Price, Ten Cents.

Practical Hints to Builders

THE
National Sheet Metal Roofing Co.
510 TO 520 East 20th St. New York

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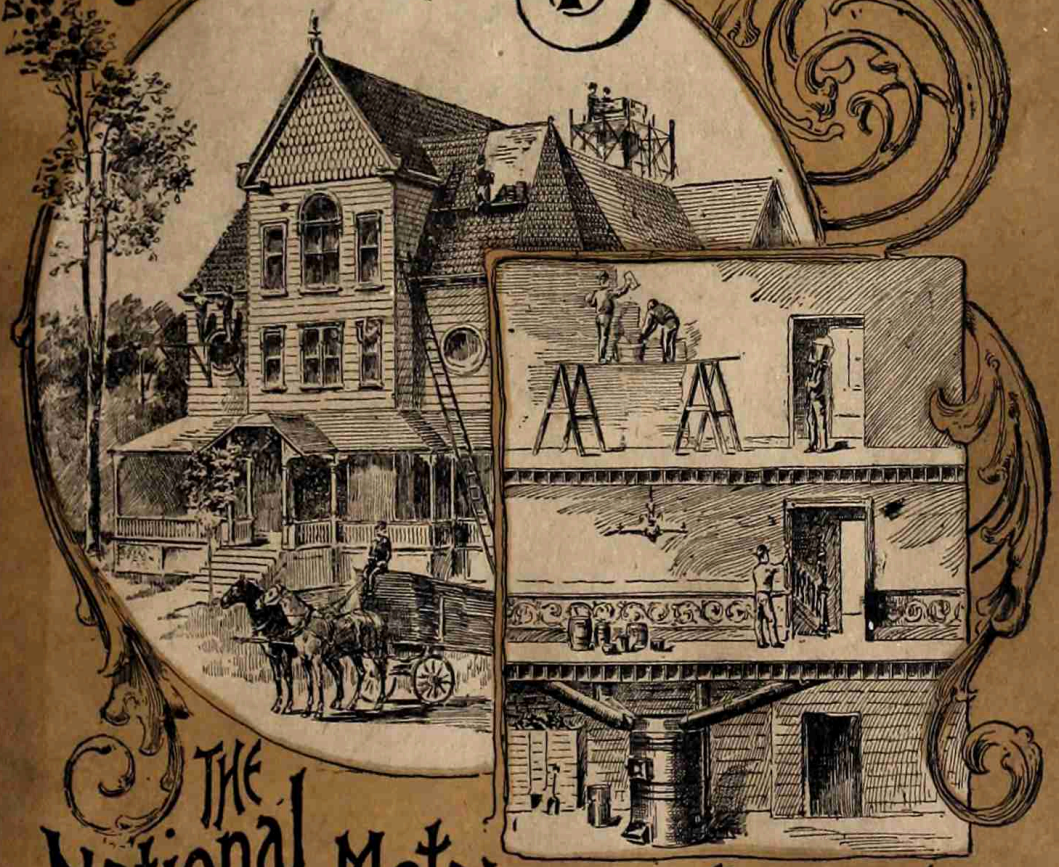
Practical Hints to Builders



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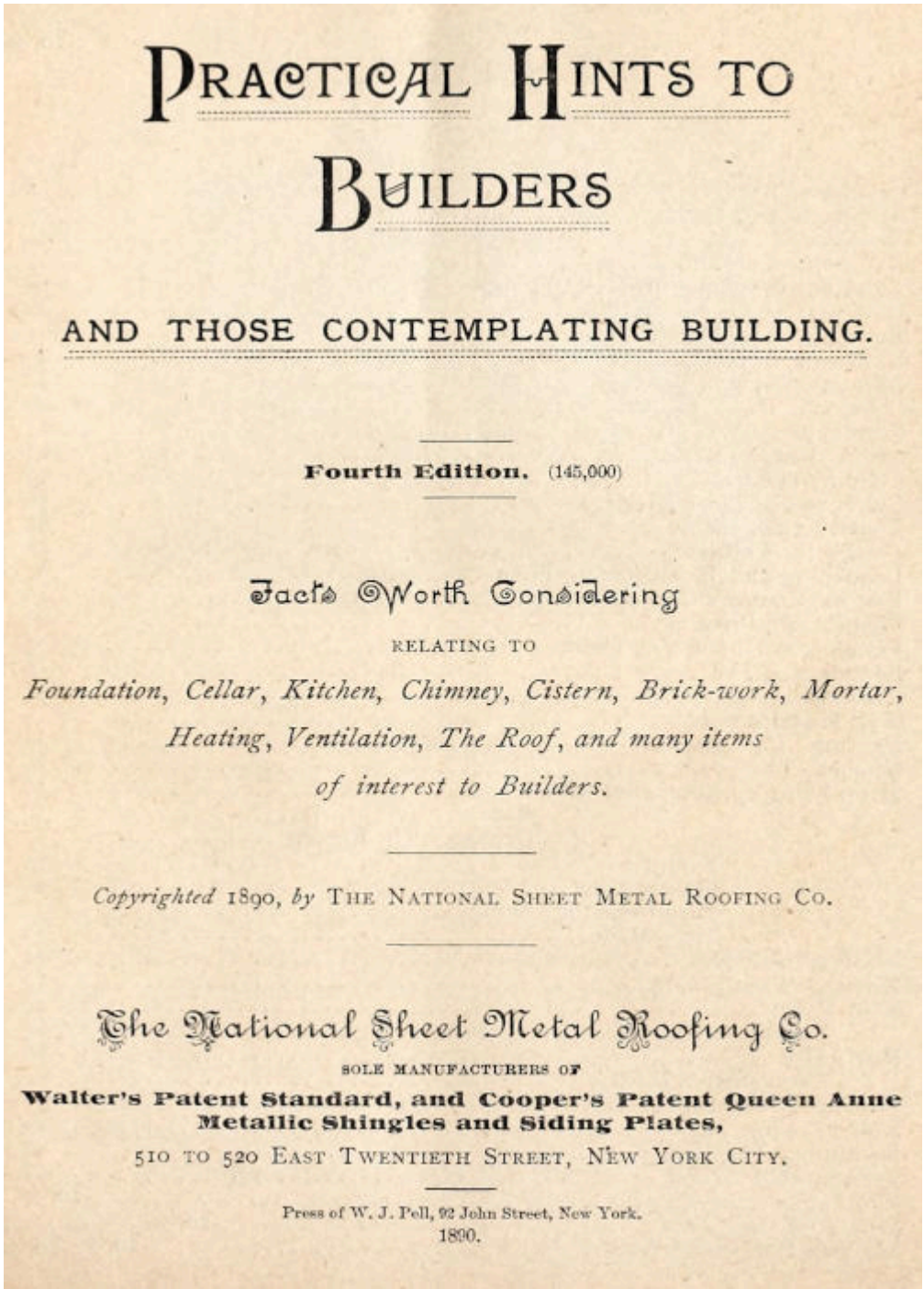

PRACTICAL HINTS TO BUILDERS

AND THOSE CONTEMPLATING BUILDING.

Fourth Edition. (145,000)

Facts Worth Considering

RELATING TO

Foundation, Cellar, Kitchen, Chimney, Cistern, Brick-work, Mortar, Heating, Ventilation, The Roof, and many items of interest to Builders.

The National Sheet Metal Roofing Co.

SOLE MANUFACTURERS OF

Walter's Patent Standard, and Cooper's Patent Queen Anne Metallic Shingles and Siding Plates,

510 TO 520 EAST TWENTIETH STREET, NEW YORK CITY.

Press of W. J. Pell, 92 John Street, New York.
1890.

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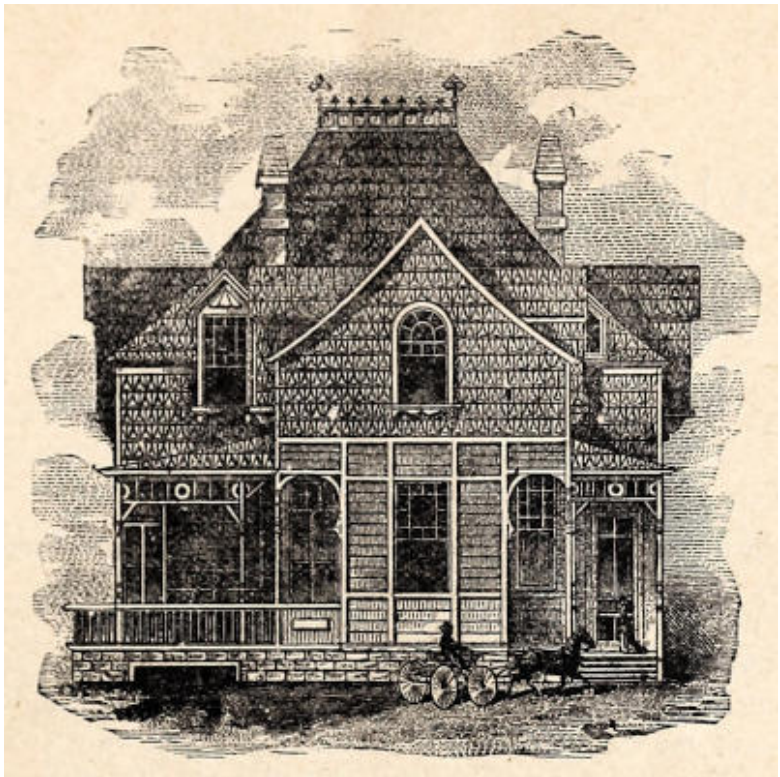


Preface.

The object of this little book is to give to builders a few practical hints that can be used in their endeavors to erect a home that is proposed to be durable, comfortable and healthy. They are susceptible of being improved to an extent that will meet the wishes of the most extravagant builder, or simplified to suit purse and requirements of a builder with moderate means.

We have left out generalities, and offer the reader solid facts that are valuable to every one engaged in the ever pleasant task of constructing a home.

THE NATIONAL SHEET METAL ROOFING CO.,
510 TO 520 EAST TWENTIETH ST.,
New York City.

Practical Hints to Builders.

THE ARCHITECT.

Shall we employ one? Yes, if the work is sufficiently important to justify it, and it is a very modest house indeed that is not.

As the professional architect is generally a graduate of one of the building trades, and has gravitated to that position because of his peculiar fitness for it, it stands to reason, some will think, that from among the many builders one can be selected who is capable of taking the contract and presiding as architect. To such persons we would say: You are not familiar with the functions of an architect, when considered separate from the builder. The architect can save you money. He discovers your wants, your likes, and your dislikes; he reduces them to a tangible form; he draws up the specifications so minutely that every variety of material and labor is distinctly set forth as to its quality and kind.

When completed, plans and specifications are presented to a builder for an estimate; he knows exactly what is expected of him. There is no chance for controversy or quibble; all has been settled by the owner through his architect. In consequence, if several contractors estimate upon the building, it is known that their figures are all upon the same basis.

We will say in general he can save you from five to twenty per cent. in cost; will give you better construction and proportions, and add a value to your house, apart from its first cost, that if it does not sell for more, it will sell more readily than if built without his service.

SELECTING A BUILDING SITE.

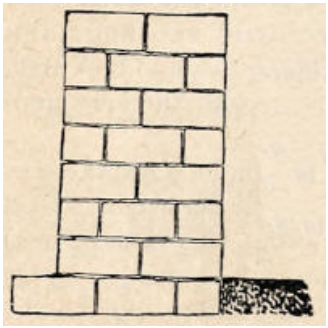
There are but few persons who are in a position to locate their proposed home just where they would most desire it. But, fortunately, most any building site is capable of being made to look well, it the style of architecture selected harmonizes with the surroundings.

It is of the first importance that the location be a healthy one. Better rent all your life than ignore that. Avoid the neighborhood of swamps and stagnant water, or where the cellar, (if you have one) to your house, from the nature of the location, will be damp. Large bodies of water, or running water is never unhealthy; but on the contrary, it is in many ways conducive to health. Some very uninviting, rugged and neglected spots, can, with but little expense and an appropriate building, be made exceedingly beautiful.

One of the prettiest school-houses I ever saw was built on a lot given by a farmer for a district school. It did look as if the piece of ground was worthless for any purpose; it was rocky, overgrown with briers and bushes, and a tiny stream ran across the lot, jumping from rock to rock, alongside of which, on a level spot but little larger than room for a building, a house with steep roof and turret was built, and the adjacent hillside made a splendid study and playground for the scholars. When completed the building and grounds was a model of what a country school-house should be.

While an elevation is at all times desirable, a hill is not. The exposure to the storms in winter, and the tiresome walk in summer, is to be avoided. A few native trees, if on the ground to furnish shade, are desirable. The water supply, too, is to be considered. Most architects say a Southern exposure is the best, but this depends on your location. For Southern homes the East is preferable.

FOUNDATION.



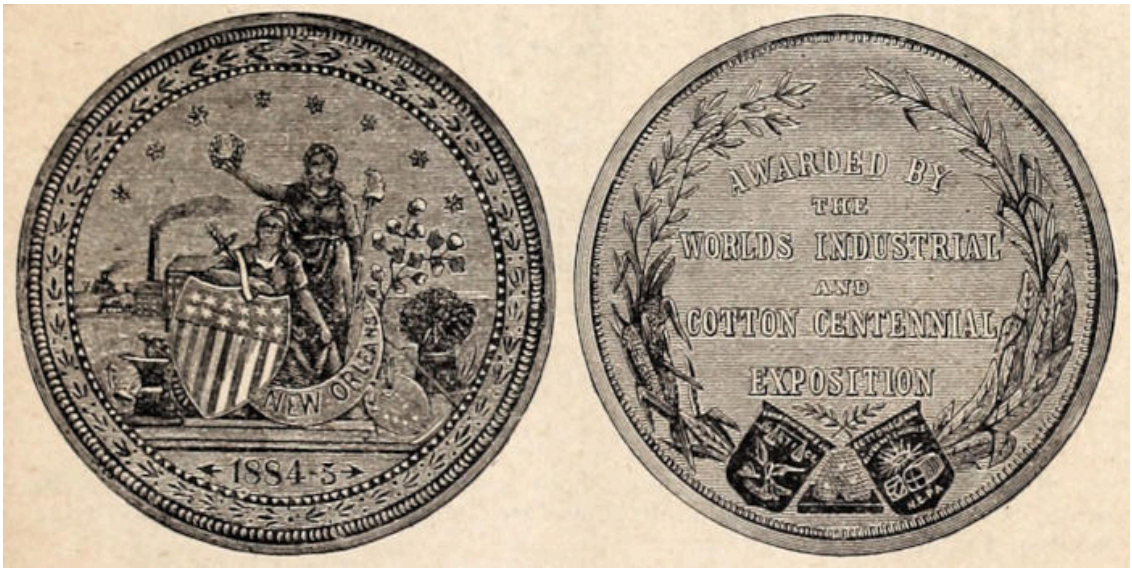
Just how deep to excavate to start the foundation of a house depends on the climate and soil. Always dig trenches below the frost line in any soil. This is sufficient if the subsoil is solid; if the subsoil is not solid, go deep enough to reach solid earth.

In saying this, we are supposing you are not building in a swamp, where it is often necessary to drive piles upon which to start a solid foundation. Stone is generally used for foundation walls where it is convenient, and it makes the best. Hard pressed brick, laid with mortar composed of one part of hydraulic lime and two parts sharp sand, makes a foundation not inferior to stone for all practical purposes. By using the above mortar, dampness will not ascend from the ground to injure the floor joists.

Mortar made from common lime or sand, though commonly used, is objectionable for foundations, because dampness will ascend even above the floor joists, if the floor is not several feet above the ground. It is often the case that hydraulic lime cannot be conveniently had. In that case a layer of slate or coarse paper, well saturated with pitch, laid between the brick seams below the line of joists, will answer the same purpose, and is less expensive.

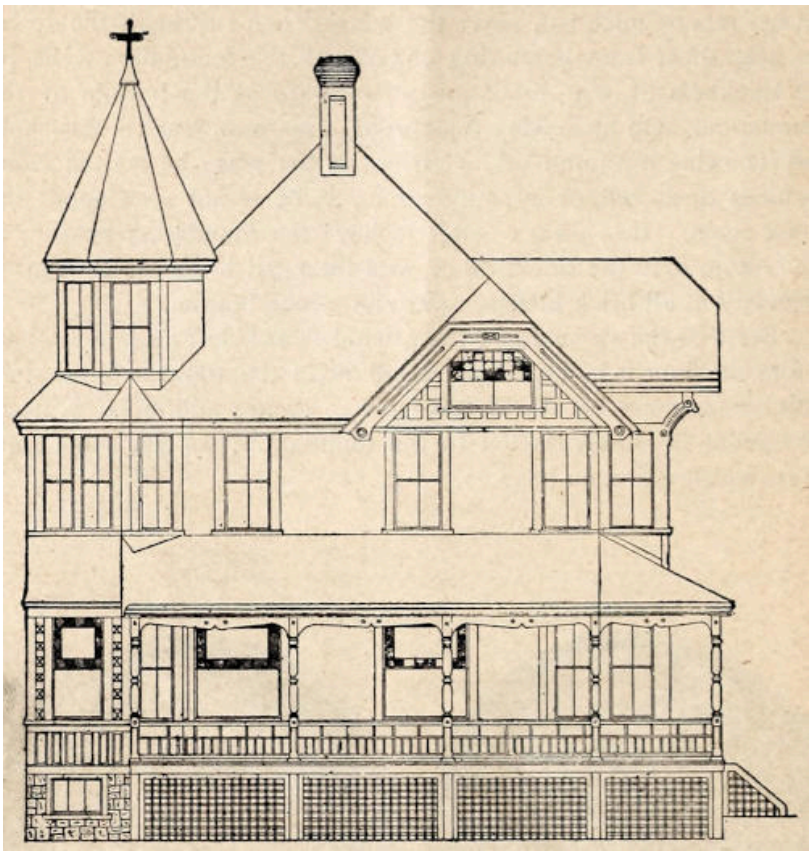
See that the space between the joists is filled with brick, flush with the underside of floor boards. This prevents Mr. Rat, or other members of his interesting family, from sitting in these little corners and gnawing into the room above, or climbing between the siding to the upper floors. If this little matter is attended to right, neither rats or mice can enter the house, except through the doors. To keep them from burrowing underneath the foundation walls, let the thickness of one brick project outward at the bottom of the foundation. On burrowing downward, a rat soon reaches this shelf, and following it around till he arrives at the place he started from, becomes disgusted, or is supposed to, as he is not seen about the house again. It is always better to have the foundation broader at the bottom than the thickness of wall intended to be used. This is necessary in all brick houses, unless on a rock bottom.

See that the space under the ground floor is left clear of rubbish before the floor is laid, and grating built in the wall for ventilation. This opening can be closed in winter to secure additional warmth. The cellar is closely related to the foundation; we give some hints on its construction on page 22.



Fac-simile of Gold Medal awarded to WALTER'S PATENT METALLIC SHINGLES. These shingles have received twenty-eight other awards for merit in the United States.

The plans and elevations of cottages presented in this book have each been specially prepared for some individual by an eminent architect, and the proportions and details can be relied upon.

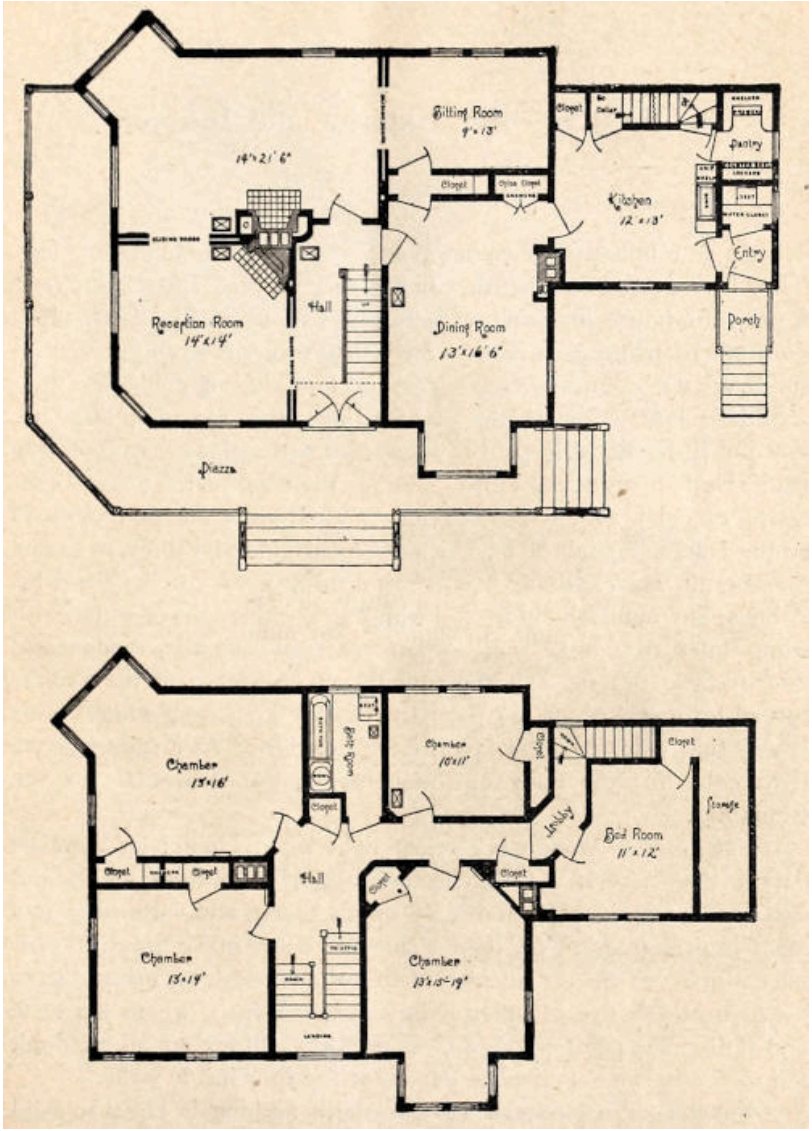


Design I.—*Front Elevation.*

TEN-ROOM, TWO-STORY HOUSE.

Estimated Cost, with Bath and Furnace, $5,000 to $6,000.

Roof to be covered with 10 × 14 Galvanized Tin Shingles; porches with same; tower with 7 × 10, same quality; use attic vents on main roof, and No. 1 Six-foot Finial on apex of tower.



First Floor.

Second Floor.

Design I.—(*Elevation, page 8.*)

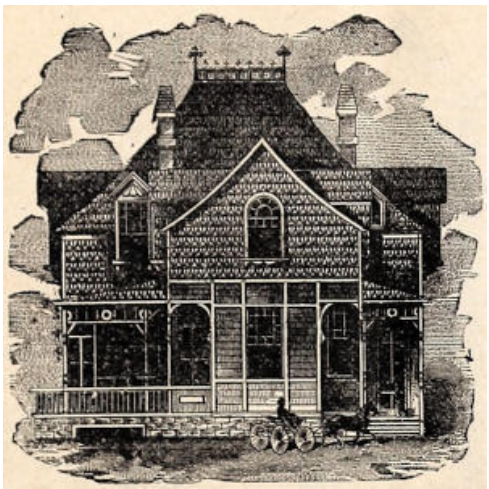
COLORS.—For Exterior and Interior.

As your house nears completion, it is well to decide upon colors. That is a distinctive feature which is to give tone and beauty, and make your house in some respects different from all others. The question of painting is often a mere matter of preserving the structure, and not a question of beauty or harmony of colors, or what would be best suited to the surroundings; it is too often the case that but little regard is paid to those nice perceptions that make one man's work many times more valuable than another. Strong contrasts of color should be avoided. Light tints are preferable to strong colors. Think of a house painted black, red, yellow, or green.

Let the surroundings suggest what the exterior colors should be. A house surrounded by trees and shrubbery will admit of white, with white tinted trimmings, such as cornices, corner-boards, window and door frames; but for half the year the green foliage of the trees is turned to brown, which but partially relieves the glaring white. This is why that color is not a favorite for exteriors. As a rule, select a light color for the body of the house, and darken that for the trimmings.

For interior wood-work select light wood colors; let none be darker than walnut. Oak, chestnut, ash, white walnut, maple and cherry make a beautiful finish by simply oiling, and varnishing if a gloss is preferred. Very light shades of ochre make beautiful ceilings which can be ornamented with suitable designs, using darker but delicate shades of other light colors. Here is where the taste and skill of the painter comes in, and unless you are an adept, don't fail to consult an experienced decorator for your inside walls.

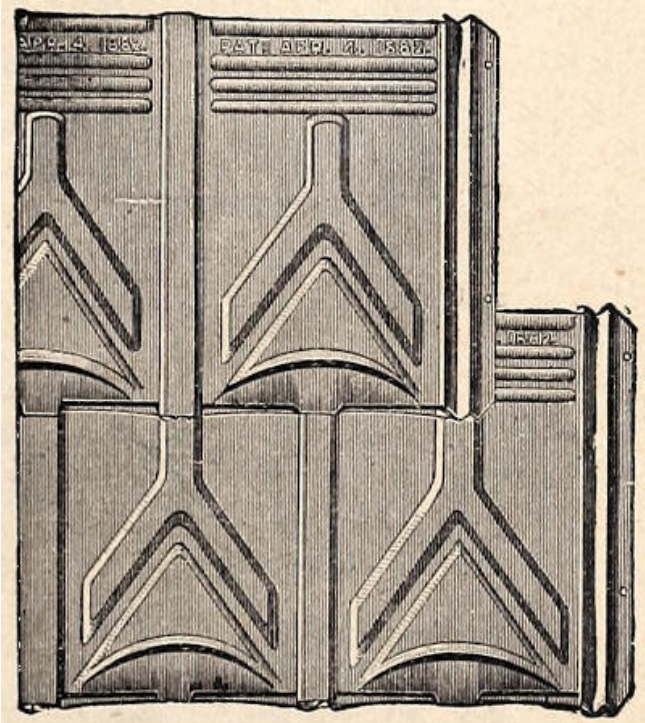
For houses of moderate cost we think nothing is equal to solid colors for inside walls. Let the colors be light and cheerful, and the rooms of different shades. (See page 48).



If you are interested in *Roofing*, send for our Price List and Discount Sheet, which is special to the trade. We are pioneers in the introduction of practical metal shingles, and no imitator has yet produced their equal. Our goods are largely used throughout the United States and Canadas; are used by the Government and Railroads; approved by the Fire Insurance Companies, and many leading Architects and Builders. They are lighter than slate, and will last longer without repairs; and the low rate of insurance on our roofing will, in a short time, more than balance the difference in price where wood shingles are cheaper.

As seen by the cut, our shingles are the same to-day as when first introduced. Remember, no cleats or springs are necessary in using our shingles. The lock is simple and perfect, with corrugations across the top, and bracing corrugations across the exposed end of the shingles, which stiffen and hold the shingles firmly to the underlying courses. They are easily applied, and any one who can lay a wood shingle can lay these. We furnish them in four sizes, made from charcoal roofing tin, painted both sides and unpainted, galvanized tin plate, which is superior to galvanized iron, cold rolled copper, and steel plates. We keep on hand a full line of roofing sundries.

Our Shingles received the highest and only award for metal shingles at the American Institute, held in this city, October, 1886, and New Orleans Exposition, 1885.



Fac-simile of beginning of first two courses.

WHOLESALE AGENTS.

RICHARD KNISELY & SON, 184 South Jefferson St., Chicago, Ills.

W. W. MONTAGUE & CO., San Francisco, Cal., Pacific Coast.

J. J. WALTERS, Denver, Col.

PHILLIPS & BUTTORFF MFG. Co., Nashville, Tenn.

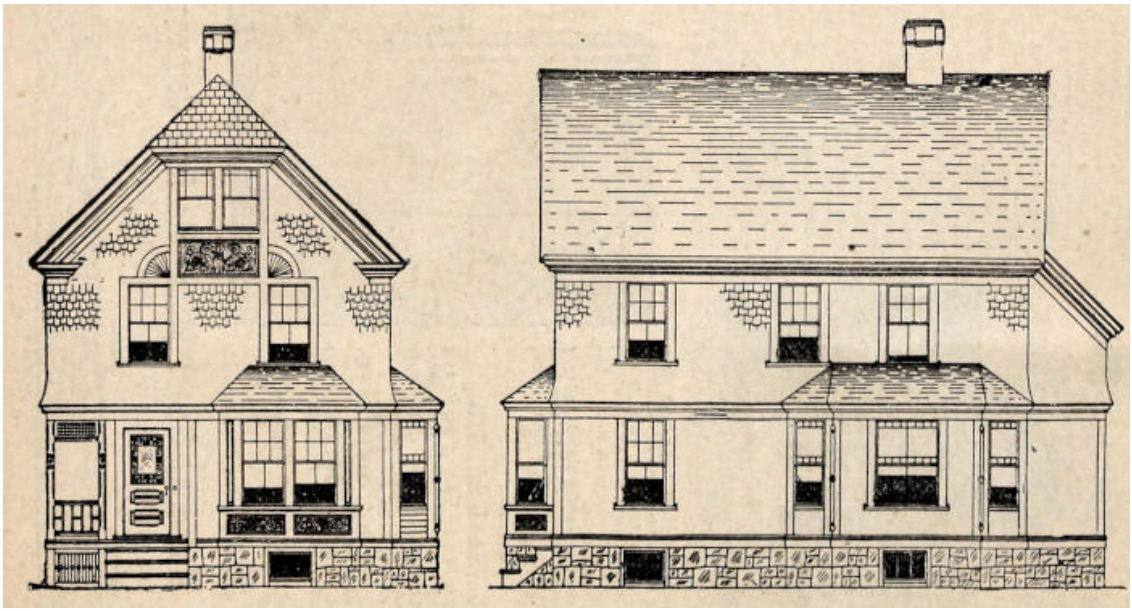
CANADA GALVANIZING AND STEEL ROOFING CO., Montreal, Canada.

MACHWIRTH BROS., Buffalo, N.Y.

JEROME TWICHELL & CO., Kansas City, Mo.

F. H. LAWSON & CO., Cincinnati, Ohio.

The National Sheet Metal Roofing Company,
510, 512, 514, 516, 518, 520 East 20th St., New York, U. S. A.



Design C.—Front and Side Elevation.

SEVEN-ROOM, TWO-STORY HOUSE.

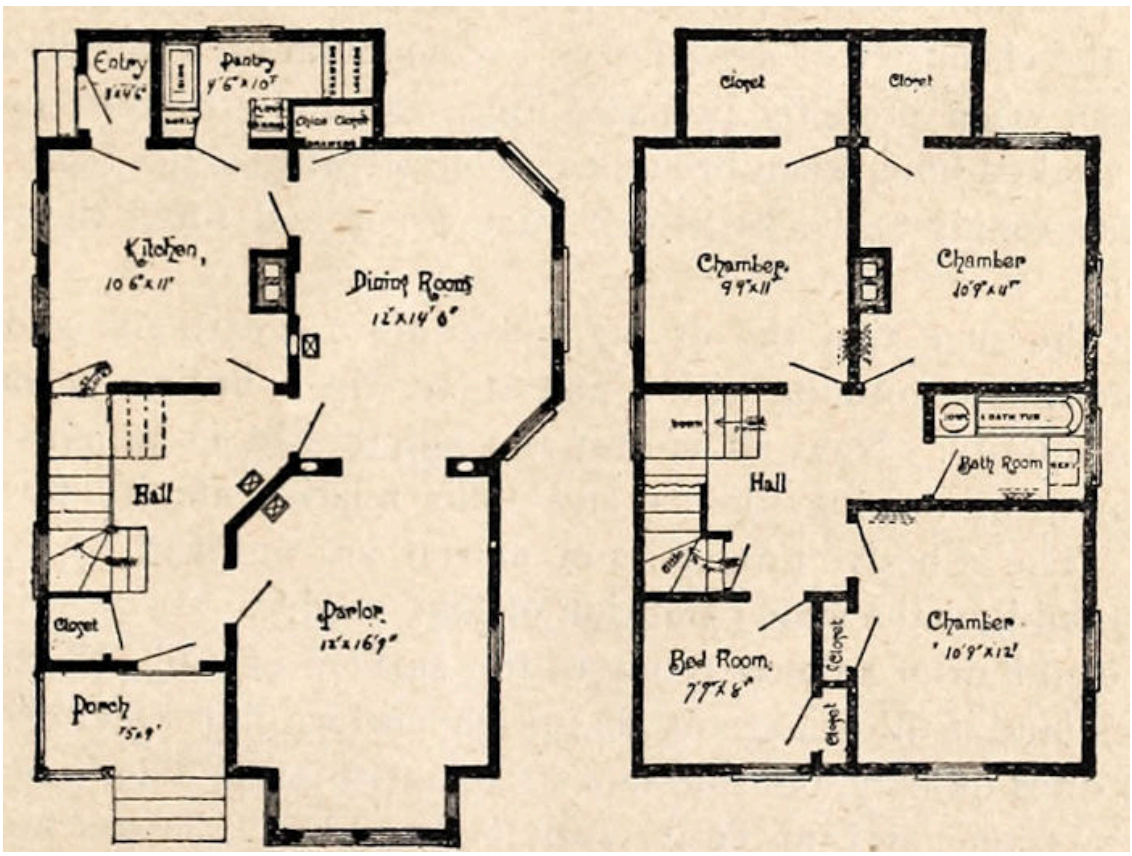
Estimated Cost, with Bath and Furnace, $1,800 to $2,000.

ROOF VALLEYS OR GUTTERS.

It is generally known to builders and roofers that the greatest amount of wear upon all kinds of roofs is in the valleys or gutters. Therefore, that part of the roof, whether covered with slate, tin or wood shingles, should be of the best material, and free from the annoying possibility of cracking.

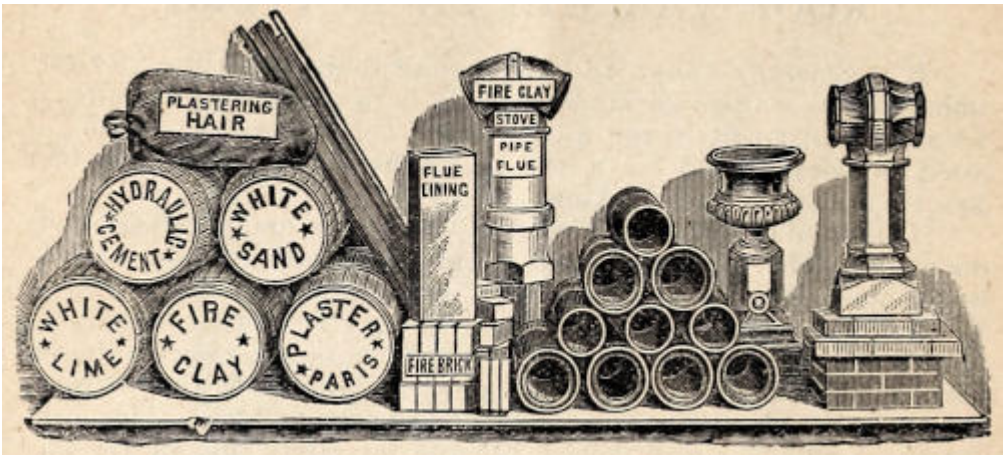
This trouble is always caused by expansion and contraction of the metal. The usual method is to make the valley of the desired length, and, after shaping to the roof-boards, to nail each side firmly. The result is, with the summer heat, a buckle is often formed at some point between the two ends. In cold weather the buckle draws out, and in course of time, if the joints in the middle do not give way, a leak will appear, caused by the metal cracking. This will not occur with our roof valleys, because we amply provide for the expansion and contraction of the same. We particularly call the attention of dealers in building material to our Queen Anne Valley. It is salable, durable and cheap, always ready to apply; can be used by any workman capable of laying slate, tin or wood shingles. (See page 23).

THE NATIONAL SHEET METAL ROOFING CO.



First Floor. *Second Floor.*

Design C.—(*Elevations, page 12.*)



WHAT IS GOOD MORTAR?

To a casual observer mortar is mud, but to a builder who understands the chemistry of mortar it is a compound of water, lime and sand, and when properly prepared forms an indestructible cement. Fresh slacked lime, when brought in contact with clean, sharp sand, adheres strongly to the surface of each grain, and forms the silicate of lime.

At the same time the drying mortar absorbs carbonic acid from the atmosphere, forming with it lime-stone, which in time becomes a rock in solidity. Now, all mortar is good or bad in proportion to the purity of the ingredients and their relative affinity for each other. The adhesive properties of mortar are nullified by loam or clay in sand, or the stale condition of lime used.

Loam mortar adheres freely to the surface of walls or ceilings. So does mud if thrown against an upright surface; but water dissolves it. It dries quickly, but does not harden with age. The foundation of many frame, and the entire walls of many brick houses are built with poor mortar, when the materials for good could be had at the same price.

Water, lime, sand and hair are the ingredients for plasterers' mortar in about the following proportions: One bushel unslacked lime and four bushels sharp sand; (to this add twenty-four pounds of dry hair for every one hundred yards,

when used for "scratch" or first coat,) and water sufficient to make it of proper consistency. After being properly mixed, the mortar should stand from three to ten days before using. However, the time it should stand depends upon the susceptibility of the lime to slack. Some lime requires a month, while good lime slacks immediately. Age improves mortar, provided it is kept wet, and makes it work easier under the workman's trowel. As it is the keys formed by pressing the mortar against the lathing on the ceiling that holds it to its place, there should be a relative width of lath and key space to insure strength sufficient to prevent its falling. Ignorance of this, and poor mortar, is the cause of falling ceilings. Lath one inch wide, 7/16 inches thick, placed 7/16 inches apart will insure good strong work.

The second coat needs but a very small quantity of hair. Fifty bushels sand, and twelve and one-half bushels unslacked lime, will make mortar enough to cover one hundred square yards. If mortar freezes before it is dry it loses its cementing properties and becomes in common phase rotten, but if the sand used is clean, and it remains frozen without thawing until it is dry, it is not injured. The best way to treat a house in which the plastering is not dry, and cannot be kept from freezing before it dries, is to throw the house open, and let it freeze for eight or ten days, or until the plastering freezes dry.

Cisterns should be plastered inside with mortar made of equal parts of hydraulic lime and clean sand. For brick work above foundations use one part unslacked lime to four parts sand.

"THE INDEPENDENT," 251 Broadway, New York, October 28th, 1889.

Gentlemen:—The shingles from your respected concern used on my new house look splendidly, and give entire satisfaction. They are far better than any metal shingles I have previously used on other buildings, which I have had torn off and thrown away as worthless. At times we were flooded by the water under their (want of) protection, and we could not stop the

leaks. Noah in the ark I am sure was, fortunately, not troubled with leaks such as we endured for years; if he had been all would have been drowned. Now, under your protection, we are all right and still alive.

Faithfully,

HENRY C. BOWEN,
CHANDLER.

TO ARCHITECTS AND BUILDERS.

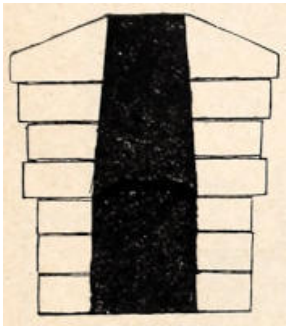
There is no detail of house building more important than the roof. Upon it depends to a great degree the durability and preservation of the whole structure. The number of good houses with mottled ceilings and cracked plastering, to be seen all over the country, are reminders of the necessity of securing the best material and faultless construction for this important part of your dwelling.

The advantages we claim for our Tin Shingle, over the ordinary mode of applying sheet metal for roofing purposes, consists in its **Superior Strength, Freedom from Wrinkles and Cracking**, (which cannot at all times be prevented where sheet metal is put on in continuous sheets); and in being the **Most Ornamental and Durable** of all sheet metal roof coverings. Now, in answer to this last assertion you may say, How can this be? Is not the same quality of tin as durable when applied in one form as another? We answer, By no means. The writer—and we presume the reader—has seen tin roofs worked, and walked over in the necessary finishing up, to such an extent as to seriously damage the roof. The Tin Roofers' mallets, seamers, tongs, and sliding over the roof, do more real damage to the surface of tin plate than several years' wear. We entirely overcome this difficulty, as no part of the exposed surface of our Tin Shingles are struck with a mallet or hammer in applying them. Again, where metal plates are put together in continuous sheets, moisture, which condenses underneath for want of ventilation, settles in the cross-seams and causes decay, and the ordinary metal roof when removed invariably shows this to be the case, while the other part of the plate shows no perceptible wear. Our form of metal roofing has no cross-seams, and has sufficient ventilation to prevent the condensation of moisture underneath, making it by many years the most durable form of metal roofing ever offered to the American people.

Our object is to furnish the building public with a better form of roofing material, attractive in appearance, without the objections of the heavy slate, the clumsy shingle, or the plain ribbed metal roof; and at a price that claims the attention of Architects and Builders of the whole country.

THE NATIONAL SHEET METAL ROOFING CO.,
510 TO 520 EAST TWENTIETH ST.,
New York City.

CHIMNEYS.

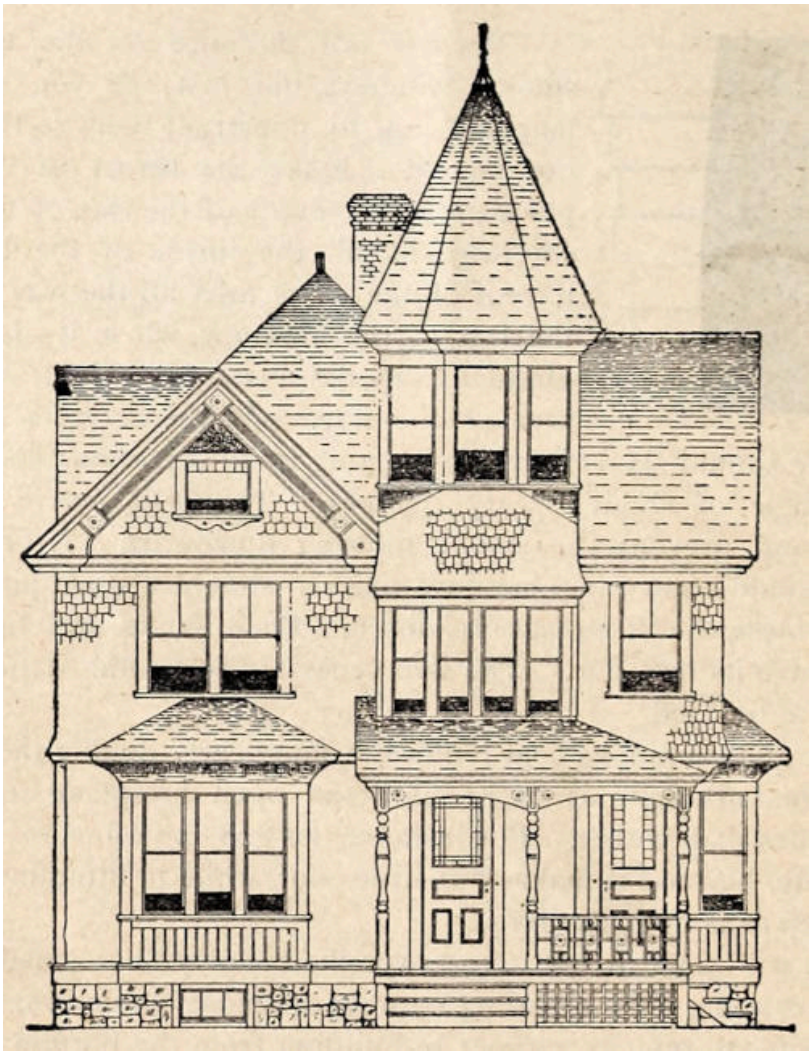


We will not moralize on the evils of smoky chimneys, but just tell you in plain language how to construct them so they will not smoke. Make the throat of the fire-place not more than half the size of the flue; carefully smooth the inside of the flue, and have it of the same area all the way to near the top of the chimney, when it should be gradually tapered inward to about half the area of the flue. At the extreme top, the cap stone should slant from the opening in all directions downward at an angle of about twenty degrees. This will insure a good draught and prevent the smoke blowing downward. No two fire-places should enter the same flue; neither should a stove-pipe enter a flue unless the fire-place is closed. Each stove and fire-place should have its own flue. The size necessary for a flue depends on the fuel to be used.

Soft or Bituminous coal requires a flue nearly double the size of one where Anthracite is to be used; an open fire-place for wood, larger flues than either. For instance, an 8 × 8 inch flue answers for Anthracite, because it makes but little soot, while if Bituminous coal is used, 8 × 12 is none too large.

You will find in houses all over the country flues smaller than the above, and a corresponding number of smoky chimneys, which it is impossible to remedy without re-building from the bottom up.

The carelessness displayed in chimney construction is astonishing. As the work is hid from view on completion, be watchful during the process of construction from the ground up. All chimneys should, if possible, extend above the apex or comb of roof, and should be built of good hard burnt brick, and no woodwork should be allowed to enter within five inches of inside of flue, and not within twelve inches anywhere near the fire-place.

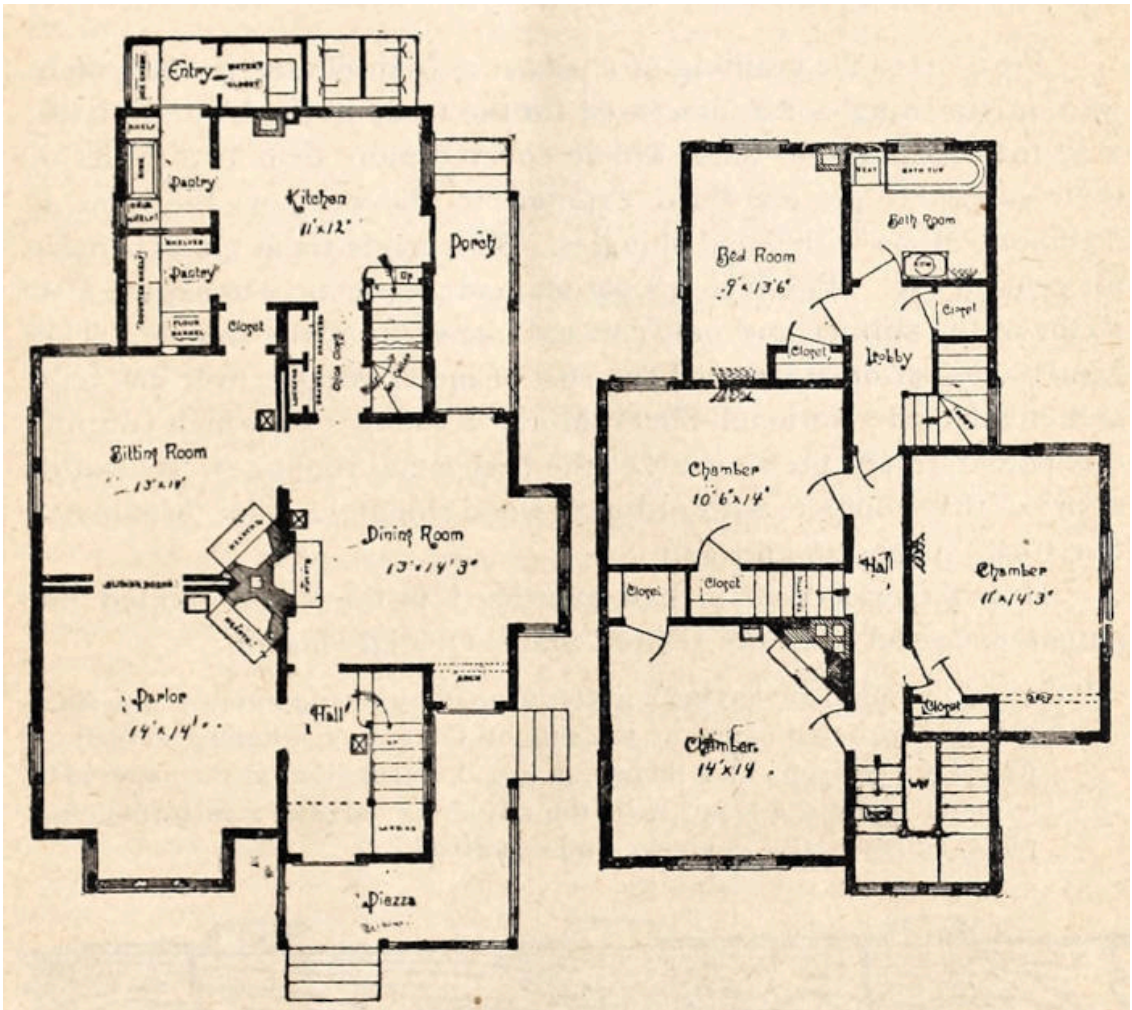


Design H.—*Front Elevation.*

EIGHT-ROOM, TWO-STORY HOUSE.

Estimated Cost, with Bath and Furnace, $3,500 to $4,000.

Roof covered with 10 × 14 No. 1 Standard Tin Shingles; gables with Queen Anne; second story, sides, with 7 × 10 Standard Tin Shingles; and porches with Broad Rib Tin Roofing; use No. 2 Five-foot Finial on tower.



First Floor. *Second Floor.*

Design H.—(*Elevation, page 18.*)

A retired plumber thus gives a point for the gratuitous relief of householders: “Just before retiring at night pour into the clogged pipe enough liquid soda lye to fill the ‘trap’ or bent part of the pipe. Be sure that no water runs in it until the next morning. During the night the lye will convert all the offal into soft soap, and the first current of water in the morning will wash it away and clear the pipe clean as new.”

THE WALTER'S PATENT, AND WHAT IT IS.

Previous to the granting of a patent to John Walter, in 1882, there were no tin shingles manufactured for the trade in the United States, with the exception of those which covered more than two-thirds of their surface to get one-third exposed to the weather; the same is commonly done with wood shingles. This made them too expensive for general use. The Walter's patent made it practical to expose five-sixths of the surface and only conceal one-sixth of the shingle. This great saving at once reduced the cost of metal shingles over one-half, and enabled the National Sheet Metal Roofing Co., which controls this patent, to put on the market the best metal roofing in the world, at prices that compete with ordinary wood shingles. (See "Comparative Cost," pages 26 and 27.)

How this was done is best expressed in the claim granted the patentee, copied from the United States Official Gazette:

> "A metal roofing plate having a gutter formed by corrugations at one side, and a perforated flange at the side of the gutter, whereby it shall be nailed to the roof of a house; a broad corrugation at the other side adapted to form a seam with the adjoining edge of a corresponding plate, substantially as shown and described."

The advantage of this lock is that it makes a water-tight seam without soldering or hammering down. The plates are joined as easy as crossing two sticks, with ample provision for expansion and contraction. This lock is the perfection of simplicity; there is no exposed seam where water is liable to

lodge and cause rust; no cleats are used, and no tin springs are necessary to hold the side edges of connecting plates to prevent water seeping through.

PAINTING SHEET-METAL ROOFS.

The subject of painting sheet-metal roofs is one of great importance, says the *Builder, Decorator and Wood-Worker*, not only on account of the protection afforded, but because the material, when properly colored, can be made pleasant to the eye when placed in exposed positions. While many kinds of paint have been discovered and patented, composed of a great variety of materials, it is a question if there is a substance used that is an effective substitute for linseed oil, regarding the effectiveness of which an authority on the subject says: "By consulting experienced and unbiased painters you will learn the fact that there is no vehicle pigments at all approaching linseed oil in effectiveness and durability, especially for exposure to the weather. A good paint must be both hard and elastic. It requires hardness to prevent abrasion and wear, and elasticity to prevent cracking from expansion and contraction. Nothing but linseed oil will give these qualities, for, strange as it may seem to many in these days of novelties, the pigments really add but very little to the effectiveness of paints. Mark, we say the best of pigments, for many pigments are the reverse of protective, and are really destructive to both the vehicles and the material which they are supposed to protect. For example, coal tar and all its products, whether called dead oil, asphalt, rubber, etc., are of the class just described, and their use at any price, especially for covering sheet-metals, is a wanton waste of money. Extended experiments have demonstrated that there is no better pigment for metal than a good iron ore ground to an impalpable powder. To be most thoroughly effective the pigment must be intimately incorporated with the vehicle, which can best be done only by grinding them together in a stone mill by steam power." It is of the greatest importance that sheet-metal roofs, especially those made of iron, should be protected from the action of the elements, as when so protected there is hardly any limit to the time they will last. In order that the paint should be effective, it should be applied before the iron has had an opportunity to

rust, and the first coat should be of the best quality and applied in the best manner; or if it is defective it is plain that it will not only require repainting far sooner than it should, but no matter how good the subsequent coatings of paint are, they cannot be effective if founded on an original coating which has commenced to crack or peel, as it certainly will if not prepared with the best methods and materials. Another important point to be observed in the painting of sheet-metal is that the paint should not be too thick, as it is the linseed oil that is to be depended on to furnish protection, and as the action of the air on the surface of the exposed oil gives it a particularly hard surface, two thin coats of paint are much more durable than one thick one.

Remember, it is the **rust-preventing** qualities of linseed oil, combined with the oxide of iron, that makes steel or iron sheets resist the corrosive action of oxygen, which is ever present in the atmosphere. (See page 101.)

THE CELLAR.

The cellar under a dwelling house has many advocates. It is a convenient, cool place, and nineteen times out of twenty is a damp, dark, musty, foul-smelling place. It cannot well be otherwise and be a cellar. It is a store-room for all sorts of vegetables; odds and ends of most everything are laid away in that dark retreat. It is the favorite resort of spiders, toads and other creeping things; it is the unrelenting enemy (?) of the family physician, the breeding-place of malaria, which unceasingly sends its poisonous vapors into every part of the dwelling above it. It would be suicide for one to make it their sleeping room.

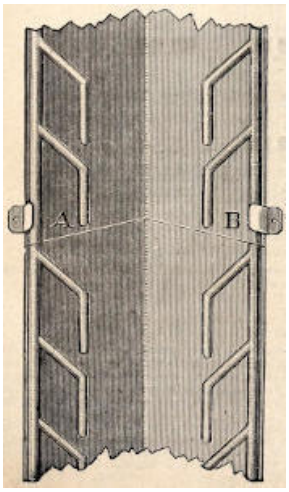
But if you insist upon having a cellar under your house, and will not put it under the corn-crib or carriage-house, see that it is properly constructed. This is more important than most of the other parts of the house, for upon it in a great measure depends the health of your entire family.

The floor of the cellar should be hard and dry, with no woodwork in its construction. To obtain this result, cover the floor about three inches deep with coarse gravel, or broken stone, well pounded to a level surface. Fill this with a thin mortar, composed of one part hydraulic cement and two parts sharp sand, smoothing it off with a trowel or plasterer's level. When we mention sharp sand, we mean coarse, clean sand.

Build a flue, say 8 × 12 inches (with an opening next to the floor of the cellar fully that size), from the bottom of cellar foundation alongside of and extending to top of kitchen chimney, the heat of which will create a constant, upward current of air from the cellar. On the opposite side of cellar from this ventilating flue make an air inlet near the ceiling for the purpose of supplying fresh air to the cellar. This will keep the cellar dry and the atmosphere healthy. Put a wire netting over the opening to prevent the entrance of rats and mice. If from the nature of the location, or other causes, a cellar is damp, dig a trench all around a little below and outside of the

foundation wall; this trench should be covered with flat stones and earth filled in a little above the surface line, so that surface water will flow from, and not settle next to, the foundation walls. When the cellar is completed whitewash the walls and ceiling.

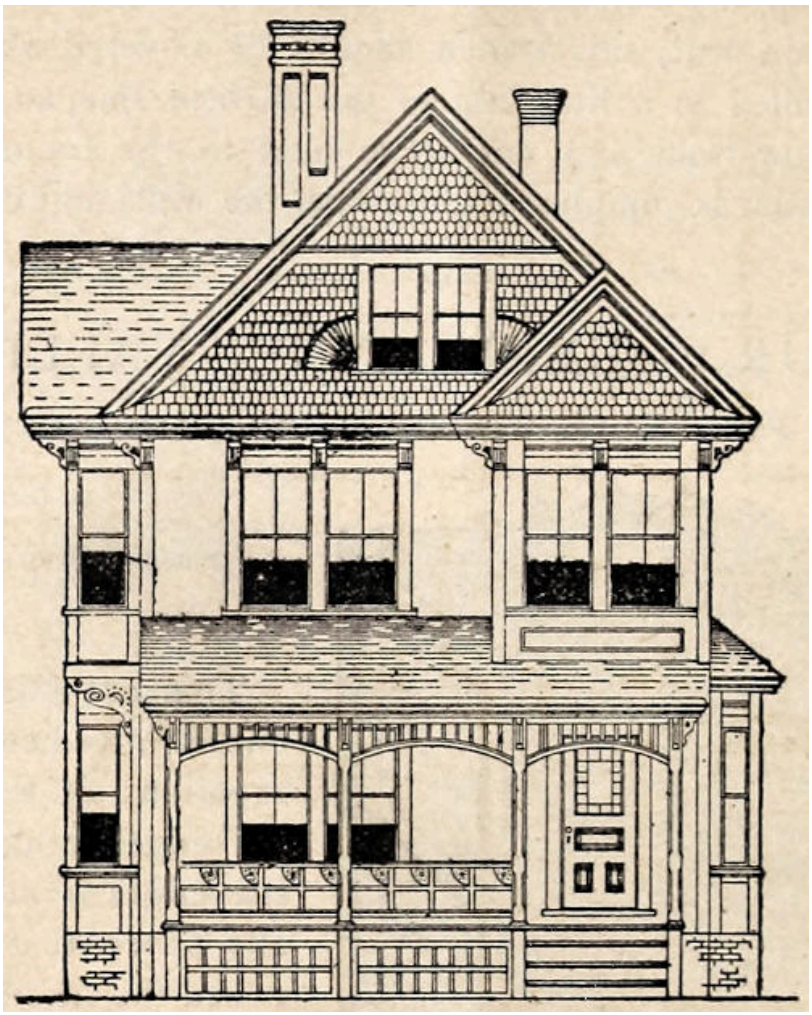
OUR "QUEEN ANNE" VALLEY,
FOR SLATE, TIN OR WOOD SHINGLES.



Patented October 30th, 1883.

This cut fairly illustrates our improvement. The corrugations at the side keep the edges rigid, and prevent the edges from *dipping* into any space that may be between the roof boards where they are not laid close. Besides this, they dispense with the necessity of chalk lines, and hold the shingle or slate from lying close upon the metal, preventing decay both of wood and metal. A convenience and benefit to every builder.

To be used where the pitch of the roof is equal to that necessary in using the ordinary shingle.



Design G.—*Front Elevation.*

EIGHT-ROOM, TWO-STORY HOUSE.

Estimated Cost, with Bath and Furnace, $3,000 to $3,500.

Roof to be covered with 10 × 14 No. 1 Standard Tin Shingles; gables with 7 × 10, same quality; and porches with Broad-Rib Tin Plate Roofing.

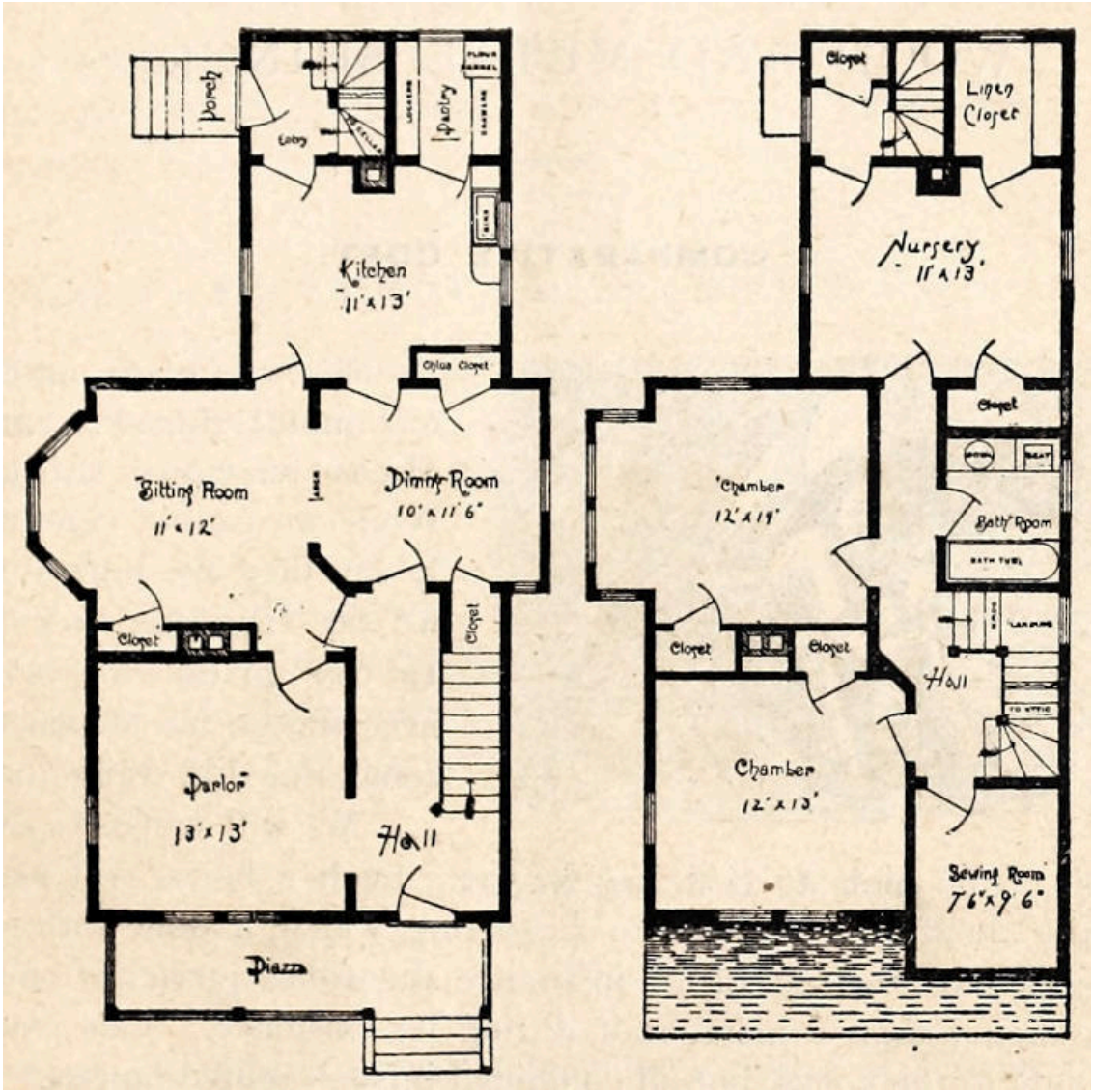
SMITHTOWN BRANCH, L. I., November 27th, 1886.

Dear Sirs:—During the recent very heavy storms—wind and rain—the roof on my house, put on with Walter's Patent Tin Shingles, *stood the test*; not a single leak has ever been discovered, not even around the chimneys, valleys, nor where the roof of the wing butts up against the main building. The work was done in April last, and never leaked, and I think *never will*, as long as the material lasts.

You will remember how reluctant I was to try the shingles, but I am now glad that I did so, for I not only have a good first-class roof—fire-proof—but I also have the *handsomest* roof in our town. I promised you I would come in and see you, and tell you how I liked the shingles, but not having done so, I write you this.

Yours very truly,

COE D. SMITH.



First Floor. *Second Floor.*

Design G.—(*Elevation, page 24.*)

NEW BEDFORD, MASS., June 24th, 1887.

Gentlemen:—The Metallic Shingles, which were put on by you on the roof of the New Bristol County Jail and House of Correction at this place, are entirely satisfactory in every respect, the manner in which the plates are rolled overcoming all objections to the expansion and contraction of the metal. Those that were put on here were of hard rolled copper, and have now turned a beautiful bronze color, and is very much admired by all who have seen it. The roof cannot but be an extremely desirable roof, and I do not see that it can need repairs of any kind for years to come.

Yours very truly,

ROBERT H. SLACK, Architect.

WOOD AND METAL SHINGLES.

COMPARATIVE COST.

We are often asked if our metal shingles are as cheap as wood shingles. While we cannot consistently say they are not; still, if we say they are, they refer to our price list, which necessitates an explanation something like this:

We will suppose a dwelling is to be built to cost, say $2,500. Such a house will usually require about 20 squares of roof covering, which, if done with wood shingles, fixes the cost of fire insurance about one-quarter of one per cent. higher than a metal roof during its existence. This extends not only to the house, but all contained in such roofed houses. And this is the case, no matter how good the wood shingles are.

In making this comparison, we will consider such shingles as are generally used in the older settled portions of the country. We are aware that shingles made from well-matured timber, straight-grained, free from sap and wind-shakes, full length, hand drawn to five-eighths of an inch at the butt, four inches wide, and carefully put on make a good, durable roof. But shingles of that kind are only to be had in the thinly settled portions of the country.

It is the broad, thin, split or sawed shingles, found in all markets, which we contend are more expensive than our metal shingles. These do not last, on an average, more than fifteen years, and after ten years the repairs are a continual expense until removed and replaced with new material, which is not often done until some of the woodwork is badly damaged, and

ceiling cracked and stained from frequent leakages. On the other hand, *tin shingles will last for any length of time, if painted once in every five or six years, and show no perceptible wear*.

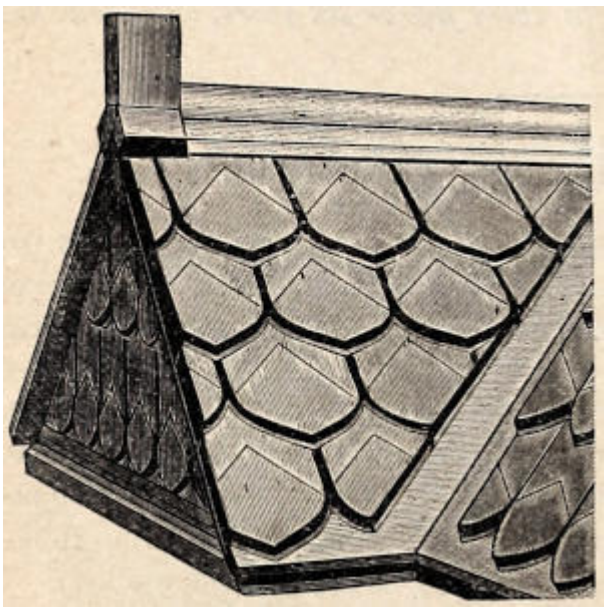
Cost of a TIN SHINGLE Roof for a period of Fifteen Years.

Twenty squares of Tin Shingles, at $6.75 per square	$135 00
Labor of putting on same	10 00
One coat of paint after roof is laid	8 00
Total cost of same	$153 00
One coat of paint at expiration of five years	10 00
One coat of paint at expiration of ten years	10 00
One coat of paint at expiration of fifteen years	10 00
Insurance on $2,500 for fifteen years, at one-half of one per cent. per annum	187 50
Total cost at expiration of fifteen years	$370 50

Cost of a WOOD SHINGLE Roof for a Period of Fifteen Years.

Twenty squares of Wood Shingles, at $3.75 per square	$65 00
Putting on same	20 00
Expense of five years' repairs, after expiration of ten years; damage to roof and ceiling caused by leakage not counted	15 00
Insurance on $2,500 for fifteen years, at three-quarters of one percent. per annum	281 25
Expense of covering at expiration of fifteen years	85 00
Total	$466 25
Making a difference in favor of Tin Shingles in a period of fifteen years of	**$95.75**

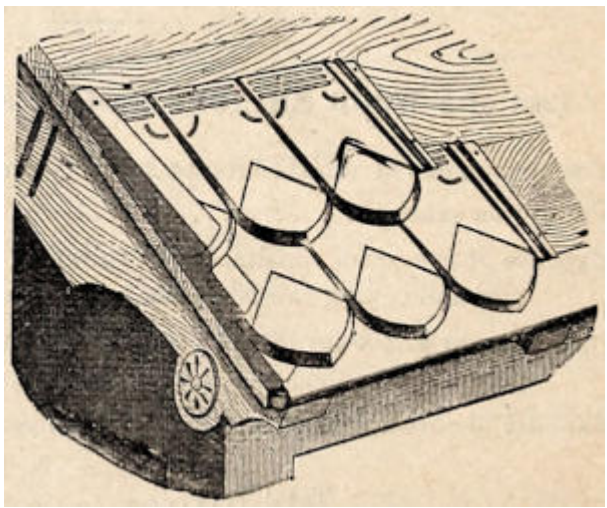
THE ROOF.



(For Finials, see page 74.)

A roof for your house is indispensable, and because it is so, let it be a good one. No part of your house is subject to the same amount of exposure, and there is no part independent of its protection. If you have built for the personal comfort of yourself and family, do not slight the roof because cheap, plain material is the most convenient. There is really no economy in doing so. It is outside, to be sure, but, like the chimney, it is a necessity. As we cannot ignore it, we must try to make it, as a part of the house, attractive. No money spent on the house will add more to its selling value than that expended in taste and material for the roof.

The difference expended in favor of good material adds to every part of the structure. The roof is about the first thing the prospective purchaser sees. He cannot help it; it is right before his eyes. His first impressions are the hardest to overcome.



A good roof must be, first, rain-proof; second, fire-proof; third, light in weight; fourth, durable; fifth, ornamental; sixth, not liable to get out of order. You can have your house covered with such a roof, and not pass the limited boundaries of economy.

Read carefully the pages of this little book devoted to roofing materials and sundries.

THE KITCHEN.

Somehow, our architects and builders habitually neglect to study the requirements of the kitchen, but persist in constructing for this use a plainly constructed room, generally cramped in size, with no means of escaping the great heat generated by the range or stove, which in the hot months of summer is almost unbearable. If men were often obliged to remain in such a place, a large part of the day during the hot season, they would be quick to seize upon any plan which would mitigate the heat. But as their wives, daughters or "help" preside in that department, they offer no amendment to the long-established mode of kitchen construction.

Now, a kitchen can be so constructed that even with the largest size family-stove or range in use, it will be as comfortable as any other room in the house, and at an expense not to exceed the cost of the stove or range used. To do this, build of brick a large open fire-place, say from three to twelve inches broader than the length of the stove or range to be used, and from front to rear deep enough to receive the same. It is best to set an ordinary cook-stove with the side to the front, so that the oven door can be convenient. The oven door, of course, on the opposite side is permanently closed. The range being differently constructed can readily be set in the brick enclosure or open fire-place, the walls of which should be built perpendicular to the floor, and about five feet high. The back wall should be sufficiently thick to commence at this point a smoke-flue 8 × 12 inches, with an opening to receive the smoke-pipe from the range or stove, and continue it out through the roof of house (see "Chimneys"); resting on the walls of this open fire-place build, either with wood or brick, a tapering flue, so that after emerging from the roof it will expose an opening of not less than four square feet. A cap should be put over this to prevent an entrance of rain, but not to contract the draught space.

You will see by this arrangement you have a large chimney with a fire-place at the bottom large enough to receive the stove or range. Now construct a sliding sash with double strength glass, and balanced with weights, with the upper end of sash inside the draught flue, and the lower end to reach within a foot of the floor, and about four inches from the side of stove. You will readily perceive that the heat from the stove inside the flue will constantly cause a strong draught between the bottom of the sash and the floor, which will prevent heat from escaping into the kitchen, keeping it as cool as any room in the house. Even with the sash up, the draught will take nearly all the heat through the flue over the stove, carrying with it the steam and odor during the process of cooking. A coat of whitewash inside the brick-work will add to the appearance and give light, which is shadowed by the flue.

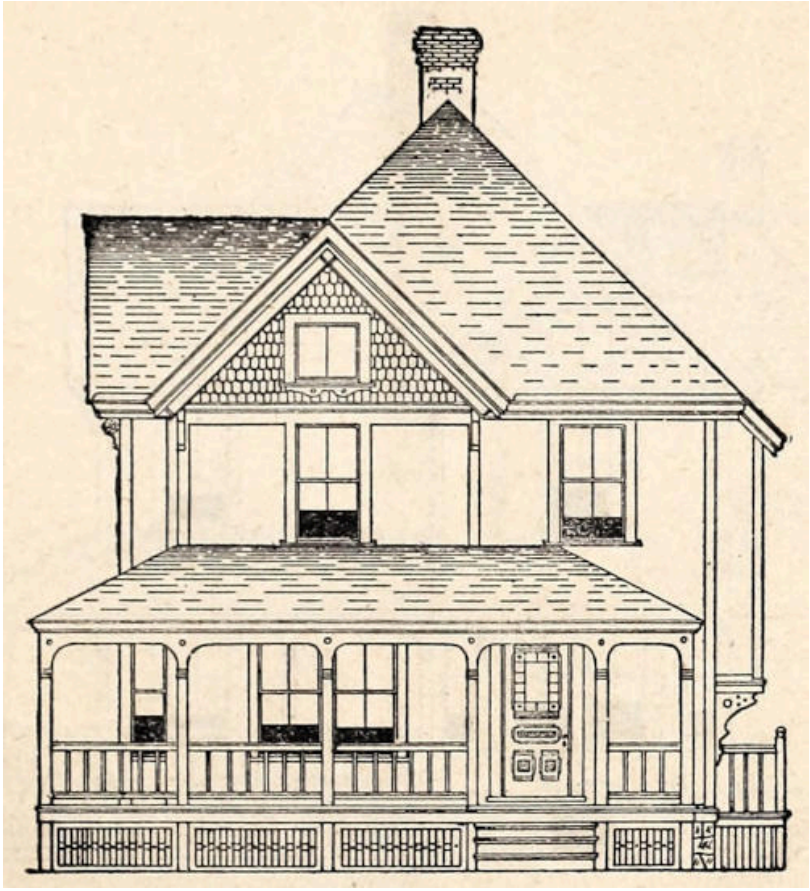
The kitchen should be large and light, and, if possible, be joined by a broad covered porch, upon which much of the kitchen work can be done in warm weather.

As this little book is merely hints to builders, we cannot go into the details of hot and cold water, stationary wash-tubs and such matters. But we will say, more important than all this is a well-constructed drain pipe, not less than three inches in diameter, leading from the kitchen sink to a point some distance (according to the nature of the ground) from the house. This pipe inside the kitchen, should have a trap to prevent offensive odors escaping into the room.

SAMPLE SHINGLES.

We will send free, and charges paid, samples of our WALTER'S PATENT SHINGLES (three pieces) to any address in the United States on receipt of five two-cent stamps; this does not pay us one-half the expense, but we propose to make the cost as light as possible to those interested in building.

THE NATIONAL SHEET METAL ROOFING CO.,
510 to 520 East 20th Street,
New York City.



Design F.—*Front Elevation.*

SEVEN-ROOM, TWO-STORY HOUSE.

Estimated Cost, with Bath and Furnace, $2,300 to $2,600.

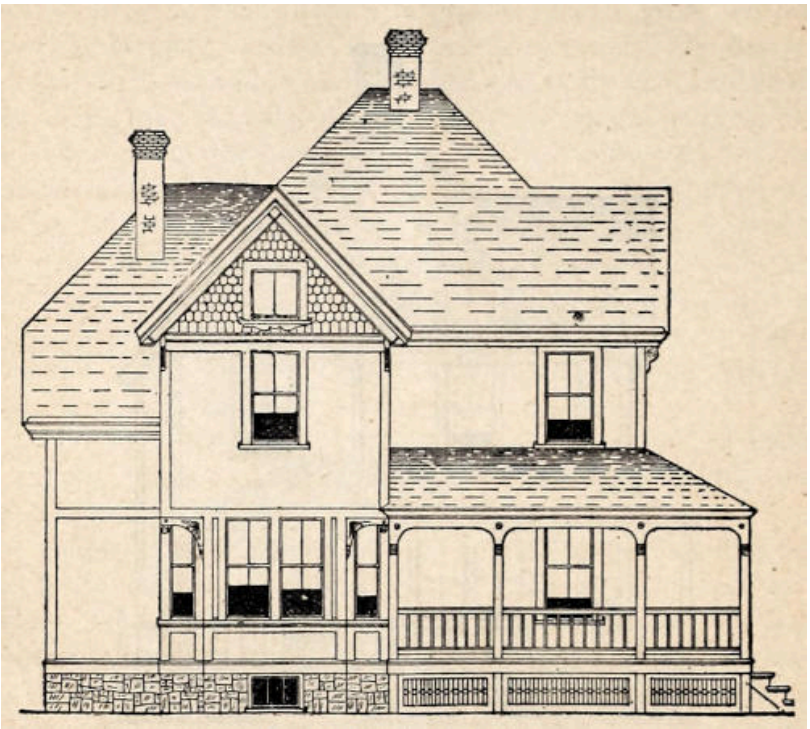
BRONZE METAL SHINGLES.—We believe we are the first to offer Bronze Metal Shingles to the World; certainly the first to manufacture them in the United States. No other metal known for house covering is their equal, not excepting copper, which in its pure state is rather soft and pliable, unless of a weight to practically exclude its use.

Bronze Metal is hard, rigid and sufficiently ductile to make the most serviceable roofing material for public and first-class private buildings in the world. Any house designed to exist as a memorial of man's sagacity and thrift

should be covered with these shingles. They are as enduring as marble; they will wear for any length of time.

We make them in three sizes—7 by 10, 10 by 14, and Queen Anne style. Prices furnished upon application.

THE NATIONAL SHEET METAL ROOFING CO.,
Office, 510 to 520 East 20th Street, New York City.



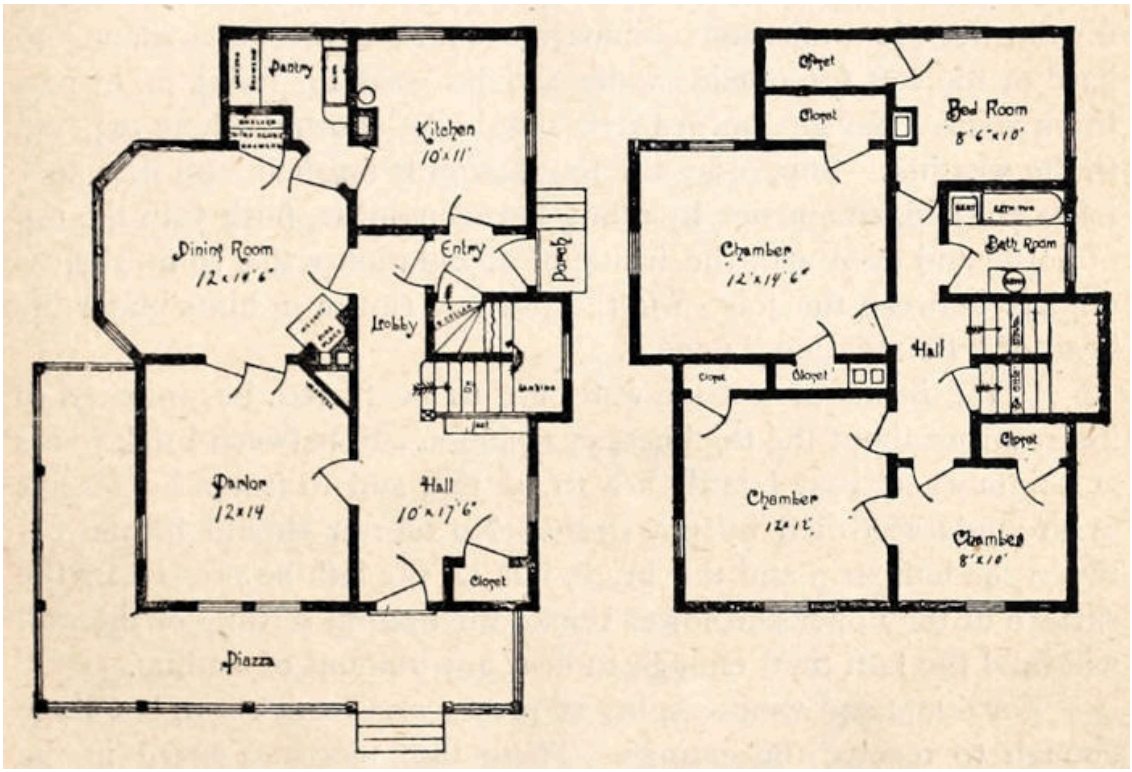
Design F.—*Side Elevation.*

Roof to be covered with 10 × 14 No. 1 Standard Tin Shingles; gables with 7 × 10, same quality; and porches with Broad-Rib Tin Roofing. Use attic ventilators and lights (see page 73) on main roof.

LITITZ, PA., February 27th, 1885.

Dear Sirs:—I was the first man in this town to cover my new house, built last summer, with Walter's Patent Charcoal Tin Shingles, and will say that they have given, thus far, entire satisfaction. They are not only ornamental but durable, and since my roof has introduced them in our town, a great many have been put on, all giving satisfaction. I am sure that this is the material for roofing houses in the future. They are better than any other roof now in use, and will take the place of wood shingles, which are getting scarce, and also of slate roofs, which are broken by storms. Mine has stood the test of the severest storms, during the summer and winter, known here for many years, and has proven itself what you claim it is—absolutely wind, rain and storm-proof.

JOHNSON MILLER, Secretary.



First Floor. *Second Floor.*

Design F.—(*Elevations, pages 31 and 32.*)

CEDAR BLUFF, ALA., February 20th, 1888.

Gentlemen:—Enclosed find exchange for one hundred and forty and 50/100 dollars to cover bill roofing.

I am delighted with the Walter's shingle, and the universal verdict of all who have seen my roof is that it is a perfect beauty. You will hear from me again, and you may expect other orders from this place.

Yours truly,

R. LAWRENCE.

BRICK-WORK.

"Brick from the run of the kiln" will answer for most houses; those of even color, well-burnt and regular shape, should be selected for the outside walls and chimneys. Those of irregular shape, too hard or too soft for outside walls, can be used for filling in, or partition walls. No soft burnt brick should be allowed where exposed to the weather. Supposing the foundation is finished, and first-floor joists are laid, commence by filling between joists, flush with the top of joists and even with the inside of foundation walls, so no shelves are left between the joists for the purpose shown in hints under the head of "Foundation," page 6.

If the inside of outside walls are to be furred, be prepared to insert strips about the thickness of common lath between brick joints at points where base boards are to be put, and to fasten long strips or grounds as called by plasterers. No mortar should be put between the lath strip and the brick, but let the lath be pressed by the surface of the upper and lower brick; the natural settling of the wall will hold the lath tight enough to bear any amount of nailing.

For doors and windows, insert pieces same thickness, but large enough to receive the casings. These thin pieces inserted in the mortar joints are better and cheaper than plugs or wooden brick, which are apt to shrink and become loose when the brick-work dries. It is very important that flues for ventilation and chimneys be properly started (see "Chimneys") and carried through the roof to a height, if possible, above the apex of the roof. Ventilating flues should run alongside the chimney flues where the construction favors them. Too much care cannot be taken in building these flues. They should be carefully and smoothly plastered on the inside, and no wood-work be allowed nearer than five inches from the inside of flue. It is customary to use headers (cross bricks) every five courses, to bind the walls together. Many people object to headers, and prefer to expose only the edge surface of the

brick. This can be done by clipping the inside courses of outside brick so as to allow the middle course to lay angular across the wall, with opposite courses resting half way between and on the outside courses, or by using square brick. The latter is a saving of labor if they can be had at a reasonable price. The thickness of walls depends entirely upon the size of structure to be built. For ordinary dwelling-houses, twelve inches is thick enough for outside walls and nine inches for partition walls. Mortar for brick-work above foundation should be made of one part of good lime, slacked at time of mixing the mortar, and four parts of screened sharp sand. The cementing qualities of sand and fresh lime depend on the purity of the sand. By pure sand we mean that which is free from loam or clay.

STANDARD CHARCOAL ROOFING TIN SHINGLES.

Our Standard Charcoal Roofing Tin Shingles are made of such brands as “Mansel,” “Dean,” “Worcester,” “P. T. L.” &c., and guaranteed to be first-class, well-coated plates, perfect in finish. Next comes our Galvanized (re-dipped) shingle; this is our Standard Tin Shingle, taken after it is made and dipped into melted zinc, adding a second coat of fully twenty pounds on each square, giving with the tin, a more durable coating than that used on galvanized iron, making it absolutely rust-proof and saving painting. Next is what we call “Old Process” or “M. F.” This is what is known as “Old Style,” “Double-Dipped,” “Old Method,” and other names, but what is really a very superior article of roofing plate, having a much heavier coating than “Standard,” but, like it, has to be painted. There are many brands of practically one quality in the market, and, having no choice ourselves, we supply the brand preferred; but if the best is asked for, we send “Old Process,” believing it to be equal to any.

THE NATIONAL SHEET METAL ROOFING CO.

THINGS ARE ONLY GOOD OR BAD BY COMPARISON.

Walter's Patent Metallic Shingles Compared with Slate.

Our shingles are not one-sixth the weight of slate, which greatly reduces the cost of the frame-work of roof. They readily conform to the shape of a roof, which slate will not do. Slate is not thoroughly fire-proof, as heat from an adjoining building on fire will cause the slate to crack, which would destroy the best roof in a few minutes, leaving the sheeting exposed. Especially is this the case if water is thrown on them while hot.

Our shingles are free from the many accidents to which slate roofs are liable, such as cracking from shrinkage of wood-work to which they are attached; breaking, caused by necessary repairs to the valleys or chimneys; and the effect of frost on defective slate. Such defects cannot always be avoided by ordinary observation. All builders of experience are aware of the expensive repairs necessary to keep a slate roof in good order, but perhaps the most inconsistent thing connected with the whole roofing business is the fact that nineteen-twentieths of all the houses covered with slate **have gutters lined with the same material of which our shingles are made**, while slate was used for covering because of its supposed durability.

Should anything fall on our shingles it would probably dent them without causing a break; but should it perforate them, the shingles can be replaced by another, or a leak can be soldered, and fire from an adjoining roof cannot more than injure the paint. They will cool off rapidly, retaining their shape.

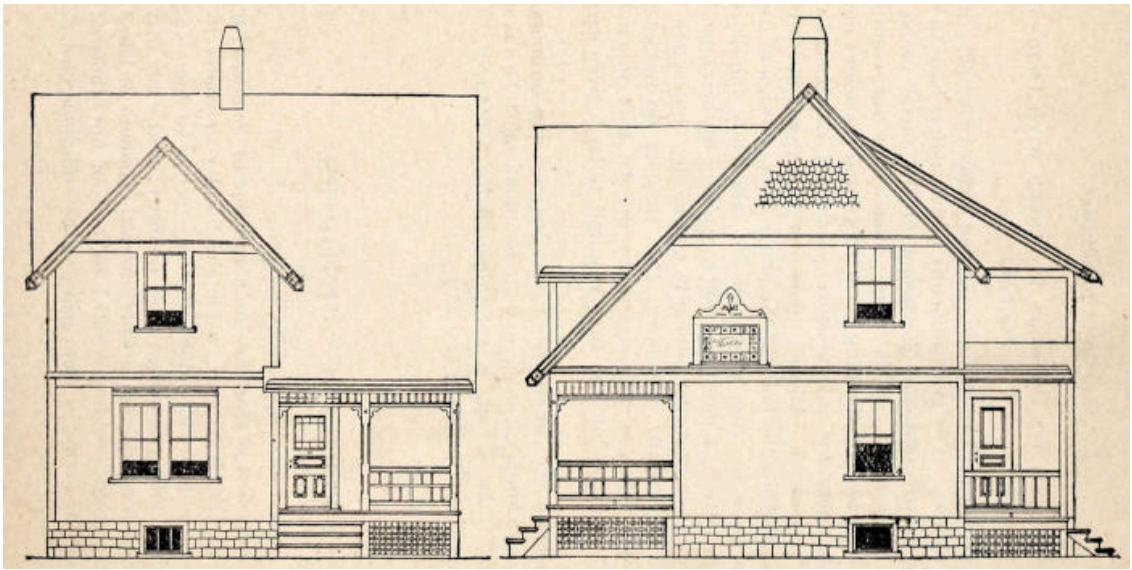
Walter's Patent Tin Shingles Compared with Ordinary Tin Roofing.

Of this we speak with the advantage of many years' experience as practical roofers. The great difficulty metal roofers have to contend with is contraction and expansion of the metal under the changes of temperature. This cause alone calls for continued repairs in all flat lock or standing seam roofs, and the seams underneath are receptacles for any moisture which may condense on the underside of the metal. All such roofs first show decay in the cross seams, and this, while the body of the plates shows no sign of decay. Our shingles have no cross seam, and are sufficiently ventilated to prevent condensation of moisture; while a glance at their construction shows at once that the difficulty caused by contraction and expansion is successfully overcome. Our shingles do not require the skilled labor which is necessary to lay the flat lock or standing groove metal roofing, while the time required to lay a given surface is much less.

In estimating the difference of cost between the ordinary tin roofing and our shingle, a steep roof house alone must be taken in consideration, as our shingle is not proposed for a flat roof. (See "Comparative Cost," pages 26 and 27.)

ROOFING SUNDRIES.

We were the first to manufacture a full line of Valley, Hip and Ridge Coping, Gable, &c., to enable the builder or roofer to use them at a reasonable price, and are the only factory in America prepared to furnish such trimming in any quantity; and while they are not absolutely necessary, they greatly lessen the amount of labor and cost of laying, besides adding a finish to the roof not otherwise obtained, so that the saving in labor will pay the additional cost.

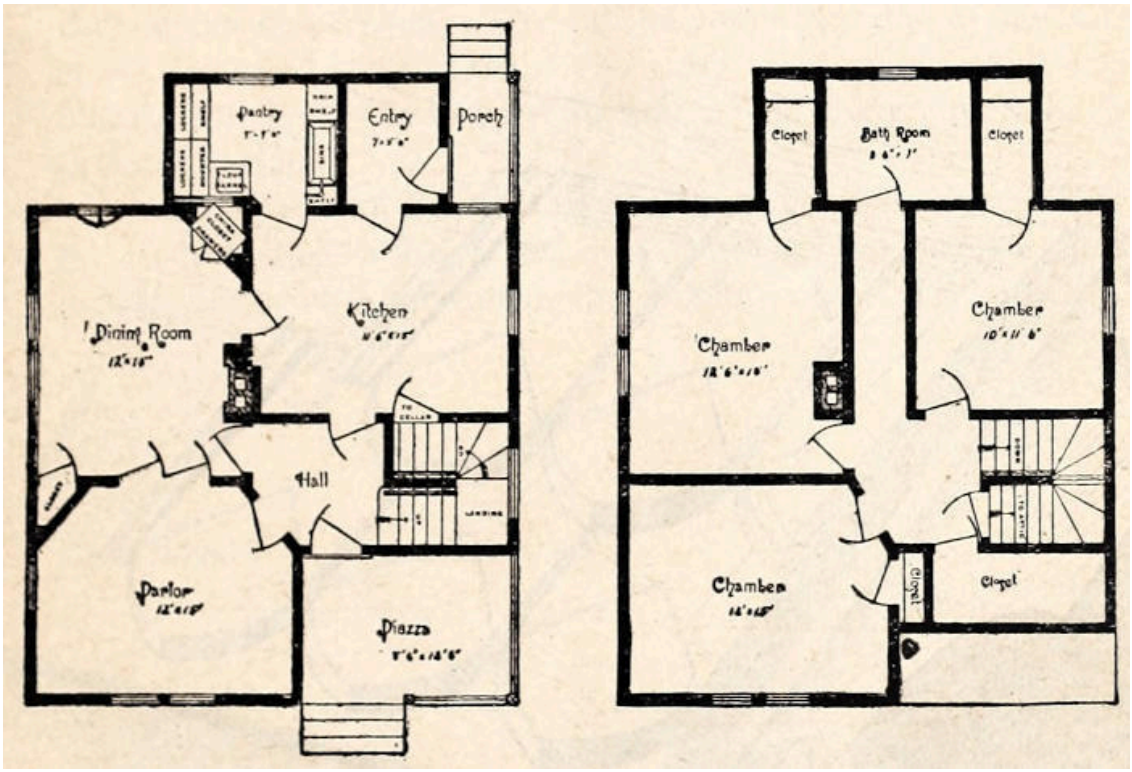


Design E.—*Front and Side Elevation.*

SIX-ROOM COTTAGE.

Estimated Cost, with Bath and Furnace, $2,000 to $2,300.

Use Broad-Rib Steel Plate with attic vents (see page 73) for roof, and 10 × 14 No. 2 Metal Shingles for gables.



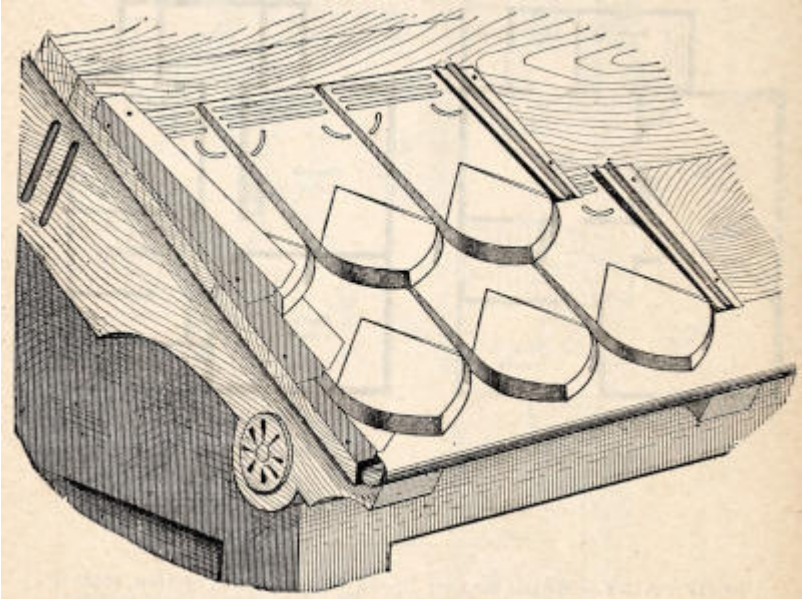
First Floor. *Second Floor.*

Design E.—*Elevations, page 38.*

ROOF PAINT.—We use the best Brown Mineral Oxide of Iron, roasted and double-ground, mixed with boiled linseed oil, grinding them together, and adding only enough turpentine to dry in the air in seventy-two hours. We first dip the shingles, and after they have stood a short time, and before the paint has set, they are carefully gone over with a brush, insuring an even, perfect coat, not obtainable in any ordinary way of painting.

All tin roofers, who have experience, know the importance of putting on a second coat. In spite of the best care in laying, more or less paint is scratched off, and without a second coat the roof is not finished. Architects and builders always require it, and if a heavy single coat of paint is given the roof every five or six years, there will be no perceptible wear on the tin, insuring many years' service.

OUR NEW PATENT.



Patented April 4th, 1882. Patented Nov. 8th, 1887.

Our Queen Anne Shingles are designed expressly to meet a want often expressed for an attractive and artistic roof covering and outside decorating. They are not intended to take the place of our Standard Walter's Patent, which for general use are incomparable, but less ornamental than the Queen Anne Shingles. They have bold clean cut lines, producing, from the effects of light and shade, the most striking and artistic roof yet produced by metallic shingles or tiles.

For church spires, belt coursing, towers or mansard roofing, they cannot be excelled. The cut illustrates the kind of finish used at the eaves and verge board. The same ridge coping used for our Standard Shingles can be used for this. This shingle must be seen to be appreciated.

We recommend the Bronze Metal, or the Galvanized Shingles for use on public or first-class private buildings, because such buildings should be covered with the best roofing material to be had.

Each superficial foot of brick wall,

4	inches	thick	requires	7	brick.
8	“	“	“	15	“
12	“	“	“	22	“
16	“	“	“	29	“
20	“	“	“	37	“
24	“	“	“	45	“

SURFACE MEASURE.—All roofers compute roofing jobs by squares, which means 100 square feet, or 10 feet square. If you go to your architect or roofer and ask him how much it will take or cost to cover your roof, he will first ascertain how many square feet there are to be covered; and if, for example, there are 2,500 square feet he will tell you there are twenty-five squares to be covered; and in order to intelligently supply what is wanted, we put up our shingles in boxes of one square each; that is to say, each box of one square will cover one hundred square feet after they have been put on.

OLD MATERIALS.

In tearing down old work be as careful as in putting up new.

Old material should never be destroyed simply because it is old.

When putting away old stuff see that it is protected from rain and the atmosphere.

It costs about 15 per cent. extra to work up old material, and this fact should be borne in mind, as I have known several contractors who paid dearly for their “whistle” in estimating on working up second-hand material.

These remarks apply to wood-work only. In using old bricks, stone, slate and other miscellaneous materials, it is as well to add double price for working up.

Workmen do not care to handle old material, and justly so. It is ruinous to tools, painful to handle, and very destructive to clothing.

In my experience I always found it pay to advance the wages of workmen—skilled mechanics—while working up old material. This encouraged the men and spurred them to better efforts.

Sash frames, with sash weights, locks and trim complete, may be taken out of old buildings that are being taken down and preserved just as good as new by screwing slats and braces on them, which not only keeps the frame square, but prevents the glass from being broken.

Doors, frames and trims may also be kept in good order until used, by taking the same precautions as in window frames.

Old scantlings and joists should have all nails drawn or hammered in before piling away.

Counters, shelving, drawers and other store-fittings should be kindly dealt with. They will be wanted sooner or later.

Take care of the locks, hinges, bolts, keys and other hardware. Each individual piece represents money in a greater or lesser sum.

Old flooring can seldom be utilized, though I have seen it used for temporary purposes, such as fencing, covering of veranda floors while finishing work on plastering, etc. As a rule, however, it does not pay to take it up carefully and preserve it. Conductor pipes, metallic cornices, and sheet metal work generally, can seldom be made available a second time though all is worth caring for, as some parties may use it for repairs.

Sinks, wash-basins, bath-tubs, traps, heating appliances, grates, mantels and hearth-stones should be moved with care. They are always worth money and may be used in many places as substitutes for more inferior fixings.

Marble mantels require the most careful handling.

Perhaps the most difficult fixings about a house to adapt a second time are the stairs. Yet I have known where a man has so managed to put up new buildings that the old stairs taken from another building just suited. This may have been a "favorable accident," but the initiated reader will understand him. Seldom such accidents can occur.

Rails, balusters and newels may be utilized much readier than stairs, as the rail may be lengthened or shortened to suit variable conditions.

Gas fixtures should be cared for and stowed away in some dry place. They can often be made available, and are not easily renovated if soiled or tarnished.

It is not wise to employ men who have nothing but their strength to recommend them. As a rule they are like bears—have more strength than knowledge, and lack of the latter is often an expensive desideratum. Employ for taking down the work good careful mechanics, and do not have the work "rushed through." Rushers of this sort are expensive.

Never send old material to a mill to be sawed or planed, no matter how carefully nails, pebbles and sand have been hunted

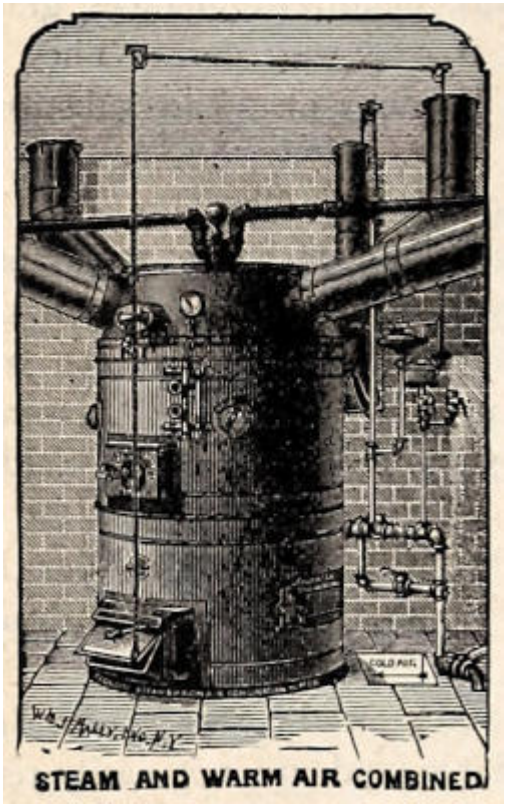
for, the saw or planer knives will most assuredly find some you have overlooked, then there will be trouble at the mill.

Have some mercy for the workman's tools. If it can be avoided do not work up old stuff into fine work. If not avoidable pay the workman something extra because of injury to tools.

Don't grumble if you do not get as good results from the use of old material as from new. The workman has much to contend with while working up old nail-speckled, sand-covered material.

Builder and Woodworker.

HEATING.



STEAM AND WARM AIR COMBINED.

I once knew a church building committee who planned and built quite a large church, and when I was called in to arrange for heating the building with a large furnace, the furnace committee were astonished when told that the building committee had forgotten the fact that the hot-air furnace required a chimney.

The construction of many houses suggests that houses built in the hot months of summer needed no special provision for heating. This is an important subject, and should be carefully considered in the construction of the plainest house. Always take climate, location and fuel into consideration. The open fire place, with fire on the hearth, is without doubt the most cheerful and healthful. This is the favorite and best mode for plain country homes. But in all instances, for churches and public halls, the open fire-place is not to be depended upon. There is a variety of good steam-heaters and hot-air furnaces to choose from. Consult the parties from whom you buy as to the size of heater required; its location, size of cold-air duct, register, pipe, etc.

For small rural churches that have no basement, construct a small room under the front entrance or vestibule; eight feet square, inside measure, is sufficient. Near its floor have a cold-air entrance leading to the furnace. Cover the opening with

wire netting to prevent the entrance of mice. Use brick for the room, building the walls eight inches thick; leave openings 2½ × 4 inches, about one foot apart all around the bottom next to the floor. Carry the wall close to the ceiling, and make it tight by plastering carefully inside and out where it joins the ceiling. Cover the ceiling, by nailing to joists, with bright sheets of tin, and white-wash the brick-work inside. For entrance make a door 6 × 3 feet. A plain wooden one will answer. In the aisle of the church, immediately over this room, put a large grating, such as your furnace-men will suggest. In this room place your furnace, and have it *large enough* to heat the room above during the coldest weather *without excessive firing*. With a larger capacity than necessary, the furnace will last longer, burn less coal, and give better results in every respect. As the furnace will radiate considerable heat, this can be utilized by running a pipe of proper size from the room to the vestibule or some other room. The objection to using this heat in the church is the noise of firing up, which would be annoying during church service. However, a furnace properly attended will not need firing during church service. Remember, a large volume of *warm* air is what you want, and *not* a small volume of *hot* air. Never cover the grating or close the cold-air duct to cool off while there is fire in the furnace, but open the doors or windows of the church and check the fire. The closing of the grating or cold-air duct will injure the castings of the furnace by overheating them.

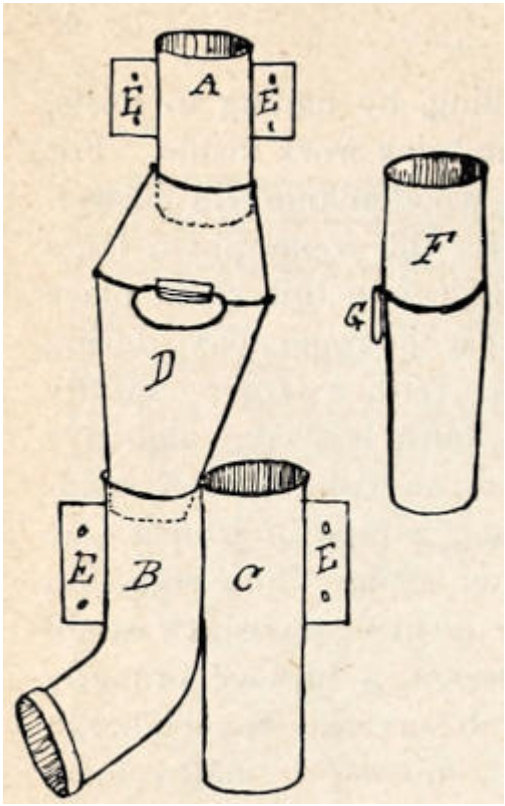
CLOSE SHEATHING THE BEST.

While a rain-proof roof can be made with our shingles, our system, as well as all metal or slate roofing should not be put upon open sheathing. If walked upon the metal will not support the weight, and bends out of shape, and the roof is blamed. In high latitudes where we have driving storms of fine snow or "blizzards," *we specify close sheathing covered by paper* (*using same rules as for laying slate*). We will then guarantee a perfect roof.

THE NATIONAL SHEET METAL ROOFING CO.,
510 to 520 East 20th Street, New York City.

THE CISTERN.

Three things are all that are necessary to supply any family with the purest and best water in the world for drinking, cooking and washing purposes: a well-constructed cistern, a clean roof and a rain-fall.



CUT-OFF ATTACHMENT.

A. To connect with down pipe.

B. Outlet for waste water.

C. Leads to filter or cistern.

D. Is adjustable to fit box *C*.

E. Fastenings to wall of house.

F. Side view of *D*.

G. Handle to adjust *D*.

(Not patented; can be made by any tinsmith.)

These are within the reach of every one able to own a home. By a cistern we mean an excavation in the earth from twelve to twenty-five feet deep. Dig deep if you want cold water all the year round. From eighteen to twenty-five feet will produce it. If your cistern is dug in a clayey soil, there is no use of brick lining; but if in gravel, sandy or rocky soil, line the inside with hard, well burnt brick, and do the work well; using for mortar equal parts of hydraulic lime and clean, sharp sand. When completed, plaster the inside carefully with the same mortar. If the walls are clay plaster immediately on the sides and bottom, without lining with brick.

No roofing material is better for collecting

chemically pure water than tin, and none so bad as wood shingles. They hold dirt which no ordinary shower will wash off, and furnish organic matter which is disagreeable to the taste and smell; the porous nature of wood makes it the home of myriads of insects, the remains of which are eventually deposited in the cistern and poison its waters.

No such objections can be urged against tin roofing. A short shower cleanses it thoroughly. Water-pipes leading into the cistern in every case should have a cut-off attachment within easy reach.

There are several on the market, but those having no inside arrangement to get out of order, or obstruct the direct passage of water into either the cistern or waste-pipe, are the best. The water should be strained before entering the cistern. This can be built of brick and be underground, or a cask can be used above ground. A strong, iron-bound linseed oil barrel answers the purpose. Its construction is very simple. Take out one end of the cask and perforate it with a sufficient number of one-inch auger holes; lay four brick on edge in the bottom of the cask, and let the perforated cask head rest upon them. Then fill the cask three-quarters full of charcoal, pounding it down on top pretty hard. Put on top of the charcoal clean, coarse gravel to within three inches of the top of cask; make a covering with an opening to receive the water which flows from the roof, and convey the water from the bottom of cask to the cistern. At least once a year this filter should be emptied and cleansed, putting in new charcoal and washing the gravel carefully. Let no summer months' water run into the cistern. See that the first rain of a shower is used to wash the dust and soot from your roof before it is turned into the cistern, and you will have an abundance of water not equaled by any well or spring.

BUILDING PAPERS.

NEPONSET PAPER is absolutely water-proof and air-tight, is clean to handle, not tarred felt, but far more durable. Its resistance to air and dampness renders it unsurpassed under clapboards, iron roofing and wood or tin shingles.

CLIMAX is a light, clean, pink, colored paper; useful for any purpose where building paper is required; is much cheaper than Neponset, but not water-proof. The use of building paper under roofing or clapboards adds greatly to the ease of warming a building. By its use you save fuel and your house is more comfortable. Its cost is nominal compared with its advantages. We keep a large stock and fill orders promptly.

COLORS AND HOW TO MAKE THEM.

Blue and yellow makes green.

White and yellow makes buff.

White, yellow and black makes drab.

White and black makes lead.

White and black makes gray.

White, black and blue makes pearl.

White and lake makes pink.

White, blue and black makes slate.

Red, black and blue makes brown.

Red, black and yellow makes maroon.

Red and yellow makes orange.

Blue and lake makes purple.

U. S. Marine Barracks, Navy Yard, Pensacola, Fla., October 22d, 1887.

Sirs:—In compliance with your request, I have to say that about a year ago I was called upon to decide which of several kinds of roofing material to select for two barrack buildings, which I was constructing for the Government at this place. Owing to the heat and moisture of the climate, very destructive to wood, and the proximity of the Gulf of Mexico, which makes what is known as a salt atmosphere, very injurious to iron roofing, I was induced to try your system, and ordered the 14 × 20 size, I. C. Standard, some painted and some galvanized. As it was previously almost unknown to me, I had to assume the risk of its success, and have since watched it very closely; the more so, as it was laid by soldiers entirely unfamiliar with it.

After the first rain a close inspection failed to reveal a single leak. I have had it inspected after every heavy rain since then with the same result. On the 20th inst. we had the severest gale for many years, and the roofs not only resisted it in every way, but there was no rattle, which could not be said of our other tin roofs (old system).

You can refer any one to me for commendation of these points which are established; also of its architectural beauty, and I have little doubt as to the rest, for we painted it very carefully on both sides.

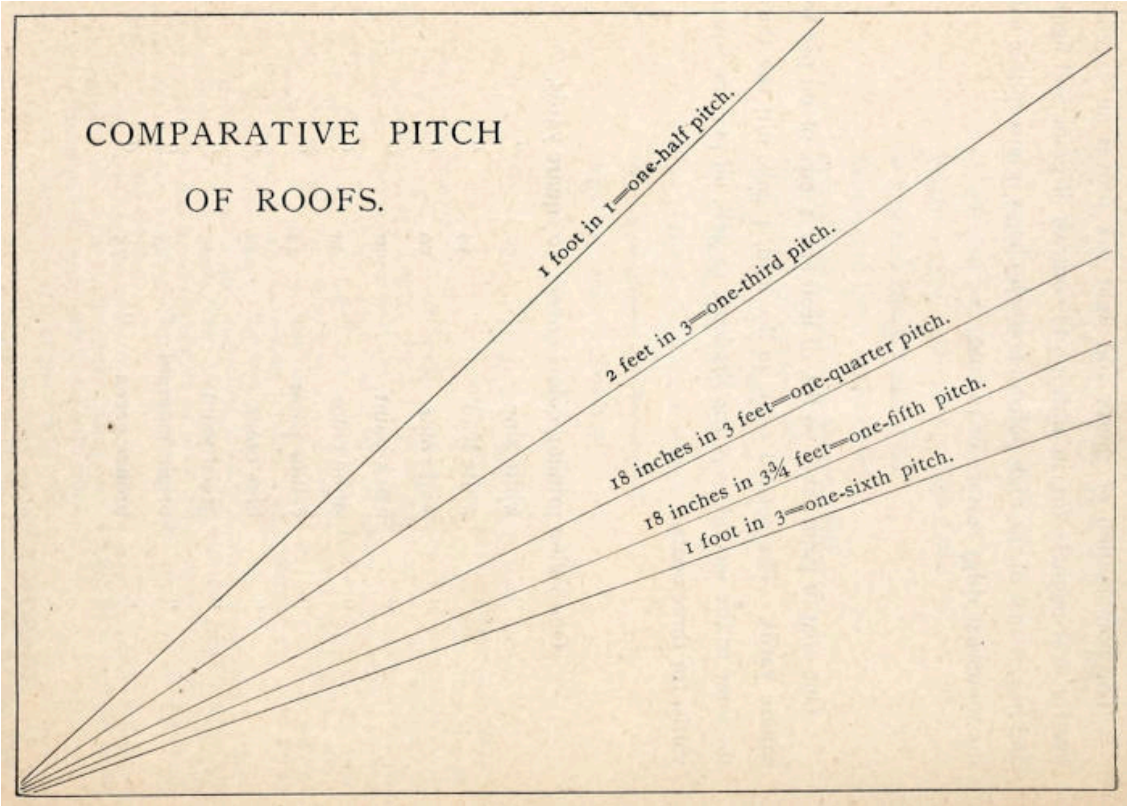
I am, Sirs, very respectfully yours,

HENRY CLAY COCHRANE,
Captain U. S. Marine Corps, Commanding Post.

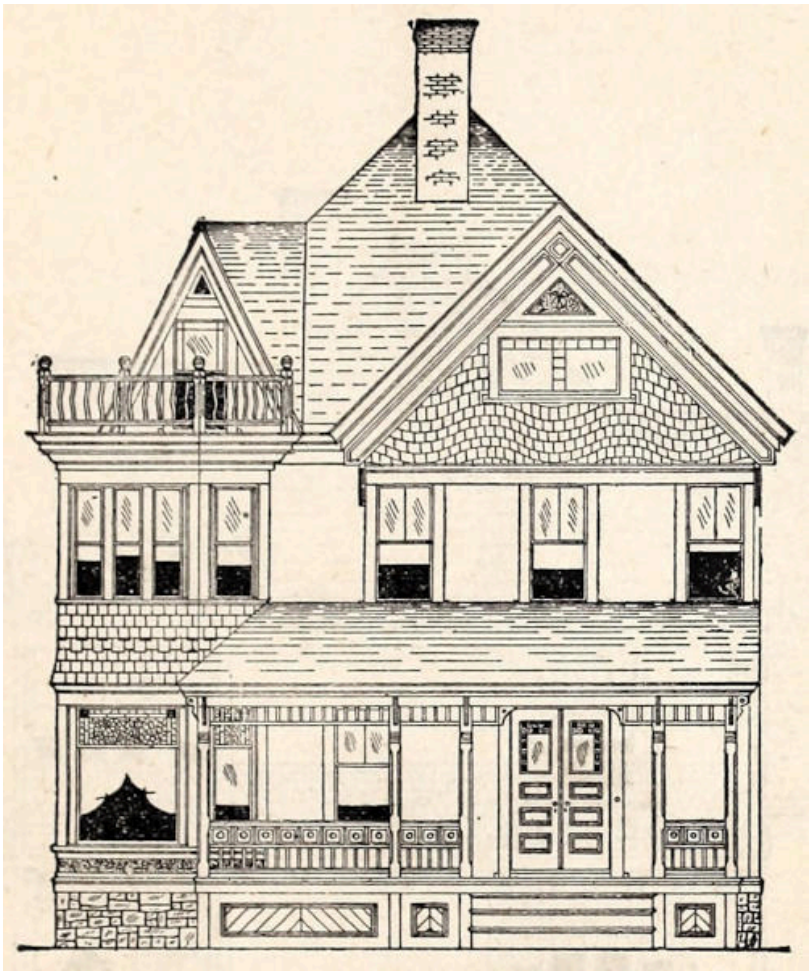
The combination of cherry and light oak proves an excellent one for over-mantels, for, in addition to contrast of grain, and figure, and hue, is that of the high polish of which cherry is susceptible with the somewhat ridgy surface of the oak.

One coat of paint takes 20 lbs. of lead and 4 gals. of oil per 100 square yards. The second coat, 40 lbs. lead, 4 gals. oil; the third, the same as the second—say 100 lbs. lead, 12 gals. oil per 100 square yards, for three coats.

One gallon	priming colors	covers	50	square yards.
"	white zinc	"	50	"
"	white lead	"	44	"
"	lead color	"	50	"
"	black paint	"	50	"
"	stone color	"	44	"
"	yellow paint	"	44	"
"	blue color	"	45	"
"	green paint	"	45	"
"	bright emerald	"	25	"
"	bronze green	"	75	"



COMPARATIVE PITCH OF ROOFS.



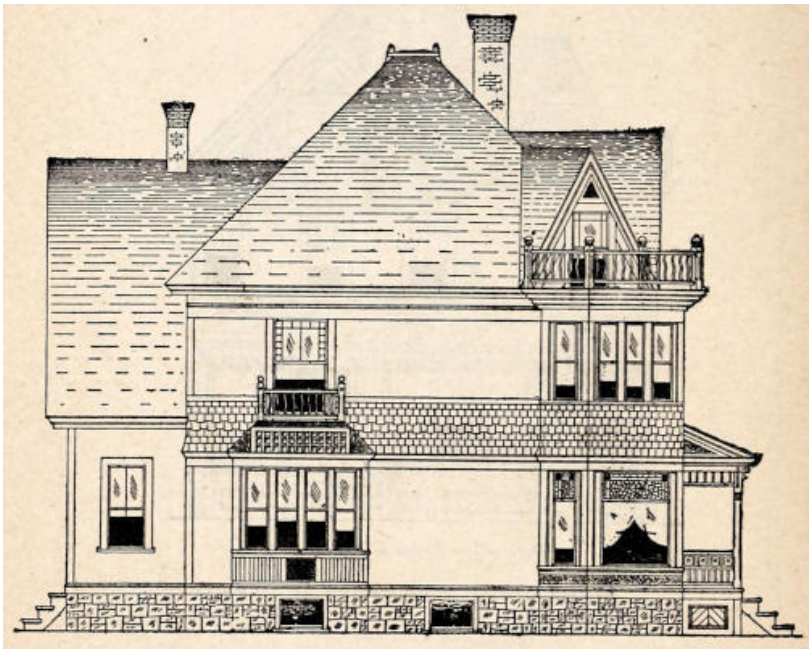
Design J.—*Front Elevation.*

EIGHT-ROOM, TWO-STORY HOUSE.

OUR GUARANTEE.

We guarantee our shingles as follows: If you will use them, and *they are properly put on in accordance with our instructions*, and if they do not then give satisfaction, we agree to replace your roof, free of expense to you, with equally expensive material, any time within two years from the time you put them on. In addition to this, we may be able to give you a local reference, as our goods are in use in every State and Territory. We call your attention to the price list, and we will be pleased to make you discounts on application.

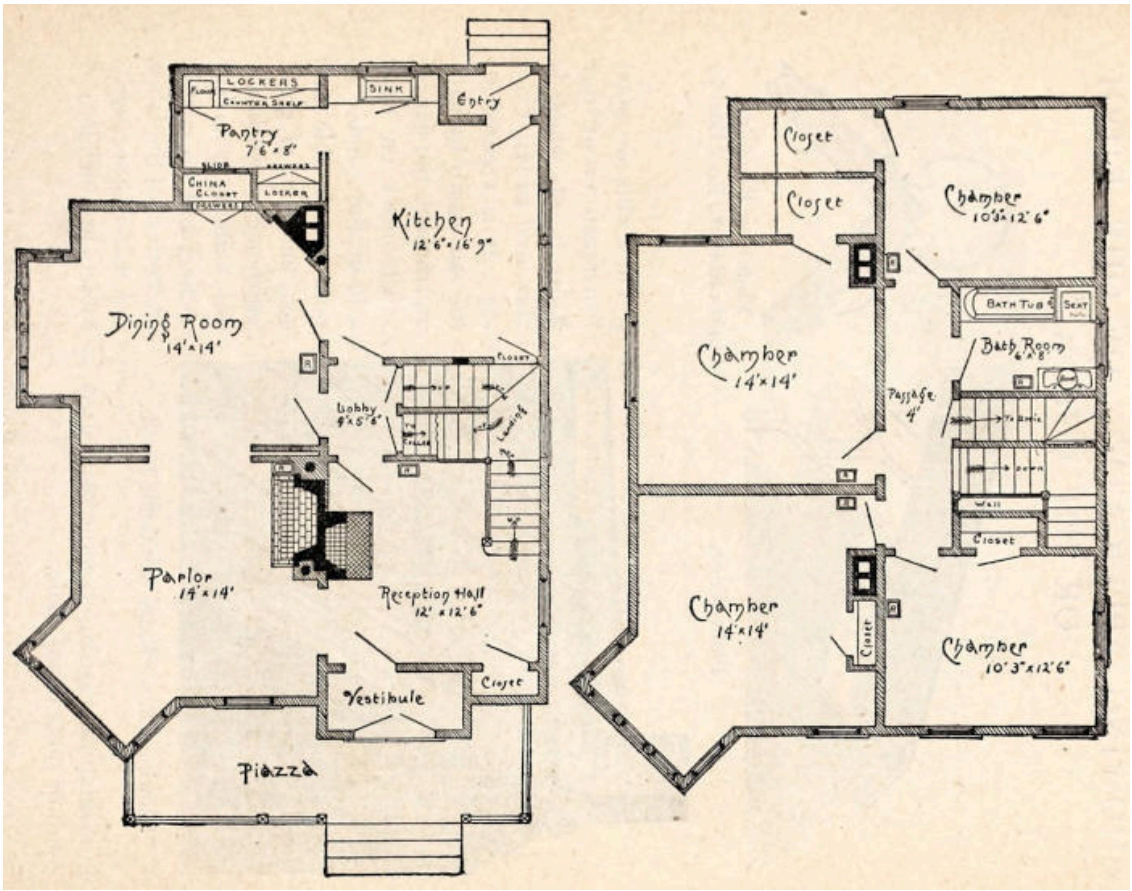
THE NATIONAL SHEET METAL ROOFING CO.,
510 to 520 East 20th St., New York City.



Design J.—*Side Elevation.*

Cover roof with No. 1 Standard 10 × 14 Tin Shingles; use attic vents (see page 73) on main roof, and cover belt courses with 7 × 10 Tin Shingles, same quality as those for main roof.

The plans and elevations of cottages presented in this book have each been specially prepared for some individual by an eminent architect, and the proportions and details can be relied upon.

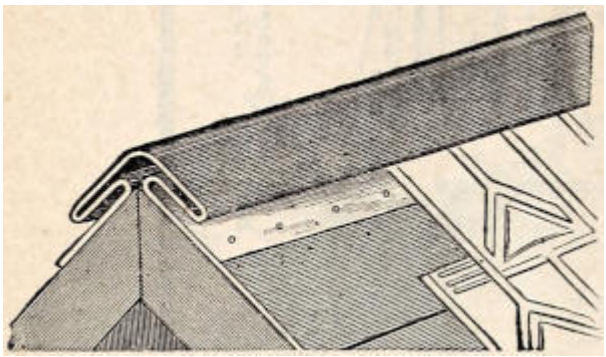


Second Floor.

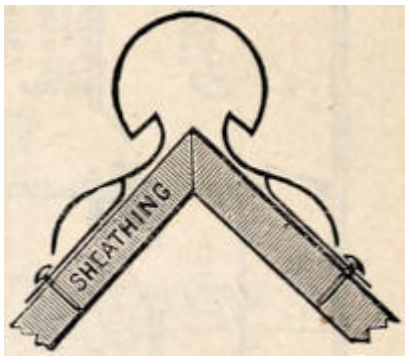
First Floor.

Design J.—(*Elevations, pages 51 and 52.*)

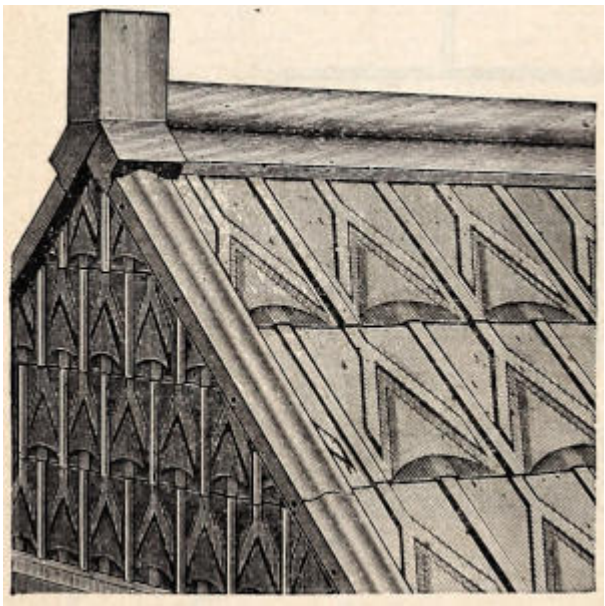
SHOWING APPLICATION OF OUR RIDGE OR HIP COPING.



Plain Ridge.



Manner of Fastening Climax Ridge to Roof Boards.

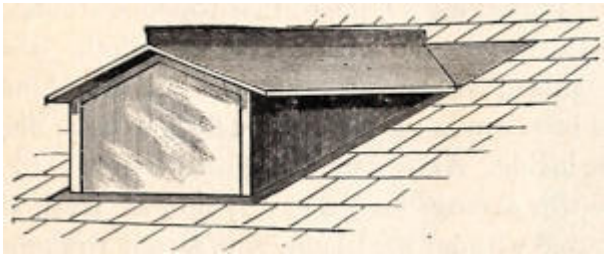


Showing Climax Ridge and Gable Finish.

These cuts are good illustrations of our Ridge Finish, which is also used as Hip Coping. It is secured to the roof comb by nailing through the flange, which rests on each side of the comb. It makes a durable and neat finish; is of great assistance to workmen not skilled in metal roofing, and its cost is no more than the labor and material necessary in making the regular standing seam used by roofers in finishing the comb of sheet metal roofs.

FOR RE-COVERING.—Use our Roofing; no other has the conveniences for rapid laying.

VENTILATION.



The “Attic” Sky-light and Ventilator.
(See page 78.)

As you value health, study well this important subject, which is oftener neglected in constructing dwellings than any other detail. An experienced and observant man can pick from those whom he meets on the street men or women who habitually sleep in badly ventilated rooms. The florist will study and practice the best means to ventilate his propagating house, and ignore the necessity of the same principle for himself and family. Everything that breathes—and what living thing does not?—needs a change of air to remain in a healthy condition. Leaves are the lungs of plants, and, deprived of this change, soon assume a delicate, sickly hue.

Why should the human family, in full possession of reasoning powers, ignore the lesson that is every day before them? By ventilation we mean a system that will constantly supply the dwelling with fresh air; at the same time it draws the vitiated atmosphere from each hall and room in the house. This can be done during the process of erection in a simple, effectual and inexpensive manner. Even if it should cost more than you feel inclined to pay, the result will justify the expense.

There is no better way of creating upward draught than the open fire-place, or a flue built with an opening near the floor. Such flues should not be less than 8 × 8 inches for an ordinary size bedroom, and should, if possible, be built alongside of the chimney flue, and extend through the house-top without openings, except the one nearest the floor in the room it starts from.

As vitiated air is heavier than pure air, and is always nearest the floor, the artificial draught caused by a long, upright flue is constantly at work carrying the lower atmosphere from each room in which these upward and outward draught flues are built. To supply the rooms with fresh air, corresponding flues must be built similar in size and construction to the above. Commence them with outside openings about on a level with the first floor joists, extending upward, and end with openings inward near the ceiling. Each of these openings outside and inside the house should be covered with coarse wire cloth. That made from tinned or galvanized No. 16 wire, with one-half in. meshes, is the best. Care should be taken in building these flues to have them smoothly plastered on the inside. An ornamental finish can be used at each end if desired. By this arrangement a steady flow of fresh air, both night and day, is secured without the ill effects of strong draughts.

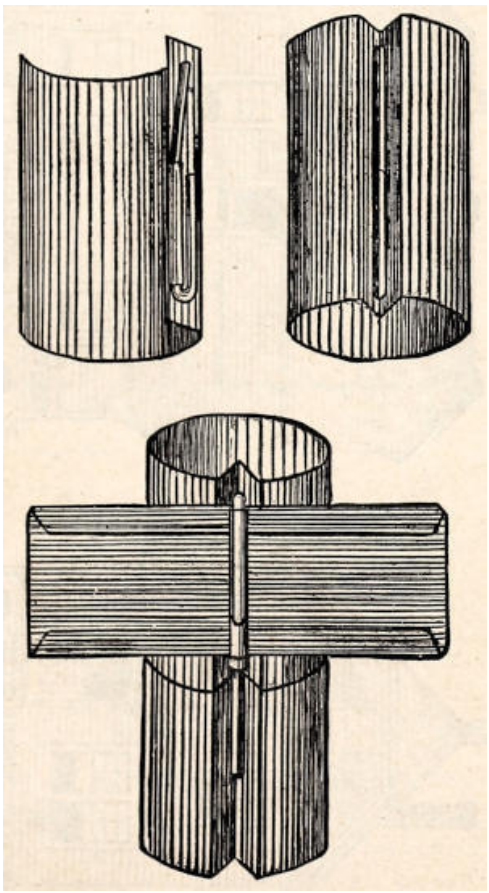
Do not try to economize by using one flue for two or more rooms. Good results are only secured by using a set of flues for each room or hall. I have seen ventilating flues built to open through the cornice. That is a bad plan, for even a slight wind will check the draught while blowing against that side. If the flues are properly finished after passing through the roof the wind will increase the draught. The above suggestions answer equally as well for frame houses. It is easy to construct wood flues between the weatherboarding and lath.

COOPER’S CONDUCTOR OR LEADER PIPE.

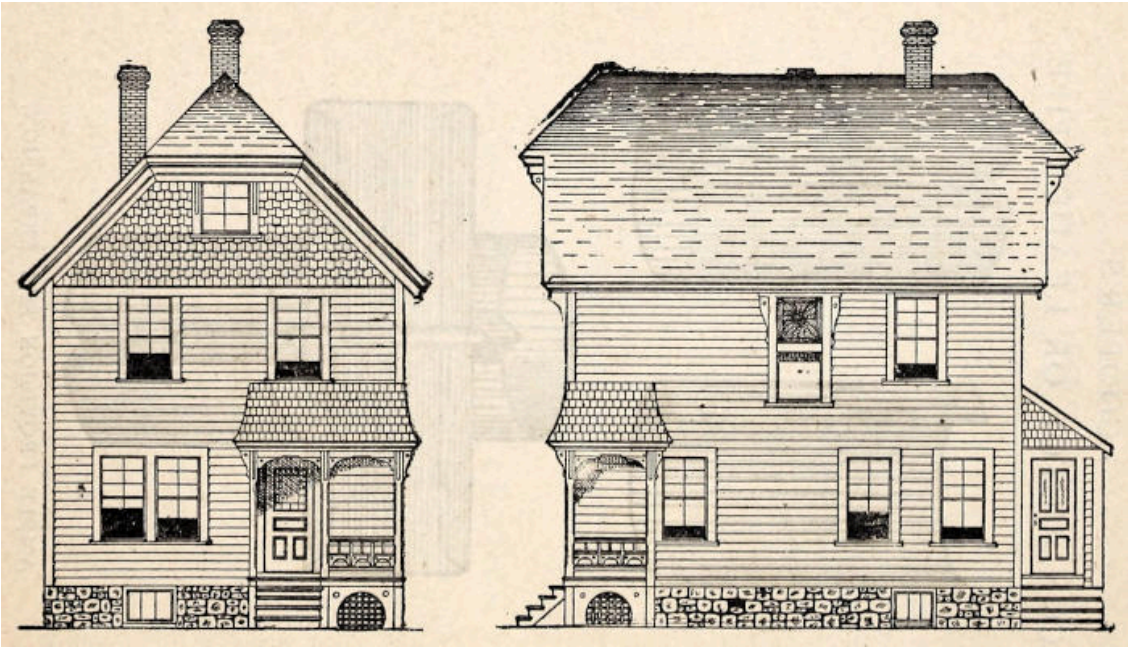
The object of this invention is to supply the builder with a conductor-pipe that will not burst after freezing, which all pipes without provision for expansion are liable when water is frozen solid in them. The peculiarity of the joint lies in the wedge principle, applied in a manner which forces the rim of the inside lap hard against the overlapping end with strength sufficient to do without soldering the joints. Besides this, each joint is provided with a fastening which prevents the pipe from settling. This fastening may or may not be used, but if used in connection with the ordinary pipe hook (which does not prevent the pipe from settling) makes a very superior fastening.

The V-shaped corrugation prevents bursting, as it allows the pipe to expand when frozen, thus preventing its bursting. We make two sizes, three and four inches in diameter, twenty-eight inches long, using tin plate, which we galvanize with zinc after it is formed, making a pipe superior to any galvanized iron pipe of equal weight. We make the same not galvanized, but painted one coat inside and out with linseed oil and oxide of iron paint.

COOPER’S
CONDUCTOR OR LEADER PIPE.



AMPLE PROVISION FOR EXPANSION.

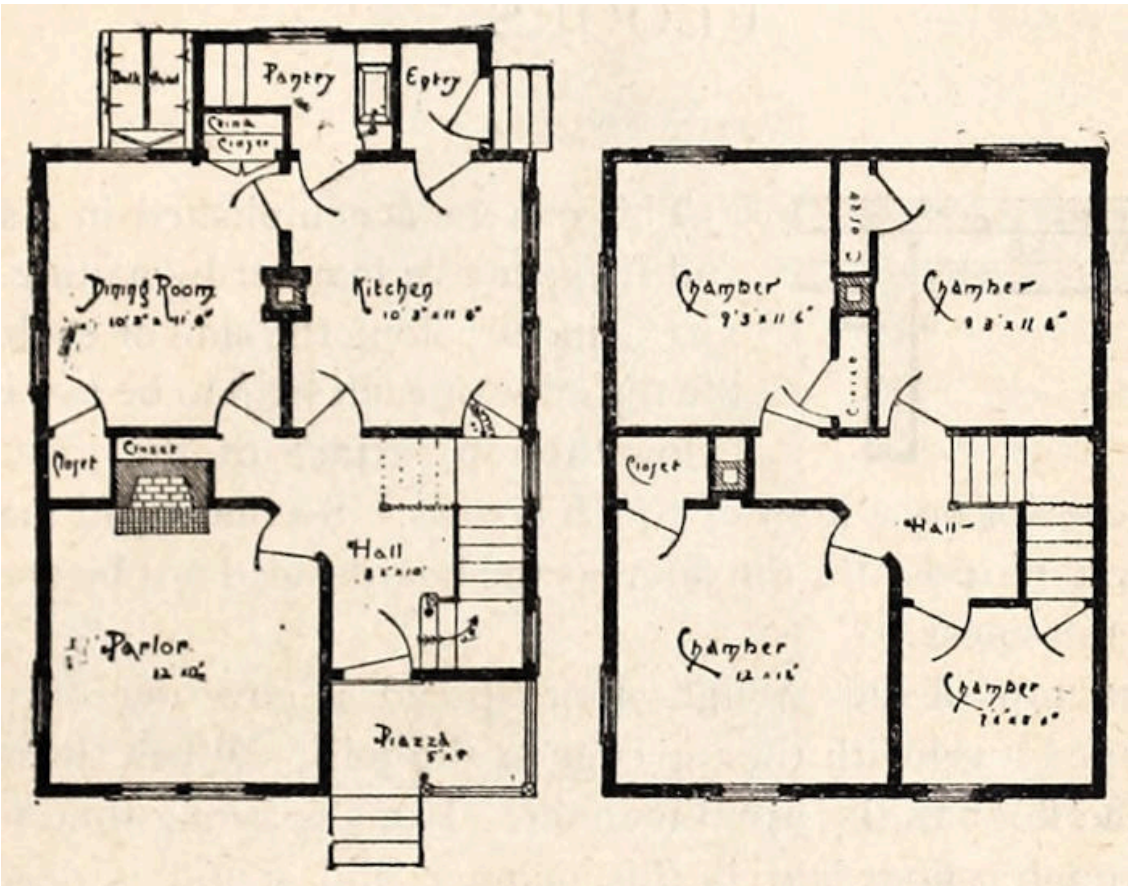


Design B.—*Front and Side Elevation.*

SEVEN-ROOM, TWO-STORY HOUSE.

Estimated Cost, $1,200 to $1,500.

Cover main roof with No. 2 14 × 20 Metal Shingles; gables with same, and porches with 7 × 10, same quality. Attic ventilators will improve the appearance and give additional light to the rooms under roof (see page 73).



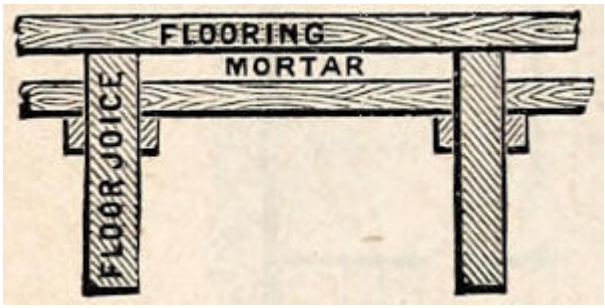
First Floor. *Second Floor.*

Design B.—(*Elevations, page 58.*)

NAILS.

STEEL WIRE BARBED NAILS are superior to any cut nail made. Are lighter, stronger and easier to drive. Holding firmer in the wood, and having a larger flat head, they hold the tin to the roof boards much better, are nearly double the quantity to the pound, and therefore fully as cheap.

DEADENING AND FIRE-PROOFING FLOORS.



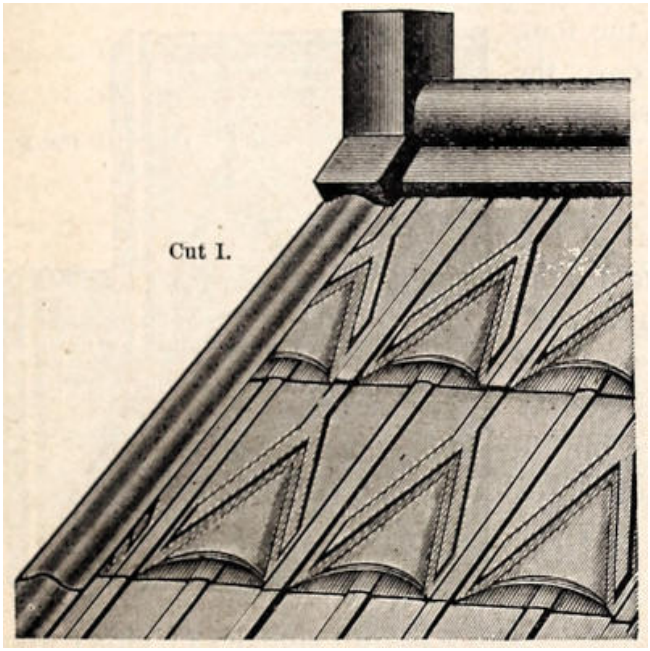
This can be accomplished in a simple and inexpensive manner by nailing strips 1 × 1½ inches along the side of each joist, the top edge of each strip to be two inches below the top surface of the joist. On top of these strips lay a floor of rough boards. Second-hand material answers every purpose for the floor, as the boards need not be matched or of even thickness.

On the top of this rough floor spread a covering of coarse mortar gauged level with the top edge of the joist. When the mortar is dry lay the floor in the usual manner. It takes a long time for fire to burn through a floor laid in this manner, and sound is deadened completely by the mass of non-conducting mortar and the double floors. For fire-proofing and deadening partitions in an effective way, build a four-inch brick wall between the studding. A nail driven every ten or twelve inches in the side of the studding, on the line of the mortar joint, will hold the wall firmly between the studding. Where brick is scarce or expensive, sun dried brick made from stiff clay is a good substitute. They can be made 12 × 12 inches, and thick enough to come within ⅜ of an inch of the lathing. The mortar keys impinging against the wall make the plastering firmer and consequently stronger.

The expense of fire-proofing and deadening in this manner is so small, it is surprising it is not more generally adopted. If the flooring is laid before the mortar used between the joists is dry, it will cause the boards to swell and may bulge them; and when they finally become dry will leave ugly looking cracks

where they join. Remember, you cannot have a well built house without giving Nature time to do her work.

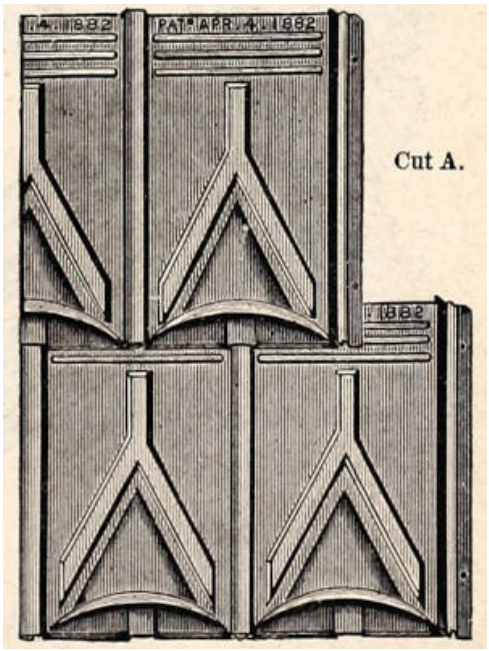
DIRECTIONS FOR LAYING WALTER'S PATENT METALLIC SHINGLES.



Cut I.

Shows manner of finishing with Climax Ridge Stop Block and Gable End Finish.

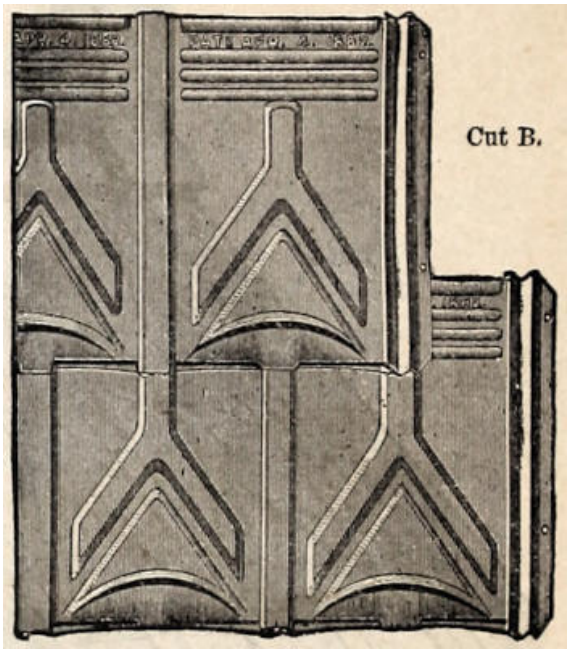
Commence at the lower left-hand corner. In starting be particular to see that you start straight with the eaves of the building. To do this it is best to draw a chalk line about twelve inches from the eaves; this distance leaves two inches to project from the eaves, which in many cases is more than sufficient. If you use our Gable End Finish (Cut I) it saves the trouble of fitting the shingles to the verge board, and adds to the appearance of the roof. After nailing the Gable End Finish to its place, press the left-hand edge of the first shingle well under the fold of the Gable End Finish, and before nailing it hook two or three shingles with the top edge on a line with your chalk line; then remove the loose shingles, and nail the first one which is held to its proper place by the Gable End Finish. By doing this in starting each course you are sure of a straight line if you follow correctly the gauge lines at the top of each shingle.



Cut A.

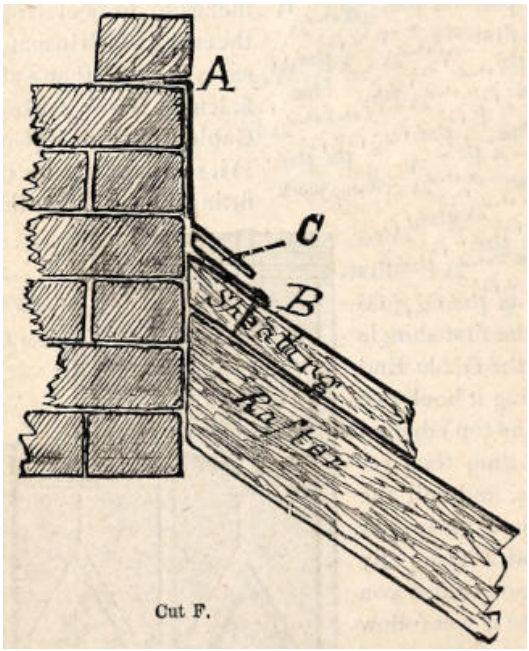
Shows commencement of first two courses.

If your roof has a **pitch of six inches to the foot, or steeper, let the bottom edge of the shingle rest just above the lower gauge line on the top of the underlying shingle, as shown in Cut A**. But if the pitch of the roof is less than six inches to the foot, let the shingle entirely cover the lower gauge line, as shown in Cut B.



Cut B.

We advise against the use of our shingles on roofs of less pitch than five inches to the foot, unless the lap is increased. As a rule, we think any roof that can be walked over with safety is too flat for shingles of either wood or metal.



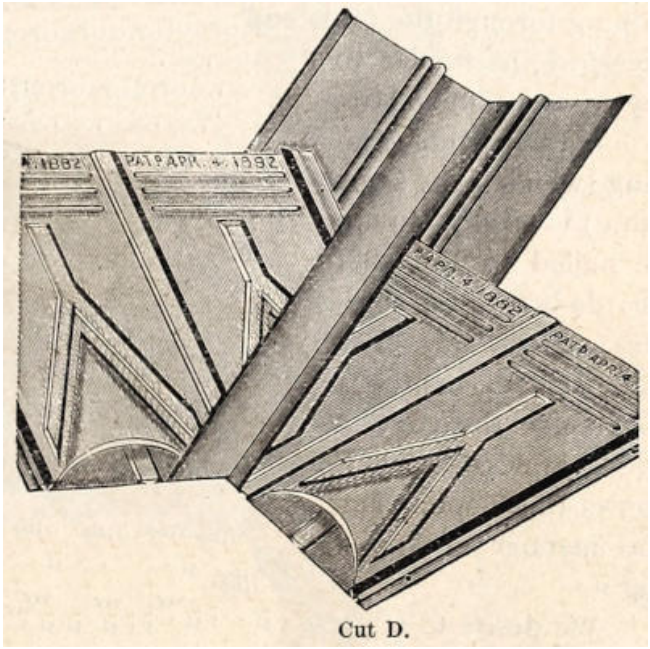
Cut F.

Should there be a gutter formed at the eave, let the shingle rest on it as you would in using the ordinary wood shingle. (Remember every other course **commences with a half shingle, as shown in Cuts A and B**.) The same rules that govern the laying of slate or the common wood shingle along valleys, or about chimneys and dormer windows, are applicable to ours, except the tin shingles are bent up against the sides of chimneys, which cannot be done with wood or slate. When our shingles turn up against the sides of chimneys or brick walls, insert flashing by sawing out the mortar joint above the line of tin work; where the upper edge of our shingles butts against the brick wall, as they do on the lower side of chimneys, cut them off on the line where the chimney comes to the roof, and use a strip of tin bent in this manner. (See Cut F.) The upper end at A is to fit in mortar joint. The lower edge, B, is nailed to the sheathing before the shingles are put on. The upper ends of shingles are then to be pressed up under the fold, C. Great care should be used in finishing about chimneys and dormers, the details of which cannot well be explained to suit each case; but a workman of ordinary skill can suggest the proper manner in which the work should be done to secure thoroughly tight work.

It is much easier to secure this result with the use of our shingles than it is with either wood or slate.

Where the upper end of shingle butts against the side of a frame house, use the same means as on the lower side of chimneys, only let there be no bend at the point A, as shown in Cut F; but let it extend an inch or so up under the weather boarding. Where the weather boarding is vertical there is no way of making tight work but to put the tin work, as before described, back of the vertical weather board.

In laying the valley, cut the tin so it extends to about one-half inch over the lock, and bend it under, as shown in Cut D. We furnish to each customer a small pair of hand-tongs, which is handy to turn this edge over and pinch it together after the shingle is laid.

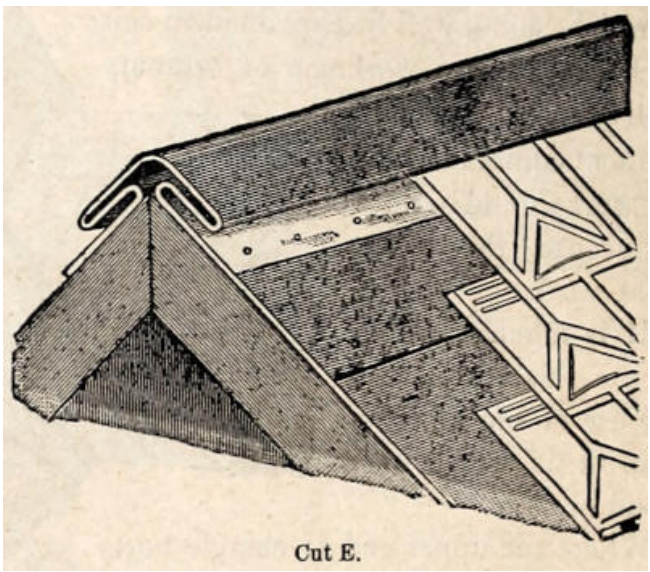


Cut D.

Cut D.

The Cut D represents the shingles laid to and from the valley. In starting from the valley it is best to hold several shingles together, or tack them at the top, then with a straight-edge mark and cut where they overlap the valley; and with the hand-tongs edge and lock them to the valley, as shown in cut D.

Use the Hip Coping by nailing the edges to the roof boards, and press the shingle up under the folds on each side after they are cut to suit the angle of the hip. (See Cut E.)


Cut E.

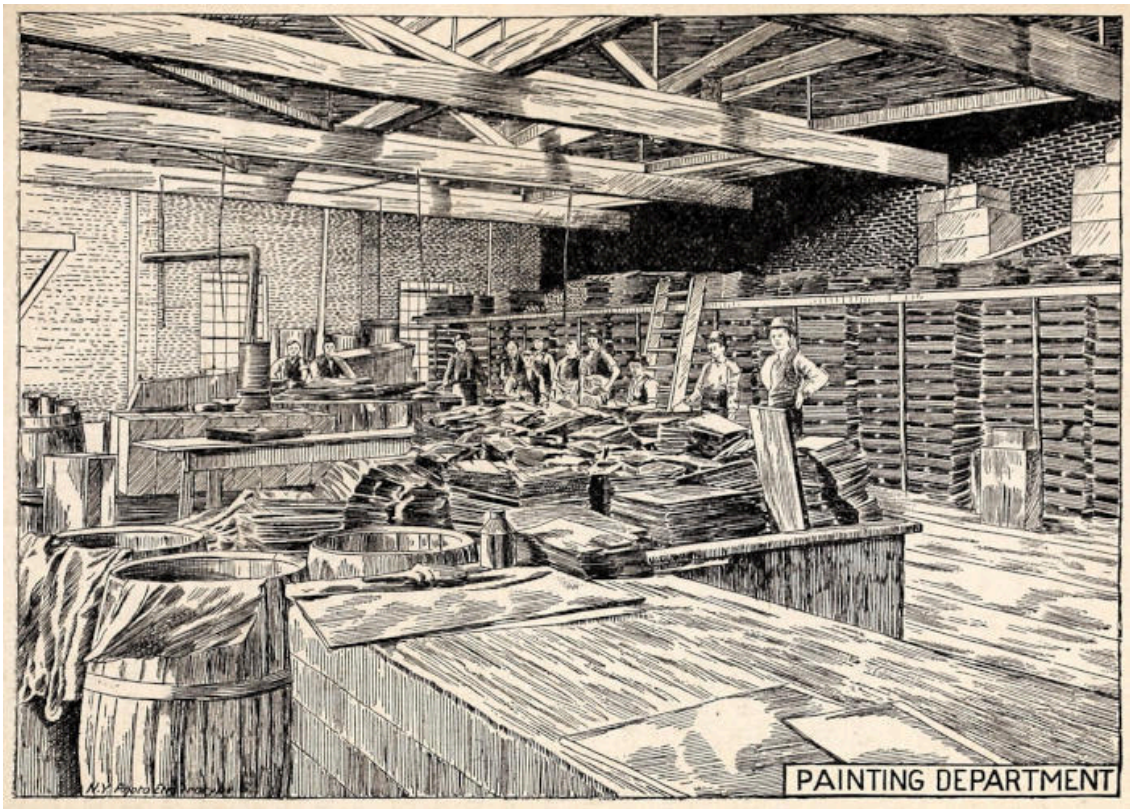
Cut E.

As plain as this appears, we have known men to nail the Hip Coping through the folds and on the top of the shingles. We are, therefore, particular to say wherever this Hip, or our Plain Ridge Coping (which is the same thing) is used it should be nailed to the roof boards before the shingles are put on. The fold is

made expressly to receive the edge of the shingles. Cut E shows this coping and the manner of applying it.

We desire to impress upon our customers, who live in the Northern States, where blizzards and severe snow storms are frequent, the necessity of using close sheathing, and if the sheathing is not close, **the use of sheathing paper, to be laid underneath the shingles**; it adds greatly to the warmth of the house in winter, and prevents small particles of snow from entering, it costs but little, and should always be used under wood, slate or tin shingles where the best protection is desired.

DO NOT HAMMER DOWN THE JOINTS OR LOCK.



PAINTING DEPARTMENT

PAINTING.

After the mason, bricklayer, carpenter, tinsmith and plasterer comes the painter. At this stage of progress in the work, the owner usually thinks of moving in; in fact, he thinks he should have been living in his new house several weeks ago.

If weather conditions have been good, the representatives of other branches of house building have got along smoothly excepting a little shaking up now and then, caused mostly by the men occasionally yielding to the seductive influences of Old John Barleycorn or his rival King Growler. The owner, having previously engaged or contracted for inside painting, now calls on the painter. The man of colors and brushes is always ready to promise quick work (and we are free to say the mysteries of his trade are equal to any reasonable emergency), and is apt to humor his employer's impatience, and meekly submits to his wishes knowing that his employer's hurry is his gain. House-builder, did it ever occur to you that first-class inside painting is a slow process? Think of this; after the first coat is laid, it should stand long enough to become thoroughly dry, dry enough to be sand-papered. The second coat should be a little heavier than the first or priming coat. It does not dry as fast as the first. (We are speaking of good materials properly proportioned.) Each coat must be thoroughly dry before it is sand-papered. Any kind of good work requires three coats. Extra good work—four, besides varnishing.

If you succeed in doing this work inside of four weeks you are fortunate. Thus you see it requires time to do good work. Time for the men to do theirs, and time for Nature to do hers. Sometimes Nature frowns and lowers a curtain of humidity for days at a time, which prevents the oils from drying. It is possible for your painter to finish all four coats in as many days; but if he is honest and you have not hurried him unreasonably, his conscience will suffer. Good painting, like

other good things, is durable, looks well, and is the cheapest in the end.

Good painters pride themselves on doing good work. So if you desire first-class work, you should give the painter a reasonable price, and sufficient time in which to do the work properly.

There is doubtless more adulteration in paint than in any materials used in house-finishing. So general is this the case that it is often difficult to get pure materials. This is caused by the low price of the products of petroleum, the earth materials used to adulterate mineral paints, and the demand for cheap work.

ATTENTION, ROOFERS!

Our BROAD RIB ROOFING and STEEL PLATE SHINGLES are not protected with a coat of richer metal like those made of tin or terne plate, and consequently their *durability depends upon the paint* with which they should be covered.

For this purpose nothing, so far as we know, is equal to a mixture of *pure unboiled linseed oil* and the *oxide of iron*. The Shingles should have two coats, one before they are put on, on both sides (this we do), the other immediately *after they are laid*. This last coat should be repeated *every four or five years*.

Remember, it is the *rust-preventing* qualities of linseed oil, combined with the oxide of iron, that makes steel or iron sheets resist the corrosive action of oxygen, which is ever present in the atmosphere. (See page 101.)

A PERFECT ROOF.

The best can only be obtained by using good materials, worked into the best form that theory and experience can suggest.

WALTER'S PATENT "STANDARD" AND
COOPER'S PATENT "QUEEN ANNE"
METALLIC SHINGLES AND SIDING,

made from Tin Plate, Steel Plate, Galvanized Tin Plate, Bronze Metal, and Copper, are unrivaled for roof covering.

BECAUSE they have a perfect lock, using no cleats, springs or exposed seams.

BECAUSE they have no exposed fastenings; all nail heads are covered as perfectly as those used for wood shingles.

BECAUSE they can be applied without the necessity of soldering, and with no other tools than a hammer, a small pair of hand-tongs and tin shears.

BECAUSE they break joints by starting each alternate course with a half shingle, thus bringing the centre of the bottom of each shingle astraddle of the locked shingle below, securely binding the same and preventing rattling.

BECAUSE they are easily and rapidly put on, requiring no odd pieces at the eaves, gables or comb.

BECAUSE they lessen the expense of insurance, which extends not only to the building but to furniture and goods contained therein.

BECAUSE they do not crack, split, warp, fall off, rust or burn.

BECAUSE there are no cross seams or joints where rain or moisture can settle and cause decay.

BECAUSE we furnish with our shingles, at moderate cost, Valleys, Gable Strips, Ridge and Hip Coping, that not

only improves the finish of exterior, but assists the workman to an extent that lessens the cost of applying.

Manufactured by

THE NATIONAL SHEET METAL ROOFING CO.,
510 to 520 East 20th Street, New York City,

and for sale by Dealers in all the principal cities of the United States and Canada.

From BARTLETT HARDWARE CO.,

Freeport, Ill., January 10th, 1888.

THE NATIONAL SHEET METAL ROOFING CO., New York City.

Dear Sirs:—I send you photo. of my house that you may see how handsome a Roof the 7 × 10 Shingles make. You thought the 10 × 14 would have been better, but this is the finest roof in this country, and we expect to sell some the present year. Everybody admires it. Please quote for the coming season's trade.

Very respectfully,

F. BARTLETT, President.

WHAT OUR GOODS ARE.

In offering our goods to the public, we desire to say, briefly, that the *Walter's Patent Metallic Shingles and Siding Plates* have now been before this country for nearly eight years, upwards of twelve thousand buildings have been covered with them in the United States and Canada, and we feel warranted in referring to the owners of every building so covered.

Our shingles have a concealed nailing flange the entire length of the shingle on one side, and a perfect lock with a concealed gutter at the side of the nailing flange that provides for *expansion and contraction*, with sufficient ventilation to prevent sweating on the under-side, (causing rust,) so common in the cross seams of flat lock and standing seam, now in use.

Our Galvanized (Re-dipped) Shingle is our Standard Tin Shingle galvanized; and, as every square has twenty pounds of zinc coating, in addition to the first coat of tin, it will be seen why it is superior to any galvanized iron made.

Our "Old Process" prices are designed to cover such grades of double-coated plates as "Old Style," "M.F.," "Phelp's Triple Plate," "Gilbertson's Old Method," and "Tregoning Old Process," all superior to the Standard Grades, and higher in price. We quote all but Galvanized, painted both sides. If any size or kind is ordered unpainted, the price will be 25 cents per square less.

Our Steel Plate Shingles are made from sheets of Bessemer steel rolled as smooth as tin plate, they are painted the same as the Standard Shingles, and when laid on a roof cannot be distinguished from them. They should be painted every five years with pure linseed oil and oxide of iron (brown mineral). They will not bear neglect; in this respect they differ from shingles made from tin plate. The price is somewhat less, but the greater durability of the Tin Shingles is worth more than the difference in price.

We make our shingles in four sizes: The smallest, 7 × 10, (showing an exposed surface, after laid, of 5½ × 9 inches,) is designed for Mansards, Spires, Siding, and other upright work. The 10 × 14, (exposed surface, 8¼ × 11½ inches,) is the popular size; and while it works to the best advantage on complicated roofs, it is equally good for plain ones. The 14 × 20, (exposed surface, 12 × 17½ inches,) is used largely on the plainer roofs, where a saving in price and labor of putting on is an item. The 20 × 28, (exposed surface, 17½ × 25½ inches,) is made from heavier metal, and is designed for warehouses, and other large surfaces; and any of the larger shingles can be used for siding equally as well.

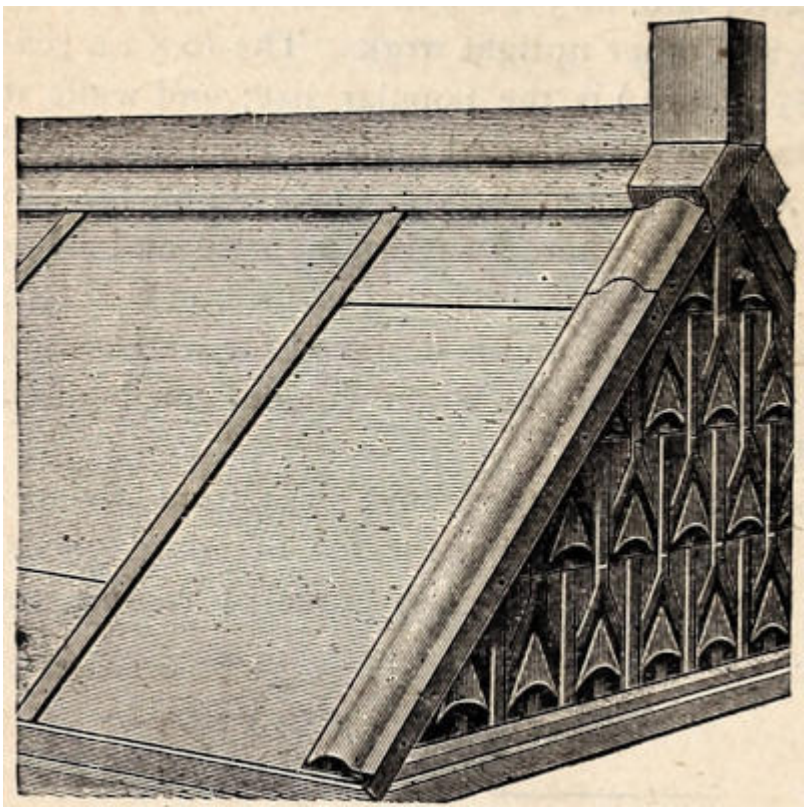
We are prepared to make any of the above sizes from any special brand of tin plate in the market, but for our Standard goods, which we carry in stock, we use a first-class grade of roofing tin plate, warranted perfect.

SAMPLES.

We will send free, and charges paid, samples of our WALTER'S PATENT SHINGLES (three pieces) to any address in the United States on receipt of five two-cent stamps; this does not pay us one-half the expense, but we propose to make the cost as light as possible to those interested in building.

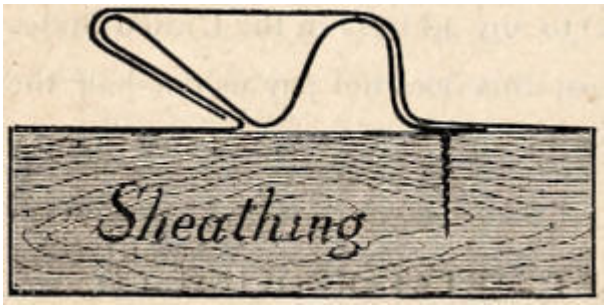
THE NATIONAL SHEET METAL ROOFING CO.,
510 to 520 East 20th Street,
New York City.

BROAD RIB ROOFING,



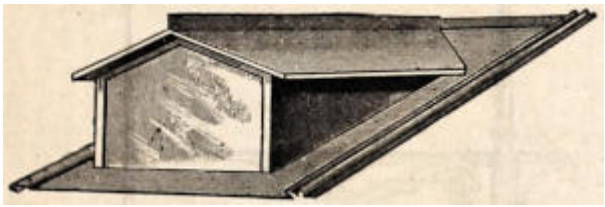
Like Our Shingles, has a nailing flange the entire length of each sheet. **It forms a Continuous Rib** when applied from eaves to comb with cross seams twenty-five inches apart, which gives it strength and rigidity not found in roofing where longer sheets are used. **It has no protruding** anchors, cleats or rivets; all nail heads are covered as perfectly as those used for wood shingles. **There is no waste** in using, either at comb or eaves. **The Side Nailing Flange** admits of the roof being fastened to roof boards with any required degree of strength. **The Cross Seams** are formed with a folded lock which allows for contraction and expansion. **Material.**—Each sheet of this roofing is made from Best Roofing Tin, or Imported Siemen's Sheet Steel, which is hard rolled, tough, durable and **thoroughly coated** on both sides with the best Oxide of Iron and Linseed Oil Paint. The size of sheets are 20 × 28 inches. **Tools.**—We send with each order one pair of *Metal Shears*, one *Mallet*, and a *Draw Tool*, for which we make a charge of two dollars. These tools can be returned to us by express at our expense, and the purchaser

credited, or the money paid for them returned. **Important Improvements** in the manufacture of Steel Sheets enable us to put this on the market at the same price as Sheet Iron Roofing, to which it is greatly superior. **The Rib is formed** of the Walter's Patent Lock, and is the same we have used on our shingles for the last seven years. This Lock has been thoroughly tested, and it is significant that over 25,000,000 square feet of shingles constructed upon this plan are already in use in the United States and Canada. The application of this Lock does away with a very large proportion of the work necessary in laying standing seam roofs as ordinarily applied, such as tonging up the seams, double seaming, capping or riveting the ribs, and making and using cleats or other fastenings. This roofing costs no more than wood shingles in sections where good timber is scarce. Each sheet is made from plates 20 × 28 inches. **WRITE FOR PRICES.**



The National Sheet Metal Roofing Co., 510-520 E. 20th St., N. Y. City.

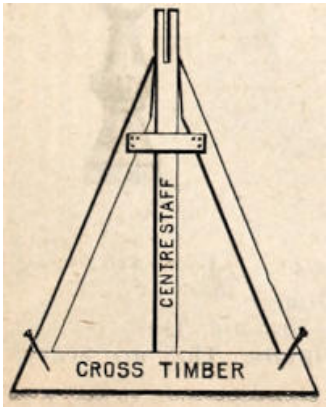
THE “ATTIC” SKY-LIGHT AND VENTILATOR.



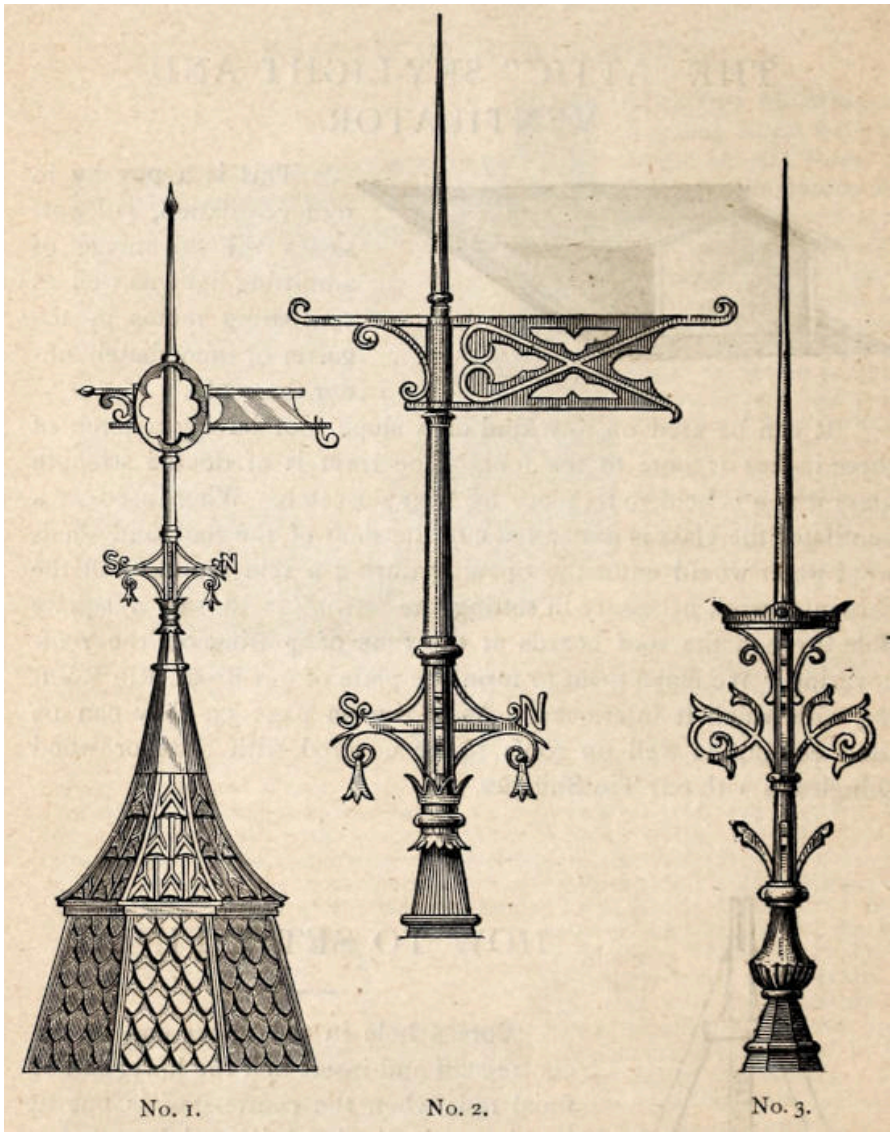
This is a novelty in roof ventilation, and possesses the advantage of admitting light as well as ventilating rooms in the garret or immediately under the roof.

It can be used on any kind of a slope roof having a pitch of three inches or more to the foot. The front is of double strength glass which is held to its place by a single catch. When used as a ventilator the glass is drawn back to the slant of the roof, and sheds what water would enter the opening during a rain storm. All the carpenter work necessary in setting the “Attic” is to saw a square hole through the roof boards at the time of putting on the roof-covering. We make them to form one plate of our Broad Rib Roofing with which it interlocks. As shown on page 55, they can be used equally as well on roofs to be covered with slate or wood shingles as with our Tin Shingles.

HOW TO SET A FINIAL.



Bore a hole in the upper end of the centre-staff and insert in it the lower end of finial rod; when the centre-staff is put to its place, plumb the finial rod by moving the lower end of the centre-staff before it is nailed to the floor or cross timbers. (See page 74.)



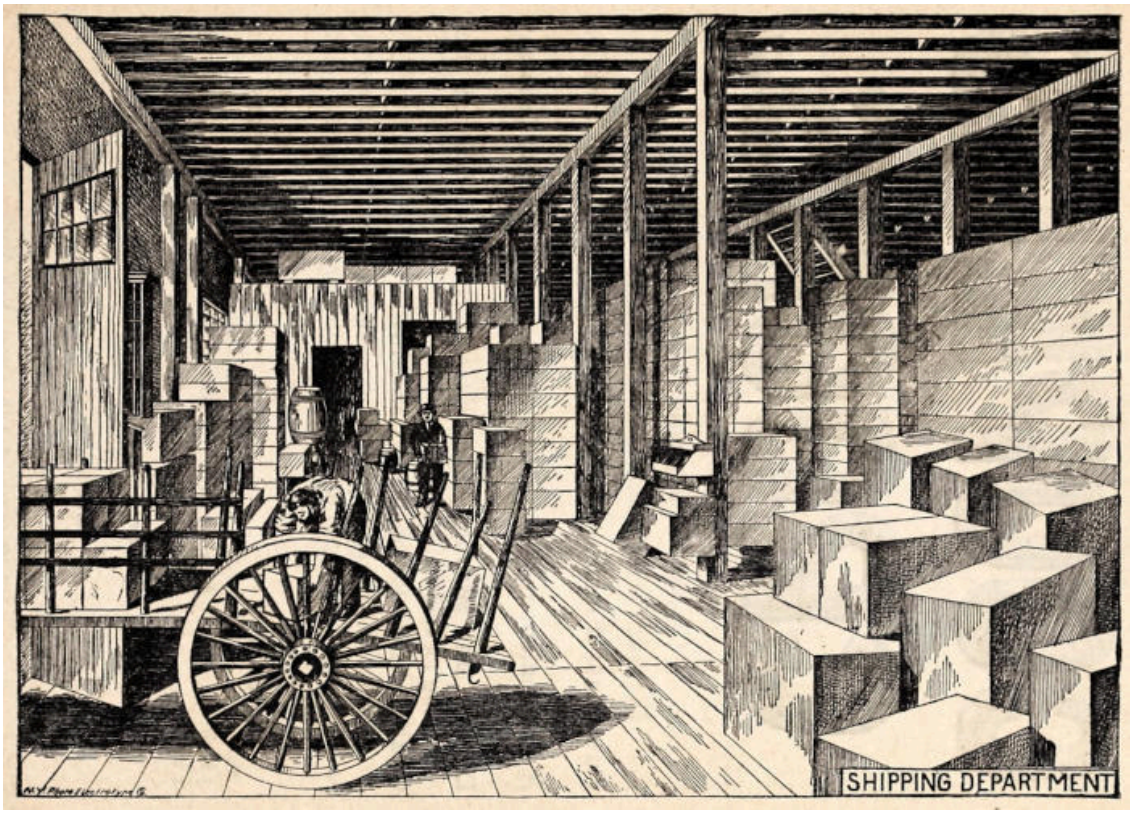
No. 1. No. 2. No. 3.

NET PRICES: 5 Foot $12.00. 6 Foot $14.40. 7 Foot $16.80.

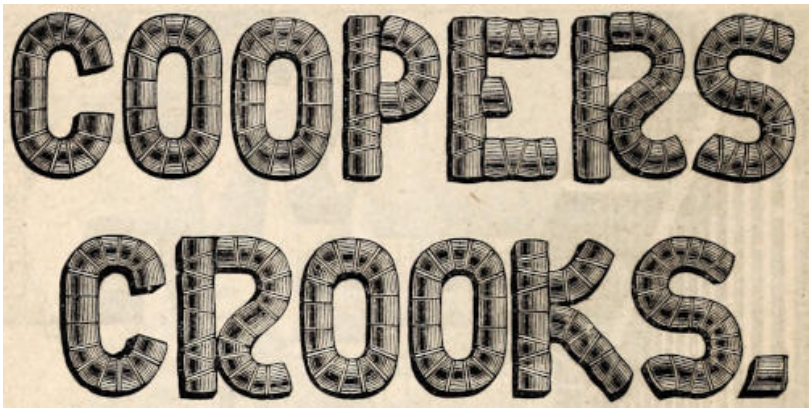
For either Round, Square or Octagon.

No. 1 includes all above the Shingles. (See page 73.)

There is no shoddy work about these Finials. They are heavy, substantially made and zinc coated.



SHIPPING DEPARTMENT



COOPERS CROOKS.

(Patented August 20th, 1889.)

Complete and in Sections. Fixed and Adjustable.

The most Perfect Machine-made Elbow ever manufactured.

First-class Finish.—Each piece is a perfect section of a curved tube.

A Convenience.—The sections can be put together to form any angle.

Durable and Strong.—The finished elbows are redipped after being locked and riveted.

Quality.—Both Retinned and Galvanized.

Perfect in fitting, uniform in size and quality. Just what the practical tinsmith should use for conductors and vent pipes.

ADJUSTABLE.			FIXED.			IN SECTIONS.	
Size.	Tin.	Galv'd.	Size.	Tin.	Galv'd.	Size.	Tin.
3 inch	$1.55	$2.00	3 inch	$2.00	$2.00	3 inch	$1.45
4 inch	2.80	3.90	4 inch	3.90	3.90	4 inch	2.50

Discount.....

MANUFACTURED ONLY BY
THE NATIONAL SHEET METAL ROOFING CO.
510 to 520 East 20th Street, New York.

WEIGHTS.

Our goods weigh, when boxed ready for shipment, as follows:

14 × 20,	No. 1, Standard	84 lbs.
10 × 14,	“ “	92 “
7 × 10,	“ “	89 “
14 × 20,	No. 2, Steel	83 “
10 × 14,	“ “	89 “
14 × 20,	No. 3, M. F.	100 “
10 × 14,	“ “	108 “
7 × 10,	“ “	108 “
14 × 20,	No. 4, Galvanized	104½ “
10 × 14,	“ “	109½ “
7 × 10,	“ “	109½ “
Queen Anne, No. 6, Standard		121½ “
“ “ “	Galvanized	144 “
Broad Rib, No. 8, Standard		88 “
“ “ “	Steel	87 “
50 ft. Climax Ridge Coping, Tin		56½ “
50 ft. “ “ “	Galvanized	71 “
50 ft. Hip, Tin		38 “
50 ft. “	Galvanized	43 “
50 ft. Valley, Tin		45½ “
50 ft. “	Galvanized	53 “
50 ft. Gable, Tin		12½ “
50 ft. “	Galvanized	15½ “

HOW METAL SHINGLES ARE MADE.

Shingles made from wood have been common all over the world for ages. Their particular form has remained unchanged because many years' experience has proven it to be the most durable and surest safe-guard against storms. What is true of wood for roof covering is equally true of metal for the same purpose. The first metal roofing made in America was tin sheets, laid shingle fashion, the overlapped edges of which covered the nail heads which were used to fasten them to the roof boards. Many of these old-fashioned metal (tin plate) roofs are yet in existence that were covered over one hundred years ago. The writer covered several houses in 1849 in this manner, which are in good condition now. The reason why this style of metal roofing was not common was its expense. On page 16 we give reasons why it would be more durable than the ordinary mode of laying tin roofing.

The use of Walter's and Cooper's patent in constructing metal shingles does away with the expense, which was a great drawback to their use, and leaves no excuse for the use of cheap, combustible material.

The National Sheet Metal Roofing Co., of New York City, have for the past eight years been manufacturing these shingles, and their use on a vast number of public and private buildings in all parts of the United States and Canada attest their superiority. Thinking that our readers would be pleased to see the process of making these shingles, we illustrate on pages 65 and 75 views taken from photographs of their paint and store room. The process requires two press operations for each shingle, and each press averages a turn out of 4,000 square feet (which is 40 squares) per day. The dies which give shape and form the corrugations of the shingles are faced with polished steel, which leaves no abrasions where they come in contact with the metal. During the past year they have added four new presses to this department to meet the requirements of the increased demand for their goods. They spare no pains

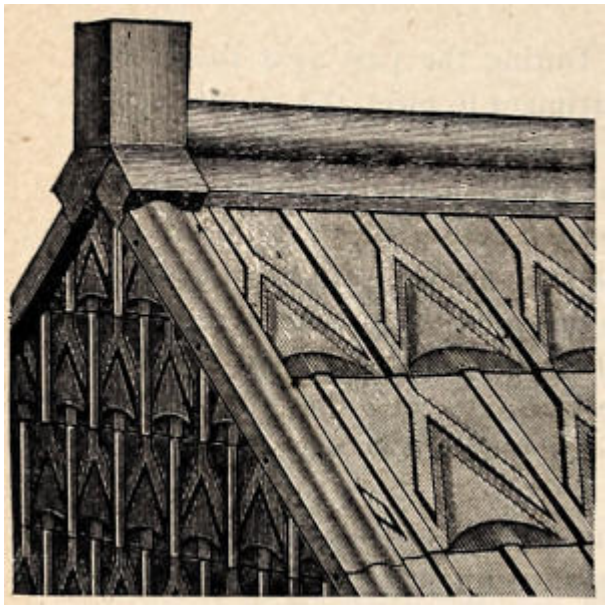
to make their shingles as perfect as the best machinery can make them. All their shingles are carefully inspected before they are boxed and sent to the store room, from which they are shipped to all parts of the country. The machinery room in which the presses are located is 37 feet wide by 80 feet long, the painting department is 80 × 55 feet, and the store room the same size. We give these figures that you may form an opinion of the space required to manufacture and handle their goods.

The process of painting is first dipping the shingles in a vat of pure linseed oil and oxide of iron paint with just enough turpentine to assist in drying. They are then set on edge and left to drain, after which they are gone over with a brush and set in racks to dry, which requires several days, according to the humidity of the atmosphere. They are all air dried, no artificial heat being used. Their customers are cordially invited to call at any time and see the process of manufacturing.

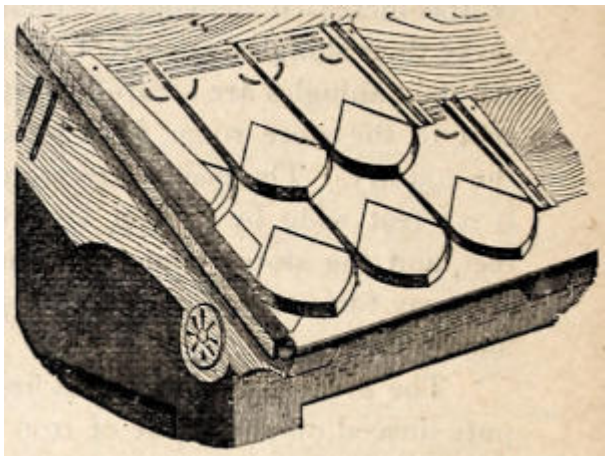
"Why don't you mend your roof my man?"
He drew him closer to the wall,
And answered with a lazy drawl:
"When 't rains so hard I never can."

"Why don't you mend it when it's fair?"
"Oh, then it doesn't need repair!"
He blandly said
As he turned his head
And shook the raindrops from his hair.

From *The Metal Worker*.



Walter's Patent Standard Shingles.



Cooper's Patent Queen Anne Metallic Shingles.

PUBLIC BUILDINGS ON WHICH THE ABOVE METAL SHINGLES ARE USED.

RELIGIOUS INSTITUTIONS.

Independent Pres. Church, Savannah, Ga.

South-West Pres. Church, Omaha, Neb.

Methodist Church, Stony Point, N. Y.

Methodist Church, Graniteville, Conn.

Methodist Church, Broad River, Conn.

Asbury Methodist Church, Providence, R. I.

Second Methodist Church, Kingston, N. Y.

Pisgah Methodist Church, Pisgah, Md.

Methodist Church, Thomasville, Ga.

Elm St. Methodist Church, Nashville, Tenn.

East Nashville Methodist Church, Nashville, Tenn.

Methodist Church, Manheim, Pa.

Roman Catholic Church, Trinidad, Col.

Roman Catholic Church, Albuquerque, New Mexico.

German Evangelical Church, New Harmony, Ind.

Holy Apostles' P. E. Church, St. Clair, Pa.

R. C. Church of St. Cecelia, N. Y. City.

R. C. Apostolic Church, Toronto, Ont.

St. Patrick's R. C. Cathedral, Ottawa, Canada.

Baptist Church, Tura, India.

Winthrop St. Baptist Church, Taunton, Mass.

Second Baptist Church, Lawrence, Mass.

Berkeley Ave. Bap. Church, Berkeley, Va.

Baptist Church, Danbury, Conn.

Colored Baptist Church, Augusta, Ga.

Christ Episcopal Church, Richmond, Va.

St. John's Epis. Church, Richmond, Va.

Christ Episcopal Church, Port Tobacco, Md.

St. Clement's Episcopal Church, Chicago, Ill.

Mission Church, Aintab, Turkey.

Mission Church, Kiota, Japan.

Bethany Chapel, Troy, N. Y.

Colonial Beach Chapel, Va.

Plymouth Church, Charleston, S. C.

M. E. Church, McMinville, Tenn.

First M. E. Church, Jackson, Mich.

Christian Church, Little Rock, Ark.

Second Baptist Church, Little Rock, Ark.

First Pres. Church, Gainesville, Fla.

M. E. Church, Beatrice, Neb.

Round Hill Church, Va.

St. Paul Lutheran Church, Lititz, Pa.

Salvation Army Barracks, South Norwalk, Conn.

Methodist Church, Salt Lake City.

Christian Church, Belton, Texas.

Salvation Army Barracks, Matteawan, N. Y.

First Cong. Church, Daytona, Fla.

Jewish Synagogue, Brunswick, Ga.

RAILROADS.

Savannah, Florida and Western R. R.

North-Eastern R. R. of South Carolina.

Western and North Carolina R. R.

New York, Susquehanna and Western R. R.

Chesapeake and Ohio R. R.

Florida Railway & Navigation Company.

South Florida Railway.

Virginia Midland Railway.

Richmond and Danville R. R.

Newport News and Mississippi Valley R. R.

Chicago and Evanston R. R.

Jacksonville, Tampa and Key West R. R.

Interstate Rapid Transit Co., Kansas City, Mo.

Kansas City Cable Railway, Kansas City, Mo.

Union Passenger Railroad Co., Richmond, Va.

Franklin Avenue Line, St. Louis, Mo.

West Nashville Railroad Depot, West Nashville, Tenn.

St. Johns and Halifax R. R.

Maryland Central R. R.

Cornwall and Lebanon R. R. Co.

EDUCATIONAL INSTITUTIONS.

DePaw College, Greencastle, Ind.

Mississippi Industrial Institute and College, Columbus, Miss.

St. John's College, Tremont, N. Y.

Las Vegas College, Las Vegas, New Mexico.

Loyola College, Collington, Md.

Woodstock College, Woodstock, Md.

Medical College, Nashville, Tenn.

Dayel College, Sparta, Tenn.

Dakota University, Mitchell, Dakota.

Public School, Richfield Springs, N. Y.

Public School, Greenville, Ky.

Public School, McCook, Neb.

Public School, Dodge City, Kansas.

Public School, Marion, Ill.

Public School, Elizabeth, Pa.

Public School, Freeport, Ill.

Public School, Paw Paw, Ill.

Public School, Hutchinson, Minn.

Thirteenth District School, Nashville, Tenn.

Tenth District School, Nashville, Tenn.

Thirteenth Ward Grammar School, Nashville, Tenn.

Fogg High School, Nashville, Tenn.

Caldwell High School, Nashville, Tenn.

Tampa High School, Tampa, Fla.

Public School, Forward Township, Allegheny Co., Pa.

Tarbox School, Nashville, Tenn.

Searight School, Nashville, Tenn.

Niagara Falls Museum, Niag. Falls, N. Y.

Hotels and State and County Buildings.

Florida State Capitol, Tallahassee, Fla.

Washtenaw County Jail, Ann Arbor, Mich.

Bristol County House of Correction, New Bedford, Mass.

Government Penitentiary, Kingston, Ont.

Main Street Central Police Station, Charleston, S. C.

United States Soldiers' Home, Leavenworth, Kansas.

Wm. Houston Home, Charleston, S. C.

Deaf and Dumb Institute, Jacksonville, Ill.

Insane Asylum, Fort Steilacoom, Wash. Terr.

United States Marine Barracks, Pensacola, Fla.

Colorado State Insane Asylum, Pueblo, Col.

Asylum for Feeble Minded, Beatrice, Neb.

Tenn. Insane Asylum, Nashville, Tenn.

County Asylum, Sparta, Tenn.

City Hospital, Charleston, S. C.

Towers of Minneapolis Exhibition Building, Minneapolis, Minn.

Horticultural Hall, World's Exposition, New Orleans, La.

Plymount County Agricultural Society Building, Brockton, Mass.

Public Library, Coldwater, Mich.

Fair Association Buildings, St. Louis, Mo.

Grand Army of the Republic Hall, Janesville, Iowa.

Caledonian Rink, Ottawa, Canada.

Park Building, West Nashville, Tenn.

Concordia Association Building, Little Rock, Ark.

U. S. Commissioners' Building, Salt Lake City, Utah.

Board of Trade Bldg., Little Rock, Ark.

Exchange Building, West Nashville, Tenn.

Lyons Water Works Buildings, Lyons, N. Y.

Water Works Buildings, Battle Creek, Mich.

City Water Works Buildings, Ottawa, Canada.

Barclay St. Ferry House, New York City.

Oakland Mills, Taunton, Mass.

I. O. O. F. Building, Port Clinton, Ohio.

I. O. O. F. Building, Savannah, Ga.

Masonic Temple, Savannah, Ga.

Masonic Temple, Daytona, Fla.

Union County Court House, Union, S. C.

Ford County Court House, Dodge City, Kansas.

Ontonogan County Building, Houghton, Mich.

Court House, Jonesborough, Ark.

Hamilton County Court House, Texas.

Menard County Court House, Texas.

H. I. Kimball Hotel, Atlanta, Ga.

Burlington Hotel, Burlington, Vermont.

Fayetteville Hotel, Fayetteville, N. C.

Mitchell Hotel, Thomasville, Ga.

Arlington Hotel, Augusta, Ga.

Summerville Hotel, Augusta, Ga.

Cottage Hotel, Nunda, N. Y.

City Hotel, Beatrice, Neb.

Opera House, Junction City, Kansas.

Grand Opera House, St. Louis, Mo.

Overland Casino, Nashville, Tenn.

Opera House, Tavares, Fla.

North River Steamboat Co., Haverstraw, N. Y.

New Central Station, Charleston, S. C.

Lower Station House Stables, Charleston, S. C.

Mechanics' Union Hall, No. 1, Charleston, S. C.

Oneida County Asylum, Rome, N. Y.

Wheeler Elevator, Buffalo, N. Y.

Ontario Elevator, Buffalo, N. Y.

A. W. Stevens & Son, Auburn, N. Y.

City Buildings, Taunton, Mass.

I. O. U. W. Hall, New Harmony, Ind.

Opera House, New Harmony, Ind.

INSIDE CONSTRUCTION.

By this we do not mean the arrangement or size of rooms, they may be large or very small, and in either instance lack the conveniences which may always be provided for by good construction. Even a small house can have transoms over all the doors which open into a hall, proper ventilating flues for all rooms, and a kitchen that will be comfortable in all seasons, (see articles under the head of "Ventilation" and "The Kitchen.") These are essential; all dwellings, large or small, should have them. The windows and doors should be arranged to suit the furniture to be used. You have doubtless seen rooms with windows on two sides, a door and fire-place on the other. This arrangement makes it impossible for the room to contain an ordinary size bedstead, without placing it before a window or some other opening. Study these things when getting up plans for your house.

The dining room should be light and roomy, fronting the East if possible, as the morning sun is always desirable, and adds much to the cheerfulness of the family. The kitchen should not connect directly with the dining-room. Construct a passage-way, well ventilated, between the two rooms; this will prevent unsavory odors entering the dining-room. The space at each end of the passage can be utilized for the kitchen closets. Arrange your rooms so that you will not be compelled to pass through one room to get to another. Do not disfigure the walls by driving nails or hooks into the plastering for the purpose of hanging pictures, but fasten a neat gilt moulding to the side walls all around the room, about one foot from the ceiling. The moulding should be about one and one-half or two inches wide, with a groove on its upper side. Hooks shaped as an S can be placed at any point on this moulding, and the pictures are to be hung to these hooks. This arrangement is somewhat expensive, but it is the only proper way in which pictures can be hung.

Closets.—No house is complete without ample closets. Every lady knows that clothing and wraps cannot be stored away in drawers, and look well when wanted for use. As closets are expensive we suggest for small houses, that a room be constructed from four to six feet wide, and from ten to fifteen feet long, with a window at one end. Make shelves on one side, and place suitable clothes hooks on the other. In such a room the entire wardrobe and family linen can be properly stored. If you desire a moth-proof room, the ceiling, walls and shelves should be made of red cedar. We suggest this clothes room because of its cheapness. Each bedroom of large houses should be provided with a clothes closet, which should be lined with red cedar for the reasons above stated.

Don’t forget to have windows and all outside doors fitted up with light sash and frames covered with woven wire cloth. This material is very cheap, and can be purchased at any house-furnishing goods store. Its use prevents mosquitoes and flies from entering the house. Freedom from these summer pests will amply repay you for the expense. During the late fall, winter and spring months, the sash and frames can be removed; they should be stored in some perfectly dry place, such as a garret, never in a cellar. Speaking of pests reminds us of another kind that breed in cracks and crevices found in most kitchens, which might lead a thoughtful man to suppose that the builder, in his kindness of heart, provided these little hiding places for just such creatures. If you don’t want them, see that there are no cracks left between the wood-work and plastering, or in any part of the floor or walls of the kitchen. Fill with cement (Plaster of Paris is good) all cracks caused by shrinkage of wood-work after the walls are completed and are thoroughly dry.

SHEET METAL WORK FOR PUBLIC AND PRIVATE BUILDINGS.

GUTTERS, VALLEYS AND DOWN PIPES.

These things are very closely related to the roof, and like it should be of the best material.

A tin gutter hung at the eaves has the advantage of being cheap; if made of good material and put up with good fastenings is durable, and suitable for cheap houses and some portions of expensive ones.

In all cases where the fastenings are to hang from the roof, the gutter should be put up before the roof covering is put on, so the fastenings can be secured to the roof boards instead of on top of the tin, slate or wood shingles. If the fastenings are nailed on top of the roof covering, the nails soon become loose, and the gutter sags. The tinsmith will charge no more for doing his work before the roofers commence, but it may delay you a day. Paint the gutter inside as well as out, and see that it has sufficient fall to clear itself of water. If you prefer the gutter on the roof near the eaves, let the sheets of which it is made be of sufficient width to extend far enough up under the roof covering to prevent water (when the gutter is full) from overflowing at the back instead of over at the front; this is a common error. In every instance let this top gutter be outside the wall line, so in case of leakage the “drip” is outside the walls. Gutters of this kind, and all gutters that are soldered and firmly fastened to roof boards (not hanging gutters), are liable to crack by expansion and contraction of the metal; we therefore say, never put a gutter inside the wall lines if they can be put outside. Valleys formed by the joining of two roofs at an angle are usually steep enough to allow the metal sheets to lap on each other and shed water without soldering. Such sheets are usually made twenty-eight inches long. Their shortness prevents cracking from expansion and contraction even if nailed to roof boards. Remember that all trash or dirt

that settles on the roof eventually finds its way into the valleys, gutters and down pipes, and in a manner scours their surface; for this reason they receive several fold more wear than the same amount of exposed surface of the roof, consequently, should be of better material. Few people are aware of the amount of dirt and sand which is carried by the wind and deposited on their house-tops; for this reason, if the water is used for drinking or cooking purposes, the first water that flows from the roof during a rain storm should not be allowed to flow into the cistern.

It is always best to have good sized down pipes. As a rule, for down pipes from hanging gutters, let the circumference of the pipe equal the girt of the gutter, and the gutter should be large enough to convey the water which falls on the roof during the heaviest storms. Use only curved elbows where a turn in the pipe is to be made, and at the foot or discharge end. Curved elbows are now made by machinery; they are stronger, more durable and cost no more than the common hand-made acute kind.

We have spoken of good material; but what is good material when Tin Plate is spoken of? The quality of Tin Plate depends on its toughness, and the weight of Tin or Terne coating on its surface. The first is easily determined by bending back and forth with the hand, the latter is not, unless handled by an expert. The following test will determine the difference, provided you have different qualities. If the qualities are the same, or nearly so, the difference will not be distinguishable.

Take two pieces of different quality of Tin or Terne plates, say two inches square, grease one side with any kind of animal fat; then with a pair of plyers, hold them separately over a gas or candle jet with one corner obliquely downward, and the amount of fusible metal which flows from them will determine the difference between good and common.

TESTIMONIALS.

St. Louis, Mo., April 26th, 1888.

Gentlemen:—We have used your Walter's Metal Shingles on the most prominent buildings of our city, all of which have given universal satisfaction both in appearance and durability. As for us, we can say we give them the preference above all others knowing that when once up there is none its equal.

Yours truly,

MESKER BROS.

Augusta, Ga., April 30th, 1888.

Gentlemen:—I have in the past six years used and carefully compared all the leading makes of Patent Metallic Shingles, and I unhesitatingly pronounce your Walter's Patent the best shingle on the market. They are simple, and easy to put on, and for a handsome, light and durable roof they are without a parallel. I have used them on many public as well as private buildings in this city, and they have in all instances given the highest possible satisfaction, which *has won me the esteem and confidence of the public*.

Yours truly,

DAVID SLUSKY.

Las Vegas College, Las Vegas, N. M., April 29th, 1888.

Gentlemen:—I am glad to inform you that we are very well satisfied with the Walter's Metal Shingles with which the new stone addition of our college is covered. It is about three years since the roof was laid, and your shingles are keeping yet a very neat and nice appearance, defying bravely the eating and inclemency of the weather.

Yours truly,

C. M. CAPILUPI, *S. J.*

OFFICE OF SUPERINTENDENT, DEPAW UNIVERSITY,
GREEN CASTLE, IND., April 30th, 1888.

Gentlemen:—We beg to say that your Walter's Shingles with which our college buildings are covered are very satisfactory.

E. T. CHAFFEE, Sup't.

COLORADO STATE INSANE ASYLUM, PUEBLO, COL.,
April 27th, 1888.

Gentlemen:—I wish to say that the Walter's Patent Metallic Shingles, with which our buildings are covered, we believe to be superior to anything heretofore introduced in the West in that line.

Yours truly,

P. R. THOMBS, Sup't.

DAYTONA, FLA., April 27th, 1888.

Gentlemen:—We have used your Metallic Shingles on the First Congregational Church at this place. As to

durability, the roof has been on now about three years, and seems as good as the day it was put on. Its appearance is beautiful, and its rain shedding qualities are perfect. We like the roof first rate, and can conscientiously recommend them to others.

Yours very truly,

CHAS. M. BINGHAM, Pastor.

ITHACA, N. Y., April 28th, 1888.

Gentlemen:—We have put the Walter's Metallic Shingles upon many buildings in Ithaca, and in each instance our customers have been perfectly satisfied. In our opinion they are the most durable roof we have handled. The writer has his house covered with the Galvanized Tin Shingles, and believes he has the most durable roof in Ithaca, because they need no painting, or care of any kind whatever. While costing more at the start, in the end the matter of economy is with the Walter's Shingles.

Yours truly,

C. J. RUMSEY & CO.

TAUNTON, MASS., April 25th, 1888.

Gentlemen:—We have used in less than two years about 800 squares of your Metallic Shingles, and they have given the best of satisfaction in every case, and in our opinion are far ahead in durability and appearance of either slate or wooden shingles.

Yours truly,

N. CRAPO & BRO.

WINTHROP ST. BAPTIST CHURCH, TAUNTON, MASS.,
May 5th, 1888.

Gentlemen:—We are in every way fully satisfied with the Walter's Metal Shingles which you put on the roof of our church two years ago. It would be difficult to desire a superior roofing.

Yours very truly,

J. K. WILSON, Pastor.

CENTENARIAN M. E. CHURCH, BEATRICE, NEB., May 2d, 1888.

Gentlemen:—I consider the Walter's Metal Shingle an improvement over anything of the past; superior to slate in appearance; of less weight and cost, and just as durable. When properly put in place it can but give the best of satisfaction. Can heartily recommend it.

Respectfully,

A. C. CALKINS, Pastor.

MATTEAWAN, N. Y., April 25th, 1888.

Gentlemen:—I take great pleasure in giving my unprejudiced opinion of Walter's Metallic Shingles. I have been using them for the last three years, and have never had any fault found with them of all the roofs that I have put on, and I have had good practical tinners proclaim to me that they consider it the best tin roofing they have ever seen. It is *the* roof for me when I am building myself. Any person adopting this roof, by giving it a coat of metallic paint every five years, I will warrant them to have a tight roof for two generations.

Yours truly,

SAM'L McKEE.

MINNEAPOLIS, MINN., April 27th, 1888.

Gentlemen:—I have put on in the Northwest large amounts of your Metallic Shingles for others, and also covered my own residence some five years ago, and can heartily recommend your goods to any one desiring a substantial and absolutely tight roof of fine appearance, which gives a roof much better than slate and a lower price.

Most respectfully yours,

M. H. CRITTENDEN.

ANN ARBOR, MICH., May 4th, 1888.

Gentlemen:—My roof was the first one in this city on which your tin shingles were used, and they have given entire satisfaction. I would not exchange it for any other roof that I know of.

Yours truly,

GEO. W. MOORE.

MILFORD, DELAWARE, May 10th, 1888.

Gentlemen:—Would say that the Walter's Patent Metallic Shingles, put on the Electric Light Station in this town, by W. P. Cullen, are giving entire satisfaction, making a handsome and durable roof, much preferable in our judgment to the regular tin roofs usually put on such buildings.

Very truly yours,

W. T. JOHNSON.

New Milford, Del., May 15th, 1888.

Perhaps it may be of interest to you to know my views of the Tin Shingle Roofing purchased of W. P. Cullen, of Milford, Del. I can recommend in the highest degree their use, as they possess many advantages over any other material used for that purpose. They require no skilled labor, and are as durable as any tin roof can possibly be. I have watched it during every rainstorm since it was laid, and not one drop has passed through it to my gratification, and to the credit of the inventor. I invite the inspection of any one who may contemplate putting on a roof upon any building.

Respectfully,

P. H. STORM.

Brockton, Mass., April 27th, 1888.

Gentlemen:—Two years ago the Brockton Agricultural Society covered the roof of their main building with your tin shingles, and I am pleased to inform you that they have given perfect satisfaction.

Yours truly,

H. W. ROBINSON, President.

Church of the Holy Apostles, St. Clair, Pa., April 25th, 1888.

Gentlemen:—The Walter's Patent Metallic Shingles have been the covering to the Rectory of this church since September, 1885. They were put on by novices under disadvantageous circumstances, and have withstood every test that a Pennsylvania mountainous district changeable weather could give. I talk tin shingles to all my friends.

Yours truly,

CHAS. A. MARKS, Rector.

NATCHEZ, MISS., February 16th, 1888.

Gentlemen:—I have been in the tin roofing business for the past 20 years, and I believe that the Walter's Patent Tin Shingles make the best tin roofing of any of the other patents that are now on the market. I have put on hundreds of squares of them, and they have given me and the property owners entire satisfaction. I will further say that each box of shingles I have bought from them has covered one hundred square feet of roof, which will be understood by tinners to be a great satisfaction in ordering roofing, as the rule is that patent roofing falls short after being laid. I have often been asked by different manufacturing companies for my opinion of the roofing that they manufacture, but this is the first time that I have ever given my opinion, and I would not give my opinion now if the Walter's Patent Tin Shingles did not deserve it.

I am, yours truly,

P. W. MULVIHILL.

BATON ROUGE, LA., February 24th, 1888.

Gentlemen:—I beg to say that I have used the Walter's Patent Tin Shingles for some time, and they have given satisfaction. I think they make the best roofing that can be put on for the money.

Yours truly,

M. J. WILLIAMS.

MILFORD, DEL., May 4th, 1888.

Dear Sirs:—This is to say that I have used several thousand shingles of Walter's Patent on our roof at the Phosphate Factory, put on by W. P. Cullen, and up to this time not a single drop of water or a weight of snow has drifted through it, and if kept properly painted, I believe the roof will last as long as any person could wish it to.

W. I. SIMPSON.

CANAJOHARIE, N. Y., May 10th, 1888.

Gentlemen:—Having Walter's Metal Shingles on two of my buildings, put on by F. H. Hodge, the new *Courier* building being sided with them, I feel that I am competent to speak of the merits of the shingles. My experience has been entirely satisfactory, and I regard the Metallic Shingles as the best roofing and siding extant. If I were to build a hundred houses, and it were possible to use these shingles, I would not hesitate one moment, as I regard them as cheaper and better than any other covering in the market.

Yours, &c.,

WILLET F. COOK.

HOSPITAL FOR THE INSANE IN WASHINGTON TERRITORY,
FORT STEILACOOM, W. T., May 2d, 1888.

Dear Sirs:—This institution has passed two winters under cover of Walter's Metal Shingles. Our Winters are very wet, rain falling most of the time, but there has been no leak. The shingles are, therefore, entirely satisfactory.

Yours very truly,

JOHN W. WAUGHOP, M. D.
Sup't Hospital Insane, W. T.

WOODSTOCK COLLEGE, HOWARD CO., MD., December 8th, 1886.

Gentlemen:—It affords me much pleasure to indorse favorably the Walter's Patent Metallic Shingles. I have used them on our church buildings in Trinidad, Colo., Albuquerque, N. M., and Woodstock, Md. In the first named place they have been in use over two years, and have withstood, without detriment, the very high winds and occasional driving storms of rain and snow for which that State is so remarkable. In the other places they are also giving satisfaction in every respect.

I consider a roof of this material far superior to the ordinary tin or iron, both in beauty of design and solidity of construction, and see no reason why it should not supersede slate, as it is far less costly, requires a lighter frame, is just as much fire or storm-proof, and equally durable if kept painted.

Hoping your goods may elicit the patronage they justly deserve, I beg to remain, gentlemen,

Yours very truly,

EDWARD BARRY, *S. J.*

AUBURN, N. Y., November 26th, 1889.

Gentlemen:—Your esteemed favor of the 16th duly to hand; by reason of Mr. Stevens' absence from town, has not had earlier reply. We take great pleasure in speaking a good word for the new roofing we purchased of your house; we find it all it was recommended to be. The condition in which it came to us rendered it very easy to place upon the roof. It makes a tight and substantial roof, one which we believe will be as durable as anything we have ever seen. We remain, with respect,

Yours very truly,

A. W. STEVENS & SON.

PENFIELD CENTER, N. Y., October 17th, 1889.

Gentlemen:—I have used about sixty squares of your metal shingles this year, and can say they excel any roof I have used. They are light, tight and cannot help being a life-lasting roof, if they are taken care of.

Yours truly,

G. H. BACON.

SHERMAN, TEXAS, October 28th, 1889.

Gentlemen:—I have been contracting and building fifty years, 34 years in North Texas. I recommend your metal roofing as the best I have ever used, and that it gives perfect satisfaction, and if painted every five years it will last a century.

Yours truly,

GEO. MELTON,
Architect and Builder.

College of the Holy Cross, Worcester, Mass.

Mr. W. F. Wallace, Sec'y and Treas'r, Nat. Sheet Metal Roofing Co.

Dear Sir:—Having used your Galvanized Tin Shingles largely in Maryland, Connecticut and here, and recommended their use in other sections, I have no hesitation in stating that everywhere the results have been completely satisfactory. I shall continue to use the roofing in preference to any that I know.

Yours respectfully,

T. W. HAYES, *S. J.*

Rome, N. Y., November 4th, 1889.

Dear Sirs:—Nearly two years ago I had the steeples of my church covered with your Galvanized Metal Shingles. I have now no hesitation in stating that in my judgment it is the best roofing material in the market. It is very ornamental, and time seems to have no effect on it, as it still retains the same color. So pleased were the citizens of this place with the work done on my church, that many of them are now using the same material in roofing their houses.

A. MURPHY, Pastor.

Webster, N. Y., October 17th, 1889.

Gentlemen:—I have used your patent shingles on my grist mill and think there is nothing better for fire, wind or weather. They are all right.

Yours truly,

B. SPERRY.

ROME, N. Y., December 2d, 1889.

Gentlemen:—The Walter's Metallic Shingles put on the roof of our new church in this city, about four months ago, by Mr. James Conley, are in every way satisfactory to our people, and the roof is admired by all who see it. I take great pleasure in recommending your shingles to the public as the best material for roofing that I have seen.

E. W. BRUCE,
Pastor and Chairman of Building Com.

ROME, N. Y., November 5th, 1889.

Gentlemen:—We have used your Metallic Shingles on the steeples of the Welsh Congregational Church, at this place, last summer, and it seems as good as the day it was put on. Its appearance is beautiful and its rain-shedding qualities are perfect. We like the steeple first rate and can conscientiously recommend them to others. They need no painting or care of any kind whatever. These were put on by Mr. James Conley, of Rome, N. Y.

Yours truly,

D. E. PRICHARD, Pastor.

JAMES THOMAS, Sec'y.

ROME, N. Y., December 6th, 1889.

Gentlemen:—The Walter's Metallic Shingles were first brought to my notice by Mr. James Conley, of this

city, some two years ago, and I made a personal examination and test of same, and have since specified and had them used in preference on several buildings. They make a light, handsome and durable roof, and I have yet to hear the first complaint.

Respectfully,

WM. H. DAVIES, Architect.

COUNCIL GROVE, KANSAS, November 5th, 1889.

Messrs. JEROME TWICHELL & CO., Kansas City, Mo.

Gents:—Yours of the 25th at hand regarding the Walter's Shingles. I purchased in the spring the Walter's Shingles and used them on my dwelling house. I must say they make the best looking roof and the tightest roof I ever saw, and they are easily laid. I am much pleased with them and can recommend them very highly.

Yours truly,

THOS. J. HIGGINS,
Breeder of Hereford Cattle.

JUNCTION CITY, KANSAS, October 29th, 1889.

Messrs. JEROME TWICHELL & CO., Kansas City, Mo.

Gentlemen:—Replying to yours, 25th inst., we have used the Walter's Metallic Shingles on the large three-story building we occupy. This roof was put on nearly two years ago: the roof has not shown any defects up to this time, and if kept properly painted will last many years.

Very respectfully yours,

ZIEGLER HARDWARE CO.

KANSAS CITY, October 26th, 1889.

Messrs. JEROME TWICHELL & CO., Kansas City, Mo.

Dear Sirs:—In reply to yours I have no hesitation in pronouncing the Walter's Metallic Shingles a good roof. It has been on my two-story frame house two years, and I have found it to be perfectly tight, keeps clean (an advantage where cistern water is used) and adds greatly to the appearance of the house.

Yours truly,

M. J. REILLY,
1308 Park Avenue.

WESTON, MO., October 31st, 1889.

Messrs. JEROME TWICHELL & CO., Kansas City, Mo.

Gentlemen:—Walter's Metallic Shingles bought of you last May were put on our school-house, and I am glad to state that they make a tight, handsome and substantial roof. Everybody is pleased with it. I can recommend them to all who want a tight and substantial roof.

Yours truly,

REV. CHAS. SCHAAF,
Pastor of Catholic Church.

HUTCHINSON, KANSAS, October 26th, 1889.

Messrs. JEROME TWICHELL & CO., Kansas City, Mo.

Gents:—We have used almost all kinds of Metallic Shingles manufactured, but find the Walter's Shingle

makes the best roof of any we have found. They make a tight, ornamental and durable roof, and have never given us a particle of trouble, and we are glad to recommend them to any one wanting a first-class metallic roof.

Respectfully,

SWIFT, MANKOFF & CONGDON.

TRINIDAD, COLO., November 16th, 1889.

Messrs. JEROME TWICHELL & CO., Kansas City, Mo.

Dear Sirs:—We have used the Walter's Patent Shingles to the satisfaction of all concerned on the following buildings: Southern Hotel, South Side Public School, Jewish Synagogue and several minor buildings. They undoubtedly make a good roof.

Yours truly,

SCHMIDT BROS.

Mr. JAMES CONLEY, *Agent*, Walter's Patent Tin Shingles, Rome, N. Y.

Dear Sir:—I take pleasure in commending the Walter's Tin Shingles, as applied to my house by you. As you will remember, the roof was not completed in all its details when the winter set in last year, and, at my request, the scaffolding was left on the different roofs, more for a test from banking of snow and back-water, feeling assured that if the shingles survived the test, I would never experience any trouble from that source, in the future, when the scaffolding was removed. I was more than satisfied with the test, as we experienced no trouble from leakage or from any other source. Therefore, I take great pleasure in recommending the

Walter's Patent Tin Shingles to whoever contemplates using a metallic shingle for their buildings.

I remain, yours truly,

CHAS. WIGHAM,
House, 418 Floyd Ave., Rome, N. Y.

OUR SPECIALTIES.

THE BEST OF THEIR KIND.

METAL SHINGLES, under the Walter's and Cooper's Patents, made from Tin Plates, Tin Plate Galvanized, Steel Plates and Copper, have no equal in the world for roof covering.

CURVED ELBOWS.—Fixed, adjustable and in sections. The most perfect machine-made Elbow ever invented. Made from Tin Plate, Tin Plate Re-tinned, and Tin Plate Galvanized. Perfect in form and fitting. The best in the world.

CONDUCTOR PIPE.—Crimp expanding. Will not burst by freezing. In sections twenty-eight inches long, which interlock with each other. Two sizes, three and four inches diameter.

WIRE NAILS.—Made from Steel Wire. All sizes, both barbed and plain, in kegs, at manufacturers' prices.

DRY PAINT. (**Devils' Red.**)—The very best Oxide of Iron. This is NOT a Ready-Mixed Paint. It is Iron Ore, burnt until all deleterious substances are destroyed, then pulverized and bolted. In a word it is IRON RUST, it

MIXES readily with Linseed Oil,

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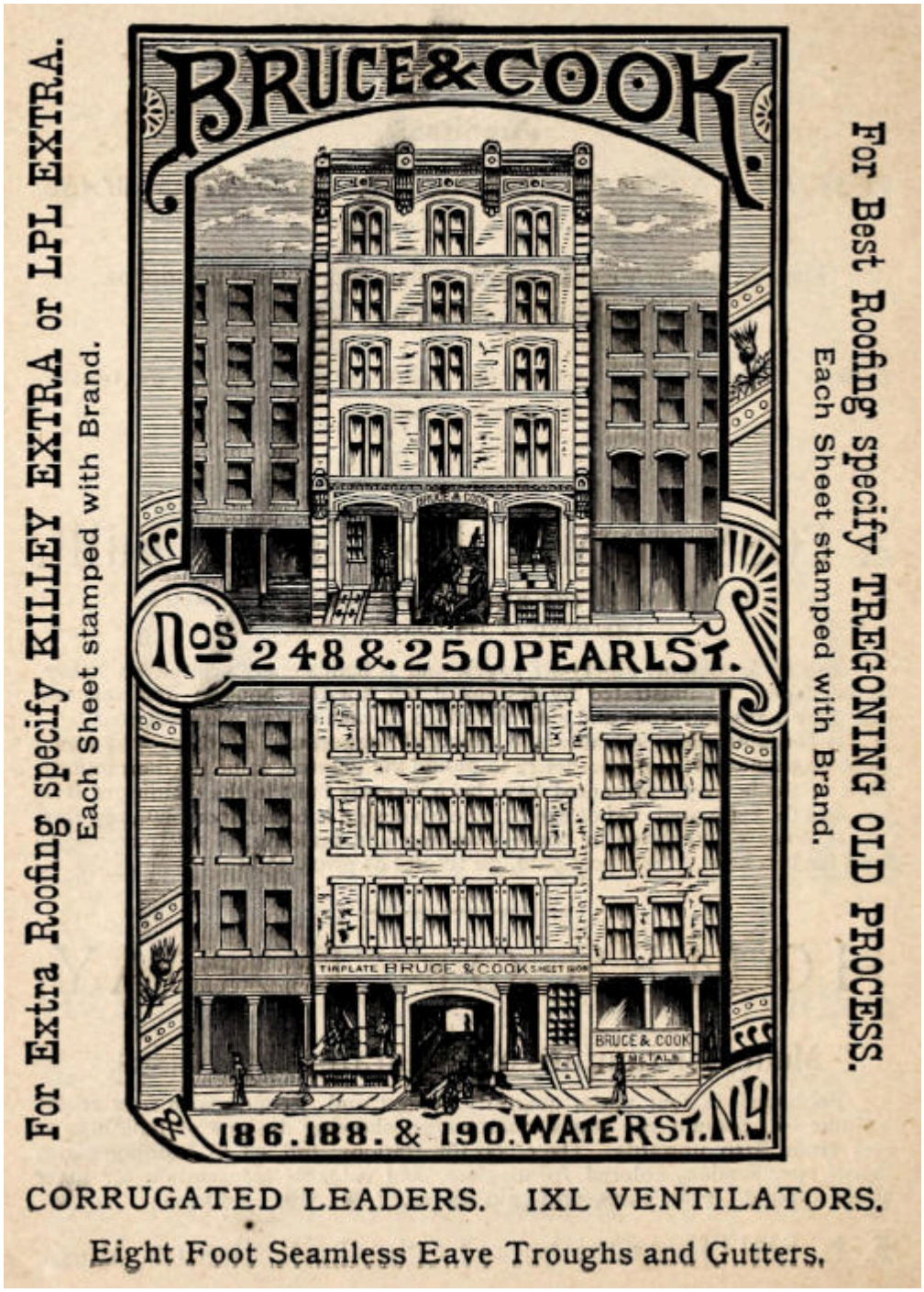

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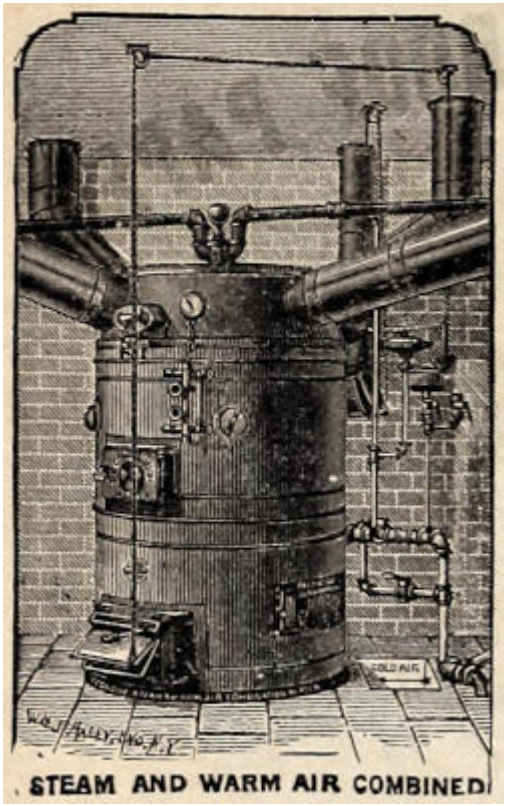

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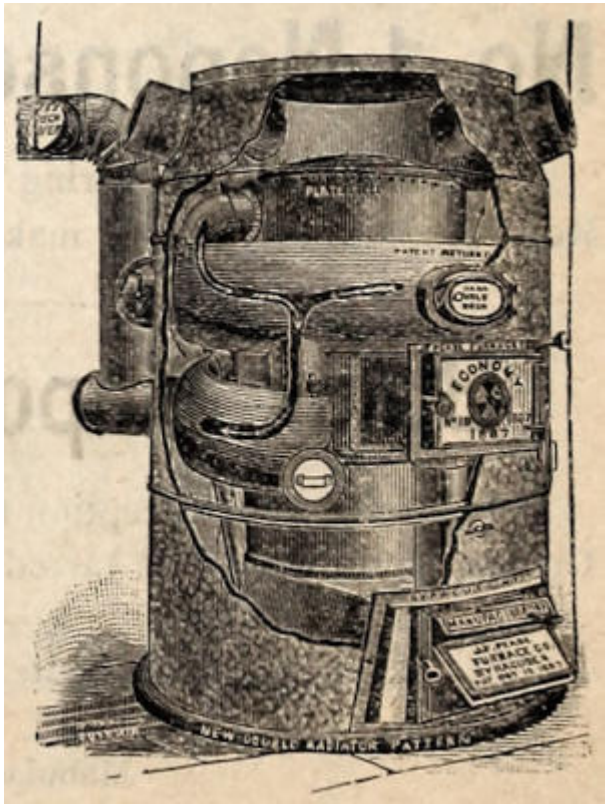

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