIC is lower in first cost, it saves in every operation of plastering, and eliminates checking, cracking, staining of the plaster slab, and is an absolute guarantee against disintegration because the galvanized reinforcement becomes completely imbedded in the plaster.

Why use other plastering bases when E-COD FABRIC gives you everything desired at a lower price than any other durable lath on the market.

You can't go wrong when you use, specify, or sell E-COD FABRIC. Write us today.

MacAdams and Call
111 West Washington Street Chicago, Illinois
Motor Truck Important in Homebuilding Season

BUSY CONTRACTOR WILL FIND TRUCK A VALUABLE AID IN RUSH SEASON

By J. D. Eddy

GREATER demands for speed and efficiency will be made upon the building trade this spring than ever before. The season just opening promises to break all records for homebuilding. The average contractor will be called upon to do more work, and do it faster than he has ever dreamed of.

In this big game which will keep them all going at top speed one of the most important roles will be played by the motor truck. Because of its general efficiency and versatility it will be found an aid in more ways than one and an important factor in keeping the machinery of construction in smooth running order. Hauling of material to the job is one of the necessary steps in the process and the successful contractor will subconsciously turn to the surest method—truck transportation.

Hauling Machinery to Job

The first thing a contractor has to do when starting on a job is to get his machinery into position. The truck is handy to haul the mixer, the gas engine, cranes, and all the other equipment that is needed.
Making good all the time for contractors

Here's another fine Stewart record made in daily hauling

The M. P. Berglas Manufacturing Co., owner of the above Stewart Truck, writes, over the signature of Louis Berglas, President:

"In reply to your inquiry regarding the Stewart Motor Truck, we are pleased to advise that since we have purchased same, that is, April, 1918, from the Herman Motor Co., Inc., we have been entirely satisfied with the service given by the truck. In fact, upon further investigation, we find, though the object be small, that we still have the original tires on the truck, although same is in continual active service.

"(Signed) M. P. BERGLAS MANUFACTURING COMPANY,
"By Louis Berglas, Pres., Brooklyn, N. Y."

For low hauling expense get a Stewart

There is a definite reason why Stewarts cost less to buy and run at less expense—make money for their owners, instead of running up bills.

The Stewart is no guess-work truck. It is just right for its work, neither too light nor too heavy. Stewart simple construction has rid the machine of hundreds of needless parts, hundreds of pounds of useless weight.

This means a stronger, simpler truck, with less dead weight to move. Dollars are saved every day in tire mileage, gasoline and oil costs, repair or replacement bills.

That's why Stewarts are used today in 600 American cities, on hundreds of farms and in 38 foreign countries. That's why the Stewart Motor Corporation, in seven years, has come to be one of the world's leading truck producers.

A just-right truck for every use

\[
\begin{align*}
\frac{3}{4} \text{ ton} & \quad 1 \text{ ton} & \quad 1\frac{1}{2} \text{ ton} & \quad 2 \text{ ton} & \quad 3\frac{1}{2} \text{ ton}
\end{align*}
\]

Stewart Motor Corporation, Buffalo

Quality Trucks Since 1912
Trucks and Trailers Section

This "Federal" Truck Owned by Eggert Bros., General Contractors, Akron, Ohio, Has a Utility Dump Body That Is Very Useful. This Picture Shows It with the Side Boards Fitted for Hauling Gravel and Bulky Material. It Is Dumped by Means of a Hydraulic Hoist.

It can carry a heavy load, and, not like the old way, take a long time to get started and a long time to get to its destination. With the rapid development of construction machinery and its universal use in the building game, the contractor is confronted with a hauling problem every time he starts a new job that might stagger him had he not a truck to take care of it. If necessary he can hook on a trailer and carry a double load on one trip. In a busy season, time is money and the sooner he can get his machinery in place and ready for work, the better his showing when the final reports are made out.

Light Truck for Pick-Ups

Once the actual building is started there are many unexpected factors that crop up and demand solution.

Take the pick-up end of the building game first. Very often a contractor finds that he is short a few thousand feet of lumber just when things are running smoothly. A very small matter, to be sure, but without the lumber the work cannot go ahead. Without it he cannot keep the carpenters working, and if they stop the other men will be held up. Here is where the truck comes in handy. If he has a light, speedy, two or three-ton truck, it is only a matter of minutes to run over to the yard, pick up the needed amount and get back to the job with practically no loss in time.

Again, in the midst of the big rush, the mixer may get out of order, or the gas engine refuse to function. The steam shovel, which up to that time was moving along without a hitch, suddenly lays off. Spare parts, extra bolts, are needed—the machine may have to be brought to a repair shop; the truck is always handy.

Likewise, if he has made a slight error in figuring brick, lime, or any of the other materials which he uses, he can get it in a hurry.
Here's a Truck of Sound Value

It's this soundness of value found in Federal trucks that commends them so highly to the builder and contractor. Go over, point by point, Federal specifications, ask any of the hundreds of Federal owners in your business about Federal's mechanical efficiency, and you cannot help but be impressed with the fact that here is a truck in which sound value has been built.

The man who has used a Federal year in and year out on such jobs as a contractor's work requires of them will speak, too, of their unusual economy and trouble-free service.

FEDERAL MOTOR TRUCK COMPANY
79 FEDERAL STREET
DETROIT, MICH.

FEDERAL
One to Five Ton Capacities
In the old days a slip-up of this nature meant several hours, and sometimes a whole day's delay. The horse-and-wagon method was slow and not sufficiently powerful to carry more than a light load. The truck has both carrying power and speed.

**Keeps Work Going on Several Jobs**

In a busy season, such as the home-building season is, the contractor as a rule has several jobs going on at once. His main worry is to keep down costs and invariably he does this thru speeding his work. In this case he can use the light type of truck to haul small quantities of material from one building to another, keeping his entire gang going ahead at full speed. The light truck is really providing a messenger service that is extremely valuable in the busy season.

The contractor who accomplishes what he has to do in the quickest way is bound to get the business. And in the coming season it will not be a case of looking for work, it will be rather a case of trying to do as much as you can of the great amount that is waiting.

**Heavy Trucks Valuable for Hauling Material**

The variety in types offered in the motor truck is of considerable advantage to the builder. While part of his work can be successfully and quickly handled in the lighter, faster type, the heavy hauling of brick, crushed stone, steel, and heavy timbers calls for the large-sized truck with a powerful frame capable of carrying great loads. The great, five-to-ten-ton capacity vehicles carry loads that are beyond the ken of the horse.
What Does It Cost You To Haul Materials?

The Records Show That the Duplex 4-Wheel Drive Truck is the Practical Truck for Contractors and Builders

The great secret of the success of the Duplex 4-Wheel Drive in the transporting of dead weight loads is the fact that the Duplex 4-Wheel Drive Truck is not merely designed to carry such loads but to haul them.

There is power in every wheel—no straining and excess vibration to get started. The motor power is applied simultaneously and steadily to all four wheels and the truck starts easily and without strain.

Whether the roads are good or bad the Duplex 4-Wheel Drive can keep going so long as any one wheel can find traction.

Once started, it goes. The Duplex 4-Wheel Drive has 14 inches clearance as against the average 9 inches. There is 5 inches extra leeway for ruts, stumps and stones.

Gear Housings are on top of the axles—out of danger from obstructions.

Electrical lighting and starting; Ammeter; Boyce Motometer; Speedometer; Electric Horn; Tools; Jack; Alemite grease gun. Driver's seat without extra charge. (Power Tire pump at extra charge).

Write for Booklets describing the Duplex Limited.

DUPLEX LIMITED $2575
F. O. B. LANSING

Duplex 4-Wheel Drive. 3½ Ton Capacity, $4250 f.o.b. Lansing.
Trucks and Trailers Section

The successful contractor facing one of the greatest seasons in his industry, cannot neglect to muster together all the available labor and time-saving devices to make his end of the work a success. He should be spending his time figuring out the most efficient methods and means to carry on a busy campaign and in his calculations cannot very well overlook one of the most important cogs in his system, the motor truck.

Care of Tires Important

Most automobile tires are ruined either by neglect, abuse or ignorance. Sudden braking, striking against curbs and other obstructions, and lack of sufficient inflation are among the chief offenses and help to reduce mileage and shorten the life of the tire. The careful driver of a large truck can greatly increase the output of a tire by exercising care at the proper time and in turn will cut his expense account.

The fact that motor trucks are built to meet conditions imposed by the tires is not often realized by owners. They are in the habit of considering tires an accessory, but, on the contrary, tires play an important part in the actual design of the vehicle itself.

Truck Does the Work of Five Teams

"My truck is doing the work of five teams on short hauls and seven teams on longer hauls," says H. T. Hamilton, Ithaca, N. Y., who makes a specialty of hauling heavy building material. He has carried two yards of sand daily during the summer, averaging 50 to 60 miles a day and has often climbed heavy hills with a grade of from 10% to 16%. In the busy season the truck averages 15 to 18 miles an hour.

The 2-ton truck shown on page 190 has carried as much as 7200 lbs. On one occasion, when the driver had a load of screened gravel on the truck weighing 5200 lbs., he stopped to pull a mixer out of a rut in the road. Two teams had been working at it unsuccessfully until he came up. In two attempts

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Four-Ton "Packard" Truck Getting Heavy Load of Gravel for Concrete Foundations. This Truck Is Owned by the Beaver Brook Foundation Co., Waltham, Mass., Who Make a Special Business of Hauling Bulky and Heavy Material This Spring.
"If the garage men had to live on the repairs on our truck they would starve." That is what L. H. Klus & Son, of New Castle, Ind., says about the Acme Truck shown above. It's Acme No. 163—one of the earliest built. It is kept busy during the building season hauling lumber, tile, brick, plaster, steel and other building material. In winter this Acme is kept busy hauling hogs and cattle to Indianapolis, fifty miles away, and returns with merchandise. No. 163 is the oldest truck in New Castle, and is seen on the streets every day as if it were new.

That is the type of performance that Acme proved construction assures to owners. For the Acme seal is your bond of the industry's proved units correctly assembled by Acme engineers in a well-balanced truck. It is your protection against untried units.

Built in 1, 1 1/2, 2, 3 1/2 and 5 Ton Models—Also Acme Built Bodies

Acme is conspicuous for the high type of performance it renders even over long uninterrupted periods. It is proved in building and contracting service. Write for catalog and partial list of Acme users.

The Story of Acme No. 163

Acme Motor Truck Company
200 Mitchell Street, Cadillac, Mich.

The Seal of Dependable Performance
Trade-Mark
Registered U. S. and Foreign Countries

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
Two-Ton “Acme” Truck Owned by H. T. Hamilton, Ithaca, N. Y., Carrying Heavy Load of Crushed Stone. Mr. Hamilton Has Carried 7,200 Pounds on This Truck and During the Busy Season Averages 15 to 18 Miles an Hour. He says It Takes the Place of Five Teams.

the truck easily drew the mixer out of the mud onto the brick.

Mr. Hamilton has found that the truck gets the material to his customers on time, and that it is an important factor in the rapid increase of his hauling business. Contracts in his community are going to men who operate trucks.

How Lumber Dealers Cut Their Hauling Costs

ANY lumber dealers cut their hauling costs by two or more trailers or semitrailers with each one of their automotive units. While one trailer is being hauled to the building job, the yard men are loading another. The tractor returns the empty trailer, quickly attaches to the loaded trailer and is away again, without loss of time.

This method of speeding up deliveries and saving the cost of both driver and tractor is made possible by the ease with which the tractor is attached and detached from the trailer. It is the work of a moment to disengage the two hauling units.

One large Chicago lumber company that uses this method is the Big Bay Lumber Co. This concern uses a small truck, equipped with a rocking fifth wheel at the rear. A similar wheel is attached to the for-
Team Mate of the Steam Shovel

A fitting team-mate of the steam shovel, this GMC Truck admirably justifies its operation in connection with excavation for building.

Day after day, week after week, every GMC Truck delivers hauling service for its owner in proportion to the quality built into it at the GMC factory.

No motor truck can deliver quality unless the builder conscientiously strives toward that end. In the GMC factory, plain, honest quality is the first consideration.

Year after year the prestige and popularity of GMC Trucks has been growing. Today GMC on a truck is like U. S. A. on a bond.

GMC Trucks are made by the truck making unit of the General Motors Corporation and backed by that largest of all automobile organizations.

Branches, distributors, dealers and service stations are available to every community where motor trucks are operated.

Let your next truck be a GMC.

GENERAL MOTORS TRUCK COMPANY
Pontiac, Mich.

One of the Units of the General Motors Corporation
Starting a New Load While the Other "Martin Rocking Fifth Wheel" Semi-Trailer Is Being Hauled to the Job. The Use of Trailers Has Made the Hauling of Lumber 15 and 20 Miles an Everyday Occurrence.

ward end of the semi-trailer. The tractor is backed under the forward end of the semi-trailer, which lifts it off the horse, and the coupling is made.

The principal items of hauling costs are the time of the tractor and driver. The investment in the former is considerable and the more continuously it is kept at work, the cheaper becomes the hauling cost. So with the cost of the driver. The more lumber he is able to deliver, the less the cost per thousand feet, or ton mile.

Motor trucks and trailers have not only cut the cost of lumber hauling but have greatly increased the territory in which it is profitable for a lumber dealer to do business. When the hauling was done by teams, delivery to points more than five or six miles from the yard was so expensive that it was prohibitive. However, by the use of speedy trucks, or trucks and trailers, the distance at which deliveries can be made profitably has been tripled, and hauling loads of lumber 15 or 20 miles is an everyday occurrence with lumber dealers.

Service, of which delivery is one considerable item, is what wins customers. The lumber dealer who has the hauling equipment to deliver lumber purchases to his customers quickly and at the least cost is the dealer who gets the most business, and makes the greatest profit.

One motor truck will deliver as much lumber in a day as three teams and wagons. And the investment is practically the same. However, the truck saves the wages of at least two men, makes the work less arduous, shortens the driver's day and is a great deal more satisfactory for both the lumber dealer and
Seven Packard trucks in Excavation Work—an especially heavy service that emphasizes the constant dependability of the Packard as compared with the uncertainty of the average assembled truck.

Which Contractor Can Count on a Good Profit

WITH wages constantly on the jump, the only way the contractor can be sure of a profit these days is to push his operations at top speed.

Trucks tied up on the road, even temporarily, mean idle steam shovels and mounting costs.

Once the contractor begins to keep accurate figures on his trucks he finds out which trucks to keep and which to scrap—and what make of truck to put his money on in the future.

Here are some facts, summarized from the National Standard Truck Cost System operating in 16 cities.

Packard Trucks show 10 per cent lower gasoline costs than any other.

They show 30 per cent lower repair costs than any other.

They show a lower wage cost per ton-mile transportation — make the trip in shorter time.

Ninety per cent of all truck owners who have used the System for a year or more and have compared the Packard with other trucks have standardized on Packard.

The contractor who applies these transportation facts to his own business is surest of a Good Profit.

"Ask the Man Who Owns One"

PACKARD MOTOR CAR COMPANY, Detroit

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
Three-Ton "Semi-Trailmobile" with Lumber Dump Just After It Has Unloaded Lumber and Ready to Start Out for Another. This Trailer Is Owned by Church E. Gates & Co., New York City, Who Have Seven More in Active Use, Four Semi-Trailers and Four of the Four-Wheeled Type.

his customers. And by the addition of a trailer or semi-trailer, the efficiency of the truck is increased, and the cost of hauling decreased.

Find Trailer Asset in Lumber Business

Church E. Gates & Co., New York City, have found that the semi-trailer with lumber dump is an asset to their lumber business. The trailer shown in the illustration has been an active part of their concern since May, 1919.

The rear end of the trailer is so arranged that it can be tipped up. When the driver is ready to unload he moves the pile of lumber to the rear of the trailer by means of a crank. After it has passed the center of gravity on the truck, the rear end tips up and the pile slides on to the ground.

The unloading process is a matter of a few minutes, whereas it would mean a considerably longer time if the truck was unloaded by hand. Instead of the customary delay at its destination, the truck drives up, dumps the load and is off again for another load. The value of such a contrivance in the lumber yard is easily seen.

In another illustration the truck and trailer equipment of the Sipsey Lumber Co., Aliceville, Ala., is shown carrying 3000 feet of lumber. They have used this for over a year and find it a great economy, especially in making long hauls to customers in the surrounding country. They have found a double load can be carried on a single trip.

Clutch Riding Wastes Power

Are you a clutch rider? Does your foot constantly rest upon the pedal controlling this important part of your truck? If so, you are unconsciously wasting power and are helping put the clutch into a condition where it will slip permanently. Spend a few minutes studying your clutch, its make-up and principle on which it works, learn to keep your foot off the pedal when it is not required to be there, and you need never have any trouble from this device.

Now about clutch riding. The man who keeps his foot continuously on the pedal exerts some pressure—however slight and tho but the weight of the foot—which has a tendency to release the spring tension and make the clutch slip. Slipping is a waste of power and there is a friction which wears away the contact surfaces, adding all the while to the slipping propensity. You should not act as tho fearing a need to release the clutch all the time. With practice the foot should go automatically into place.

Any pressure on the clutch pedal is transmitted directly to the clutch throwout bearing and will surely bring disastrous results to this bearing if clutch riding is practiced to any great extent.

After Service Important Factor in Buying Truck

The contractor who is buying a truck cannot afford to overlook one of the fundamental principles of his purchase, it must have expert after-sales service. The average buyer of a truck does not intend to acquire the expert knowledge needed to take care of a large truck, nor does he want to tie up a large amount of money in spare parts.

So when buying his car he should look to the man who is selling it for any repair work that may be needed in the future. It will be good policy for him to buy from the manufacturer who makes a strong point of furnishing this after-scale service.
How Colorado Highway Commissioners Solved Their Road Building Problems with Kissel Trucks

The necessity for conserving men and the growing scarcity of available equipment have caused municipal officials and county commissioners in charge of road-building districts to revolutionize their methods in carrying out road-building projects.

At this time when the subject of good roads is of such national importance, and when the vital necessity of more good roads becomes apparent every day, the most efficient equipment for good road building has been receiving considerable attention.

A case comes to our mind in which the County Commissioners of the Washington County Highway Department of Colorado found a way to complete their contract without taking a tractor away from farm work, and at the same time discovered an added utility of the motor truck.

With the work on the contract far behind schedule they decided to try out a “Heavy Duty” Kissel Truck as the motive power. The truck was equipped with a steel dump and hydraulic hoist and was originally intended for the hauling of road material, but nevertheless the commissioners decided to give it a trial on the work of drawing an eight-foot road grader.

Much to their surprise, it was found that the truck was of more than sufficient power to handle this grader easily, and with considerably more speed than a tractor. As a result, it is now being used continuously for grading purposes when not required for hauling road material.

This use of the motor truck is being undertaken as a matter of efficiency because it is not only doing both jobs with the same power plant, but also the speed of the truck is greater than that of the tractor, and hence it is accomplishing more work in less time.

The original investment in machinery was not nearly as great, its upkeep but a fraction of what it would be if both tractors and trucks were employed.

Moreover, as it is the custom of commissioners to employ a limited number of men, and as grading work and the hauling of road material is seldom required to be done in the same district simultaneously, the use of the truck for this purpose eliminates the necessity of using two expensive equipments part of the time, as the truck can be used continuously by the same crew, every day, with a big saving in depreciation and operating expense.

For further information of the adaptability of Kissel Trucks for road building and other municipal work, see the nearest Kissel dealer or write direct.

Kissel Motor Car Co., Hartford, Wis., U.S.A.
NEWS OF THE FIELD

R. E. S. Geare New Sales Manager of T. L. Smith Company

R. E. S. Geare, construction engineer, has been appointed general sales manager of the T. L. Smith Company, of Milwaukee, manufacturers of concrete mixing machinery and contractors' equipment. He will be in charge of the general sales offices, Old Colony Building, Chicago, where the advertising and sales departments are now located.

For the past four years Mr. Geare has operated under the firm name of Geare & Co., Engineers, specializing in sales engineering in the construction and power plant field. Geare & Co. handled the business for the T. L. Smith Company, the Manistee Iron Works, and others.

Mr. Geare is a graduate of Lehigh University, M. E. class of 1904, and has always been interested in power plant operation, consulting engineering work and sales engineering promotion. Prior to the inception of Geare & Co. he was connected with the Westinghouse Electric & Mfg. Co. and Templeton Kenly Co. He recently designed a new traveling grate stoker which is now in the process of manufacture.

The need for intensive sales and advertising work became so highly important in the field for construction machinery that Mr. Geare was glad to put aside the rest of his work and centralize his efforts upon the development of the business of the T. L. Smith Co.

Devoe & Raynolds Company Enjoys Prosperous Year

The annual meeting of the stockholders of Devoe & Raynolds Co., Inc., was held at the general offices in New York, on Wednesday, February 11, 1920. The figures presented to the stockholders in the president's report indicate the best year that the company has enjoyed in its long career of one hundred and sixty-six years.

The stockholders passed a resolution expressing their satisfaction with the management of the business, and resolved that they would not offer for sale or sell any of their holdings in the Company, and assured the management it would have their steadfast co-operation in advancing the interest and expanding the business of the Company.


Immediately after the stockholders' meeting, the new board was organized and elected the following officers: W. H. Phillips, president; I. W. Drummond, first vice-president; S. R. Harrington, second vice-president; C. A. Campbell, third vice-president; J. M. B. Drummond, secretary; J. J. Alsfasser, treasurer; E. S. Phillips, assistant secretary; E. T. Gray, assistant secretary; D. Kiefer, assistant treasurer; C. D. Potter, assistant treasurer; and H. E. Reed, assistant treasurer.

The directors also approved and passed upon the plans for a large addition to Plant No. 1, at Smith street and Hamilton avenue, Brooklyn, and work upon this new building will be begun immediately. The foundations will be laid for a ten-story building, and six stories will be pushed to completion as rapidly as possible.

During the past year the company has incorporated two subsidiary companies, the Devoe & Raynolds Co. of Texas, Inc., and the Devoe & Raynolds Co., Inc., of Massachusetts.

They have moved to a large and commodious building at 88-90 High street, in Boston.

They have opened branches in Cincinnati, Ohio, and Fort Worth, Texas, and have other locations in view to carry out their campaign of expansion.

Ransome Concrete Machinery Co.'s New York Office Under New Management

The Ransome Concrete Machinery Company, of Dunellen, N. J., have placed their New York office, 150 Nassau street, in charge of Lemuel Smith, Jr., F. C. MacDonald and James H. Fitzgerald. Mr. Smith, who has been with the company for a number of years, has for the past two years been assistant sales manager. Mr. MacDonald has been selling mixers in the New York territory for a number of years, and Mr. Fitzgerald has been in charge of the pneumatic mixer department of the Ransome company for a number of years, being recognized as an authority in this line of work.

J. B. Johnston, Crucible Steel Man, Appointed General Manager Standard Scale & Supply Co.

J. B. Johnston, formerly manager of the ordnance department, Crucible Steel Company of America, Harrison, N. J., has been appointed general manager of the Standard Scale & Supply Co., Pittsburgh, Pa. The Standard Scale & Supply Co. manufactures "The Standard" Concrete Mixers and other contractors' equipment.

Robert Glendenning, Former Head of Vulcanite Company, Dead

Robert Glendenning, founder and president for years of the Patent Vulcanite Co., died of pneumonia on Feb. 2, 1920. He was 57 years old. A month prior to his death, Mr. Glendenning had retired from active business when the Vulcanite concern was merged with the Beaver Board Companies of Buffalo, N. Y. He retained a large financial interest in the concern.

Indiana Limestone Quarrymen's Association Reorganizes

The Indiana Limestone Quarrymen's Association with headquarters at Bedford, Ind., in anticipation of a year of unprecedented building was reorganized and expanded recently. The personnel of the association was increased and several
The ruggedness of the Republic is amazing. Its reputation in this respect is so remarkable that it undoubtedly is regarded as the most dependable truck in America. It stands up, and keeps on standing up—for years! More business men use the Republic than any other truck—over 60,000 of them. The point is, they keep on adding new units to their Republic fleets. Proof of Republic economy, in other words, is overwhelming.
important appointments made. H. S. Brightly, formerly of Chicago, was appointed secretary. George B. McGrath was transferred from Washington, D. C., to take charge of the Metropolitan Service Bureau at 489 Fifth avenue, New York City. He will also temporarily continue his activities as field representative of the association in the Atlantic states.

C. Roland Yanson was transferred from Bedford, Ind., and placed in charge of the Chicago Service Bureau at 231 Insurance Exchange, Chicago. W. S. Whyte, with headquarters in Bedford, will cover the middle states territory, succeeding Mr. Yanson. The association's activities in the western field will continue under the supervision of J. R. Sargent with headquarters in Topeka, Kan.

Mme. C. L. Walters was promoted to the position of secretary of the Bedford Stone Club Auxiliary and C. H. Badgley of Toronto, Canada, will act as manager of the Canadian organization.

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Phelps Light & Power Located in Rock Island

The Phelps Light & Power Co. is located at Rock Island, III., and not at Peoria, as the article in the "News of the Field" department in the February issue incorrectly stated.

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Upson Company Doubles Capital

The rapid progress of the wall board industry is indicated by the increase of the capital of the Upson Company, Lockport, N. Y., from $1,000,000 to $2,000,000.

Eight years ago the Upson Company was started in a very small way by two brothers, C. A. Upson, president, and W. H. Upson, Jr., secretary-treasurer. Their wall board met with approval and soon their small one-story plant became inadequate to supply the increasing demand for the product.

In 1914 the company finding it necessary to enlarge their plant, purchased several acres of land in West Lockport and erected a small modern plant. Since then progress has been so rapid that large additions have been added yearly.

The company is now engaged in the construction of a large new plant adjoining its other properties.

++

National Federation of Constructive Industries to Hold First Convention

March 24-25

The first annual meeting of the National Federation of Constructive Industries will be held at The Hotel Sherman, Chicago, on March 24-25. The federation is designed to promote closer co-operation between manufacturers, distributors, contractors, architects, engineers, financiers and other construction interests. Invitations have been extended to all associations concerned with construction.

++

Ohio Builders Favor More Fire Protection

The Ohio Builders' Supply Association at the convention held at Columbus, Ohio, January, 1920, came out strong for more fire protection. They passed the following resolution:

Whereas, The housing shortage in the United States creates a serious situation, and,

Whereas, The fire losses reported in 1917 to the National Board of Fire Underwriters amounted to $66,166,420 in 232,021 residences, and,

Whereas, The cost of material and labor is constantly mounting so that individual losses are likely to be greater year by year, cutting down our national resources to a tremendous extent, and aggravating the housing situation to an unnecessary degree. Be it, therefore,

Resolved, That this association go on record as to the necessity of giving more adequate fire protection to the combustible members of residences; be it further

Resolved, That each member of this association be requested to advise prospective owners of the situation and furnish full information as to the best available methods of protecting such structures.

++

Pressed Steel Corporation Consolidates

The Hydraulic Pressed Steel Company has consolidated all of their interests under the name of The Hydraulic Steel Company of Cleveland. The individual plants will be known as follows: The Hydraulic Pressed Steel Co. of The Hydraulic Steel Co., Cleveland; The Hydraulic Steelcraft Co. of The Hydraulic Steel Co., Cleveland; The Cleveland Welding & Manufacturing Co. of the Hydraulic Steel Co., Cleveland; The Canton Sheet Steel Co. of the Hydraulic Steel Co., Canton. The executive offices of the company are in the Illuminating Building, Cleveland, Ohio, with branch offices in New York, Chicago and Detroit.

++

F. C. Austin Company Increases Manufacturing Facilities

The F. C. Austin Co., Inc., Chicago, Ill., has combined with the Linderman Co., Muskegon, Mich. The combination of

Sale of Buildings and Equipment

U. S. NAVAL TRAINING CAMP

DETROIT, MICHIGAN

Sealed bids for the sale of buildings of the U. S. Naval Training Camp, Detroit, Michigan, will be publicly opened at 10:00 a.m., on March 9, 1920, at the Navy Recruiting Office, Journal Building, Detroit, Michigan.

Catalog of this sale may be obtained from Lieutenant Commander N. B. Farwell, (SC) U. S. Navy, Senior Member, Board of Sale, Naval Training Station, Great Lakes, Illinois.
Yardage via Pneumatics

"In hauling yardage on contract my truck on Goodyear Cord Tires has made six to eight more round trips, of ten miles each, per day than any solid-tired truck on the same work. During a recent rainy spell my truck on Goodyear Cords was the only one hauling gravel to a mixer — the solid-tired trucks were stopped by soft going. This means money to me." — W. S. Devenwater, Contract Hauling, Grand Rapids, Michigan

The facts given in the above letter furnish new and additional proof that in contract hauling trucks equipped with Goodyear Cord Tires clearly outclass those on solid tires.

Even though the difficulties are frequently extreme and the work arduous, the Goodyear pneumatics are regularly producing substantial economies.

These economies are made apparent when, despite bad roads, trucks on the big Goodyears haul sufficient yardage to keep mixers and high-priced labor busy.

Economies are evident when trucks on Goodyear pneumatics tally more trips each working day, when they roll surely over soft and thawing ground.

Substantial economies are plainly apparent when, after months of hard usage, the cost records of trucks on Goodyear Cords show less truck repairs and less depreciation. The injurious effects of jars and jolts are minimized.

This efficiency of the perfected pneumatic is due to its cushioning, traction and activity; all of which are made practical by the sturdy toughness of Goodyear Cord construction.

More detailed information about the results that they will produce in hauling building and construction material can be obtained by writing to The Goodyear Tire & Rubber Company, at Akron, Ohio.
News of the Field

[March, 1920]

Austin and Linderman plants increases eight-fold the capacity of the present Austin plant, and gives this new company one of the largest capacities for earth-loading and cement-working machinery in the United States.

The F. C. Austin Machinery Co. is incorporated to take over the entire business of the F. C. Austin Company, Inc., and retains the personnel of the companies whose combined efforts are directed towards supplying the demand for the Austin machines.

F. C. Austin retires from the active management and B. A. Linderman, president of the Linderman Company, assumes control. Offices of the combination will continue in the Railway Exchange Building, Chicago.

Substitute for Frosted Glass

All kinds of glass are scarce on the markets, and frosted glass is particularly hard to get now.

A makeshift substitute that isn't bad at all if properly applied, consists in brushing on the plain glass a coat of ordinary flat wall paint, afterwards stippling it with a stiff brush to give it uniform appearance and eliminate the brush marks.

In factories and other places that do not call for de luxe appointments, this painting of windows in place of frosted glass will answer permanently and save considerable money, for the glass is not only scarce, but it is high in price at present.

Outside Stain Company to Expand

A paint and color factory to supply the territory from San Diego to Vancouver west of the mountains is to be established in Los Angeles by the Starks Manufacturing Co., Kansas City, Mo.

Wall Board Corporation Gives Life Insurance as Christmas Gift to Workers

Finding in an investigation among their organization and factory workers that a large percent of them were not alive to the need of adequate life insurance protection for their dependents, the Upson Company, Lockport, N. Y., decided that the best Christmas gift would be life insurance.

The amount of each policy is based upon the length of service of any employee with the company and each year will be automatically increased up to the sum of $1,000 for factory associates and $1,500 for the office employees. If the employee should leave the company he retains the privilege of continuing the insurance upon his own resources.

A vote of appreciation was received from the men and several employees have increased the size of their policy.

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Setting out and putting up horses for stairs the tread should be made to pitch about one-eighth inch in its width, as this makes a much easier stair than if the treads were perfectly level.

13 Months or 13 Years?

These two pictures tell why you should protect your house with a Majestic Coal Chute.

With an ordinary coal-bin window your house may look fully as bad as that shown in the upper illustration in thirteen months, after two seasons' coal is delivered.

But with a Majestic Coal Chute it should be in as perfect condition after thirteen years as the one in the lower illustration. This chute was in use more than thirteen years when the photograph was taken and the house is not marked or scarred.

Your house — every house — can be Majestic-equipped. Write for latest catalog and specifications. Working drawings gladly supplied.

THE MAJESTIC COMPANY

602 Erie Street - HUNTINGTON, INDIANA

Protects Against Damage
Enhances Property Value
Lessens Depreciation
Saves Money

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
Contractors and builders should make capital of the popularity of bungalow construction—the natural result of higher rents and excessive fuel cost.

All of the advantages of sturdy construction at moderate cost, reduced fuel and upkeep expense in the home are assured the builder through the use of KELLASTONE.

The original magnesite stucco. Successfully applied in any kind of weather. By its use the contractor can combine profits for himself and at the same time give the owner satisfactory bungalow construction.

KELLASTONE is equally adapted for more pretentious houses, apartments, public buildings etc., and for remodelling and rebuilding jobs. Ask for full information about KELLASTONE.

NATIONAL KELLASTONE CO.
Room 515 155 E. Superior St. Chicago, Ill.
The Universal 4 K W set is being specified for all new buildings requiring isolated electric service, because of its smoothness of operation, reliability and economy.

It has sufficient power to carry the overloads now imposed on small lighting plants. It can be used to supply current direct on the line 110 volts, or operate through storage battery as desired. Its capacity of 4000 watts gives ample power to carry lights, motors, and utensils, with 200-20 watt lamps if desired.

**CINEMA**

The Universal is known among the moving picture trade as the ideal plant for operating picture machine and house lights of a small theatre.

**ARMY AND NAVY**

Used over 1500 Universal 4 K W sets during the recent war.

**AT HOME**

Many large farms, homes, and churches use one or more Universal sets to supply their current.

It will interest you to read how this best known of plants is constructed in our big especially equipped factory.

*Send for Bulletin No. 30*

**UNIVERSAL MOTOR CO.**

**OSHKOSH, WISCONSIN**

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**CATALOGS, BULLETINS & BOOKS RECEIVED**

The following literature, dealing with subjects of interest to builders is now being distributed.

"Lifting Loads with Less Labor" is the principal article in the February number of "Door-Ways," published monthly by the Richards-Wilcox Manufacturing Co., Aurora, Ill. It describes and illustrates the application of Over-Way equipment manufactured by the concern.

Concrete for War Memorials is discussed in the February-March issue of Concrete in Architecture and Engineering issued bi-monthly by the Portland Cement Association, Chicago, Ill. The other articles are devoted to the uses of concrete in all kinds of buildings.

"Acme Angles" is a sixteen-page booklet published monthly by the Acme Motor Truck Company, Cadillac, Mich. The February issue contains letters from customers who have used the Acme truck in a wide variety of businesses. It also contains helpful hints to truck users.

"New Homes for Old" are illustrated in the December Medusa Review, a monthly paper devoted to the products manufactured by the Sandusky Cement Co., Cleveland, Ohio. Other pictures of buildings constructed of stucco or cement bricks are shown, as well as pictures of concrete garden furniture and building trim.

"Kohler of Kohler News," published by the Kohler Co., organization at Kohler, Wis., is a twenty-six-page booklet with cover dealing with the activities of the employees of this concern, which manufactures enameled plumbing ware products.

A History of Stucco started in the January number of Expanded Metal Construction, the monthly magazine published by the Northwestern Expanded Metal Co., Chicago, Ill. It will take up the use and origin of stucco in the past and now. The rest of the issue deals with the use of metal lath, which is one of the products of the company.

"Republic Trucks" is the title of a color booklet with cover issued by the Republic Motor Truck Co., Alma, Mich. It contains photographs of the Republic truck as it is used in a wide range of activities, as well as drawings of chassis with specifications.

"Garage Hardware for Rolling Doors" is the title of a sixteen-page booklet issued by the Stanley Works, New Britain, Conn. It contains several illustrations showing the various combinations of rolling doors used in garages with descriptive text.

How and Where to Use Oak Flooring is fully described in a booklet and folders issued by the Oak Flooring Manufacturers' Association, Chicago, Ill. They take up in detail the laying, handling, and finishing of oak flooring.

"Gilt-Edgings" is a small journal issued by the R. J. Schwab & Sons Co., Milwaukee, Wis. It is devoted to pipeless furnaces and accessories which the company manufactures.
ALLITH-PROUTY

Convertible Wagon Bed Hardware

Enables you to build, during your spare time, three wagon bodies in one and at less expense than the cost of one new body. It provides a grain bed that is a "3 in 1"—hit and leak-proof—a stock rack that slips on snug and solid—a hay rack bed that allows loading and unloading to be done faster and easier.

We Furnish Set Complete

in every detail—already to install. Even instructions and drawings which makes it easy for any carpenter or farmer to do the work—and do it at exceptionally low cost. Send for our illustrated literature that shows and describes this hardware and illustrates how easy any one can make this combination wagon bed.

Dealers everywhere find farmers keenly interested in this money and labor saving hardware, for the combination body type is needed on every farm. Get in touch with us for our proposition.

Write for our general catalogue No. 90 showing and describing our complete line of FIRE DOOR HARDWARE, Door Hangers and Tracks, Overhead Carriers, Garage Door Hardware, Spring Hinges, Hardware Specialties, Rolling Ladders, etc.

ALLITH-PROUTY CO.

DANVILLE ILLINOIS.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
Catalogs, Books and Bulletins Received [March, 1929]

"Niagara Rooms" is the title of a 24-page booklet in colors issued by the Niagara Wall Board Co., Buffalo, N. Y. It contains attractive photographs of interiors showing the uses of wall board as well as a section on farm buildings.

Tap wrenches are described and illustrated in a small folder recently issued by the Alert Tool Co., Philadelphia, Pa. The advantages of the high speed solid tap wrench which the firm manufactures, is set forth as well as the of a combination ratchet tap and extension high speed wrench to be used in reaching out-of-the-way places.

"Aberthaw Preliminary Report on Vibration" is a bulletin issued by the Aberthaw Construction, Boston, Mass, dealing with the preliminary work carried on by the Aberthaw investigation of the effects of vibration in structures. It contains a summary of the replies answering the original inquiry sent out by the committee.

"The Red Book" is a compact little book describing the products manufactured by the United States Gypsum Co., Chicago, Ill. The extensive line of plasters, cements, tiles and wall boards are illustrated and explained in encyclopedia form in 96 pages.

"Durable Garage Hardware" is the title of a 56-page cover booklet issued by the Frantz Manufacturing Co., Sterling, Ill. It contains seventeen color plates of garages of various types with floor plans as well as many other photographs of garage hardware which the firm manufactures.

Facts About Prepared Roofing and Asphalt Shingles are presented in a bulletin prepared by the Prepared Roofing and Shingle Manufacturers' Association, Chicago, Ill. Explanatory text, testimonials and actual photographs of roofing that has been exposed to fire tests form the basis of this booklet.

"Genuine Comfort in the Cold Weather" is the subject of the pamphlet recently issued by the Steam Corporation, Chicago, Ill. It deals with the Nokol Automatic Heater which uses oil as fuel.

Tool Chests for Builders and Mechanics as made by the Union Tool Chest Co., Rochester, N. Y., are described in several small folders issued by that company. Various types of tool chests are illustrated.

"Garages and Their Stanley Hardware" has been published in miniature form by the Stanley Works, New Britain, Conn. It is a 32-page booklet containing illustrations and floor plans of eight garages with information as to the exact amount of Stanley hardware needed to equip them.

The Warmest, Most Artistic and Most Economical of all House Finishes Wood shingles are two or three times warmer than the gummed paper substitutes, and they are cheaper, last longer and are incomparably more artistic and attractive. When stained with the soft, moss-green, bungalow-browns, tile-reds and silver-greys of Cabot's Creosote Stains they have a richness and beauty of tone that no other finish can equal and the creosote thoroughly preserves the wood. Use them also on siding, boards, sheds and fences. Anyone can apply them with best results at least expense.

Cabot's "Quilt" makes floors and partitions sound proof by breaking up the sound waves and absorbing them. It makes walls and roof cold and heat proof by a column of minute dead air spaces that prevents the conduction of heat. From 25 to 50 times as efficient as cheap building paper.

You can get Cabot goods all over the country. Write for samples and name of nearest agent.

SAMUEL CABOT, Inc.
Manufacturing Chemists
BOSTON, MASS.
1133 Broadway, New York
24 W. Kinzie St., Chicago
Cabot's Brick Stains, Stucco Stains, Conserve Wood Preservatives, Damp-proofing, etc.

The low cost of a Deming Hydro-Pneumatic System makes the expense practically negligible when figured in with the total cost of building. The contractor is not only able to plan and deliver a more modern and livable home, but by our special contractor's offer makes a neat additional profit. Write for full details.

The Deming Co., 99 Depot St., Salem, O.
Heating & Roofing, Chicago Harris Pump & Supply Co., Pittsburgh

Demin WATER SYSTEMS

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
This Trade Mark Identifies QUALITY

Quality that endures—quality that assures lasting satisfaction for a buyer and adds to the prestige of a builder. The enduring excellence of

NICE

Paints Varnishes Stains Fillers Colors

is daily proof of careful manufacturing from highest grade raw materials.

Prices, Samples and Literature on Request—write us

EUGENE E. NICE

268-274 South 2nd Street
PHILADELPHIA, PA.

THE HERCULES

A Concrete Block House is not complete as to durability and appearance, unless the trimming is made of concrete. Artificial stone also make ideal trimming for brick and stucco buildings. Stucco should be used on concrete blocks on account of color, low absorption and equal expansion.

All necessary blocks and trimming stone can be made on the HERCULES MACHINE with any mineral facing desired.

The HERCULES is distinctive, elastic, accurate and durable with both quality and production considered.

The equipment may be extended to meet increasing demands. Simply add new plates or forms to the original machine. Get away from the close competition by using a Hercules, and make high grade work to be used above the foundation.

May We Send You Our Catalogue?

You cannot afford to be without our CEMENT BAG CLEANER if you use any quantity of cement. May we send you a descriptive circular giving the savings that can be accomplished, and a partial list of users?

Century Cement Machine Co.
56 Brown's Race
ROCHESTER, N. Y.
MacLean Daily Reports

tell you what you want to know

The industrial information gathered by our reporters throughout Canada is delivered daily at your desk.

These daily reports put your salesmen on real prospects. No hazy rumors and wasted trips. This service will mean contracts for you that you would never hear of otherwise.

Hundreds of firms are using MacLean Daily Reports.

Write for our pamphlets

MacLean Daily Reports, Limited
345 Adelaide St. W. 119 Bd. of Trade Bldg. 607 Electric Ry. Chbres.
Toronto, Ont. Montreal, Que. Winnipeg, Man.

Unload Your Barn Ventilating Problems Onto Us

Let us assume the responsibility of ventilating the barn you build. Planning a ventilating system that will operate satisfactorily requires knowledge gained only through long study and experience. Put the problem up to us by asking your customer to let you put in a King System.

Good barn ventilation means more than the Aerators on the roof. King Systems consist of three units—King Aerators, Foul Air Flues and Fresh Air Intakes. King Aerators can, of course, be used without the other parts of the system, but with the complete system you can guarantee satisfactory ventilation of the entire building.

When we accept an order for a King System our responsibility does not cease until the building is properly ventilated.

Send us the plans of the next barn you build and let us make an estimate on a King System for it. Our book on Barn Ventilation should be in your hands for reference. Write us.

King Ventilating Co.
1302 Cedar St. Owatonna, Minn.
(On the Jefferson Highway)
Ventilating Engineering for Barns, Hog Houses and Creameries

KING

Unload Your Barn Ventilating Problems Onto Us

Let us assume the responsibility of ventilating the barn you build. Planning a ventilating system that will operate satisfactorily requires knowledge gained only through long study and experience. Put the problem up to us by asking your customer to let you put in a King System.

Good barn ventilation means more than the Aerators on the roof. King Systems consist of three units—King Aerators, Foul Air Flues and Fresh Air Intakes. King Aerators can, of course, be used without the other parts of the system, but with the complete system you can guarantee satisfactory ventilation of the entire building.

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King Ventilating Co.
1302 Cedar St. Owatonna, Minn.
(On the Jefferson Highway)
Ventilating Engineering for Barns, Hog Houses and Creameries

KING

System of Ventilation

"Makes Good Barns Better"
EVERY hour your truck stands idle is an hour of expense without returns. The transportation of very load too bulky or awkward in shape for your truck to take means increased production cost. Keep your truck moving, and do all your own hauling, by using a MIAMI TRAILER.

"Miamis" come in styles and sizes to carry anything, from 30 ft. timbers, to sand or men. Capacities from 500 lbs. to 12,000 lbs. They are sturdily built of best materials, and each is carefully inspected before leaving the factory. The Timken Roller Bearings, Shock Absorbing Drawbar, Artillery Wheels, Solid Rubber Tires and Oil Tempered Semi-Elliptic Springs make the Miami an asset that will give the best service under any conditions.

Write and tell us of your hauling problems and we will tell you how to cut your expenses.

THE MIAMI TRAILER COMPANY, Troy, Ohio

The Insley Mast Hoist Bucket Plant
For handling concrete on Small Concrete Jobs

If you have concrete work on which you use either one-half or one-sack mixers, this is equipment which you cannot afford to be without. Of low first cost and such construction as to permit of quick erection, it solves the problem of elevating and distributing concrete on the smaller job where the erection of a tower is not justified.

Write For Particulars.

INSLEY MANUFACTURING CO.
Engineers INDIANAPOLIS, INDIANA. Manufacturers
Haul Material Efficiently

DLE standing time for loading or unloading is practically abolished by Four-wheeled and Semi-Trailmobiles with special frames for dumping lumber.

The load can be put on while the driver and motor unit are away on another trip. The load can be deposited on the ground in a few seconds without scattering.

Trailmobiles of suitable models and sizes are provided for the building trades. Lighter four-wheeled Trailmobiles may be drawn by passenger cars. The lumber-dump Semi-Trailmobile illustrated is one of the eight Trailmobiles operated by the Church E. Gates Company, New York City.

The high-grade rugged construction of the Trailmobile; its exclusive dumping mechanism and efficient coupling and steering devices, give it many advantages.

Write for literature.
The Trailmobile Company
583 E. Fifth Street
Cincinnati, O.

"The Hen That Laid the Golden Eggs"

may be a myth—but the idea appeals, and the woods are full of people out hunting for just that kind of a chicken.

Following this line of thought, thousands of Jack-the-Garage-Builders have climbed the beanstalk of doorway convenience and feathered their nests with the down of comfort and economy that comes from that modern hen that lays the golden eggs of doorway perfection.

**Slidetite, Garage Door Hardware**

**SIMPLE TO INSTALL. EASY TO OPERATE.**

Doors cannot sag. Close weather-tight. Do not need locks nor holders to keep them from blowing shut. Make an attractive and convenient doorway!

If you have "Slidetite" on your garage you know that it is the last word in Garage Door Hardware. If you do not have "Slidetite" you owe it to yourself to find out about it.

You undoubtedly pass garages every day "Slidetite" equipped—ask one of the owners. They are always glad to demonstrate "Slidetite."

Write for descriptive folder QF-1.

Richards-WilcoxC Mfg. Co.


**WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER**
Here's What a Milwaukee Contractor Says About

**AMERICAN**

Metal Shingles

—And he is in a position to know:

I was previously uninformed about the use of this class of roofing and therefore rather skeptical about putting them on my buildings, but since these shingles were erected they have undergone tests of severe rain and hail storms and have withstood same with no indication of any leaks. Therefore, I heartily recommend the use of these shingles to anyone desiring a roof of artistic appearance and lasting qualities.

Yours very truly,

JOHN HUPFER, Contractor and Builder

“Titelock American” shingles are especially appropriate for residence buildings. They reduce insurance cost approximately 10%. They are artistic in appearance and will outlast practically any other shingle made. We make other patterns of “Titelock” Metal Shingles and Tile. Ask for Safety Roof circular. Estimates furnished on application.

MILWAUKEE CORRUGATING CO.

Milwaukee, Wis.

Branch at Kansas City, Mo.

Minneapolis Sales Office, Minneapolis, Minn.

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THE Circulation of the American Builder is 50,000 copies monthly, a circulation which represents in one grouping more than twice the number of intelligent, discriminating, wide-awake builders, dealers in building materials, architects and contractors enjoyed by any two other publications in the building field.
It Pays to Make Good Blocks

Architects and contractors will pay more for blocks made by the Miles Wet Process because they are finely faced and have density and strength. Our No. 5 machine makes 53 different sizes and a wide range of designs. Write for Prices and Catalog.

THE MILES MANUFACTURING CO.
JACKSON, MICHIGAN, U. S. A.

It'll Keep Six Men on the Jump

Work and lots of it! The Sheldon Concrete Mixer is built to stand up under the toughest kind of service and keep it up the year around. It gives a perfect mix in one to two minutes. It is easy to charge and discharge and will work in very close quarters when necessary. It is so easily moved from place to place that it is often set to dump directly into the forms and move along with the work, saving the labor of wheeling long distances.

Sheldon Concrete Mixers

No. 8X. A contractor's machine from the ground up; one of the most popular of our eleven models among contractors. Equipped with Stover 2 H. P. engine. Very easy to move from place to place. Dumps into wheelbarrow or directly into forms (all Sheldon models dump the same way). Costs complete less than some hand mixers.

GET THE CATALOG

For complete information on all models—hand and power, on legs, skids, or trucks, fill in the catalog coupon and send it to us today.

Sheldon Mfg. Co., Box 3003, Nehawka, Neb.
An Urgent Necessity to the Builder

From Iowa comes this letter:

"Please send us, special delivery, 1 box of No. 14 ANKYRA Ankor Bolts. We have used up the last box in stock and our experience during the past two years proved quite conclusively to us that we cannot get along without them.

"Hanging fixtures on any wall is just pastime when you have ANKYRAS."

ANKYRA advantages to the builder are:

1. Time and labor saving.
2. Ease of application.
3. Hold in any wall.
4. No nailing blocks necessary.
5. Permanent fastenings.

Prove these advantages to yourself. Tear out this advertisement, pin a Dollar bill to it and mail it. You will get a collapsing tool and 25 No. 8 ANKYRAS by return mail.

ANKYRA MANUFACTURING COMPANY
151 Berkeley Street Wayne Junction
PHILADELPHIA

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER
When considering a crib or granary, the grain elevator is the most important feature of construction. Be sure that it is right, that it will give you the greatest capacity and the most satisfactory service at the least expense.

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