

Sept. 3, 1935.

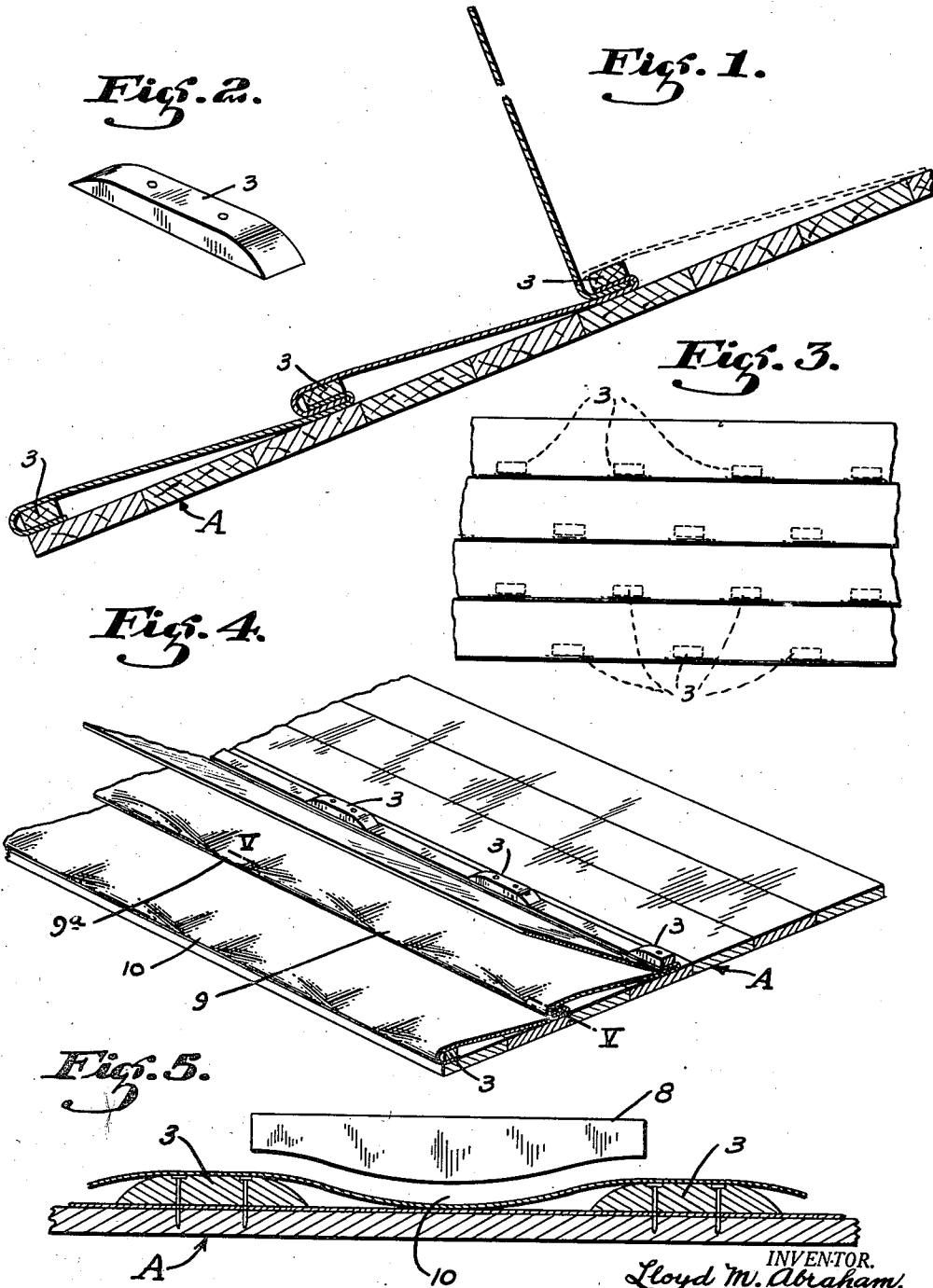
L. M. ABRAHAM

2,013,330

ROOFING

Filed May 26, 1933

2 Sheets-Sheet 1



INVENTOR.
Lloyd M. Abraham.
BY Townsend & Loftis.
ATTORNEYS.

Sept. 3, 1935.

L. M. ABRAHAM

2,013,330

ROOFING

Filed May 26, 1933

2 Sheets-Sheet 2

Fig. 6.

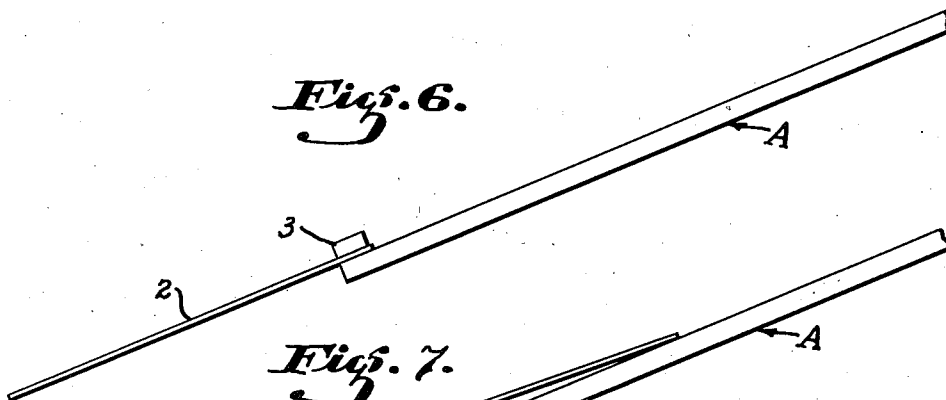


Fig. 7.



Fig. 8.

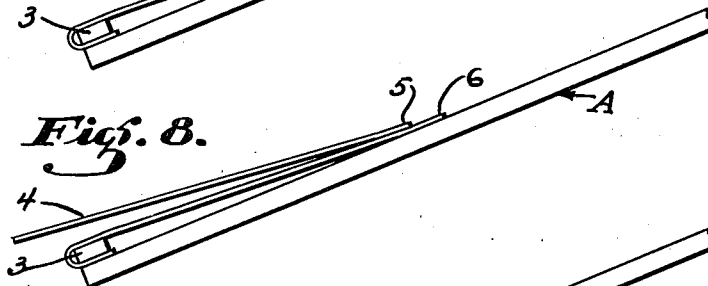


Fig. 9.

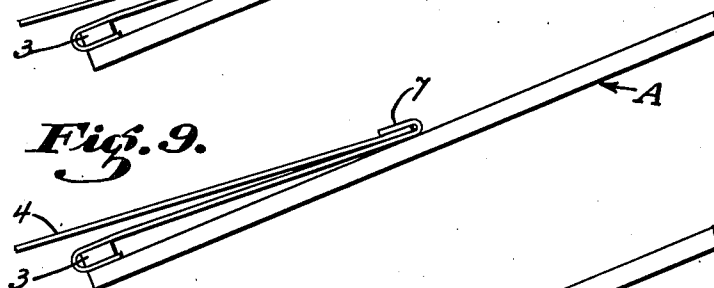


Fig. 10.

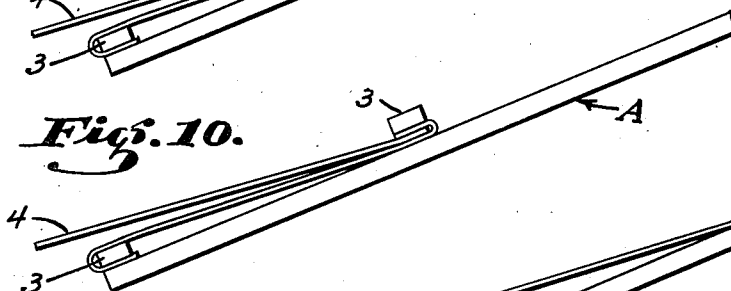
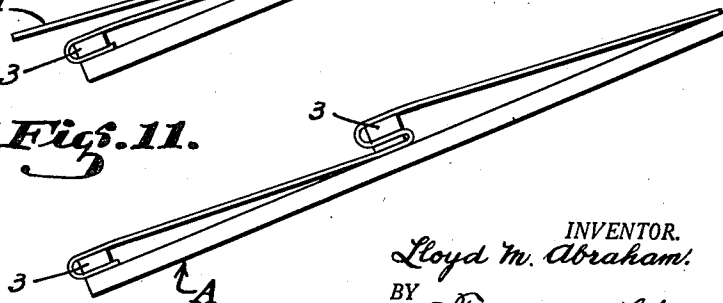


Fig. 11.



INVENTOR.
Lloyd M. Abraham.
BY *Townsend & Loftis.*
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,013,330

ROOFING

Lloyd M. Abraham, Mill Valley, Calif., assignor,
by mesne assignments, to Hans H. Doe, Phoenix, Ariz.

Application May 26, 1933, Serial No. 672,966

4 Claims. (Cl. 108—22)

This invention relates to a method of applying and forming roofing material, and particularly to the laying of copper or like metallic roofs.

In the construction of buildings, whether residential, or otherwise, it will be found that numerous materials have been and are being employed in the construction or covering of the roof. Among well known materials in general use may be mentioned wood and gravel covered paper, shingles, slate, tile paper covered with tar and gravel, metal roofs, such as copper, lead, etc. Numerous other materials have been employed but of all these materials an all copper roof is probably the most satisfactory and enduring for such roofs have been known to last for more than a hundred years, and require practically no attention or repair. The only objection to a copper roof is cost of material and labor, as fairly heavy copper sheets are employed. The sheets must be interlocked and soldered and great care must be taken to allow for contraction and expansion due to the comparatively high coefficient of expansion of the metal when subjected to temperature changes.

The object of the present invention is to generally improve and simplify the construction and method of laying roofing materials; to provide a method of applying and forming roofing material so as to permit the economical use of copper; to provide a method of applying which permits the use of long strips of very thin copper, for instance four to six one-thousandths of an inch in thickness; to provide a method of forming thin strips of copper that results in a finished roof surface of great strength, durability and artistic appearance; to provide a method of applying and forming thin strips of copper which does not require especially skilled labor and which can be quickly and readily laid at a minimum of labor cost; to provide a method of applying and forming thin copper strips which produces an insulating dead air space between the copper and the underlying sheathing or roof structure to which it is attached; to provide a method of applying and forming thin copper strips which eliminates all expansion and contraction problems; and further, to provide a roof of the character described which will afford good drainage.

The method of applying and forming roofing material of the character described is shown by way of illustration in the accompanying drawings, in which—

Fig. 1 is a cross section of a portion of a roof showing the manner in which the copper strips are laid and interlocked.

Fig. 2 is a perspective view showing one type of nailing cleat that may be employed.

Fig. 3 is a plan view of a portion of a roof showing application spacing between the nailing cleats.

Fig. 4 is a perspective view of a portion of a roof after the copper strips have been laid and some of them formed.

Fig. 5 is an enlarged longitudinal vertical section taken on line V—V of Fig. 4, and

Figs. 6 to 11, inclusive, are diagrammatic views showing the manner in which the copper strips are laid.

The copper material employed in a roof constructed according to the present invention is preferably supplied in rolls composed of long strips of thin copper. The actual thickness may be four to six one-thousandths of an inch, and the width of the strip may be a foot or so. The copper strips may be applied to any type of roof structure but, in this instance, will be shown as applied to an underlying wood sheathing, such a sheathing being indicated at A in Fig. 1.

In laying the roof the first strip of copper is first placed at the lower edge of the roof in the position indicated at 2, see Fig. 6. A series of nailing cleats, such as shown at 3, are then placed along the edge of the sheet and nailed thereto. The nailing cleats serve four functions: First, that of securing the edge of the copper strip to the underlying sheathing; secondly, that of forming a dead air insulating space between the copper and the underlying roof structure; third, that of producing an artistic finish; and fourth, they function to produce a laid strip which is more or less corrugated longitudinally so as to take care of longitudinal expansion and contraction of the strips when subjected to temperature changes. The nailing cleats are spaced apart a foot or more, as shown in Figs. 3 and 4, and when the entire edge of the strip has been secured it is only necessary to bend the strip over the cleats to assume the position shown in Fig. 7. The second strip is then ready for application and is placed on the first strip to assume the position shown at 4 in Fig. 8. It will here be noted that the upper edge 5 of the second strip is pulled back with relation to the upper edge 6 of the first laid strip. A straight edge may be laid along the edge 5 and the projecting end 6 of the first laid strip is then bent over the edge 5 so as to form a hook-like interlock indicated at 7, see Fig. 9. A series of nailing cleats are then applied, as shown at 3 in Fig. 10, and when these have been secured along the entire edge the second laid

sheet is bent over the cleats 3 to assume the position shown in Fig. 11. A third sheet may then be applied to assume the position shown in Fig. 8, the projecting end 6 is then bent over to form an interlocking hook, such as shown at 7, and the operation of laying each strip thereafter will be the same.

When the whole roof has been covered in this manner, or prior thereto, a forming block such as shown at 8 in Fig. 5 is employed. This block is placed on the lower edge of the first strip at the points indicated at 9; that is, at a point between two nailing cleats, such as indicated at 3-3. The forming block is struck with a hammer or mallet and thus depresses the copper between the cleats 3-3 forming a wave 10 therein. The forming block is then moved to a position shown at 9a, that is, between the next two nailing cleats and struck with the mallet to again wave or depress the metal, and the lower edge of each strip is thus waved throughout its length until the entire roof is completed. This depression of the metal between the cleats causes the lower edge of each sheet to take a longitudinally waved or corrugated shape. This is of great importance as first of all it takes care of longitudinal contraction and expansion; secondly it produces an artistic finish to the roof surface; and third, it produces a shape which affords good drainage. The nailing cleats, as shown in Figs. 2 and 5, are tapered at the ends so as to conform to the waves formed by the forming block 8 and a smooth uniform waved finish may thus be given to the lower edge of each strip. The nailing cleats may be made of any suitable material, whether wood, or otherwise, and may be perforated to receive the nails driven therethrough.

The entire operation of laying the roof can be accomplished without the use of especially skilled labor as the only care required is to see that the strips of copper are laid parallel. The spacing and nailing of the cleats 3 obviously does not require skill, nor does the bending of the sheets to form the interlocking edges require skill, as the material is exceedingly thin and easily bent. Furthermore, when the bending operation takes place a straight edge may be employed and the uniform desired finish will thus be insured.

Due to the fact that the operation of laying the roofing material is very simple and quickly accomplished and that unskilled labor may be employed, time and labor cost will be exceedingly small and as strips of copper as thin as four thousandths of an inch may be employed the actual weight or number of pounds of copper per square becomes very small and the cost proportional. The roof, when laid, is artistic in finish. It is durable and as it is not stressed by expansion and contraction repairs due to this cause are eliminated.

The roof, once laid, should be almost everlasting as oxidation or corrosion will be the only factor to be feared, and such action is exceedingly slow when copper and like materials are employed. A roof of this character is moisture-proof and fire-proof. It affords good drainage, and it should be comparatively cool due to the dead air insulating spaces provided.

Soldering of the sheets is entirely eliminated and even though the sheets are secured by nailing through the upper and lower edges, the punches or perforations formed by the nails are of no consequence as far as leakage is concerned as each nailed edge is covered by the unperforated portion of each sheet which overlies the

nailing cleats. It should also be noted that the perforated edges of each sheet are remote from the nailing portion which is exposed to rain and weather, thus further insuring against leakage.

While a copper metal has been described zinc lead and other metals may obviously be employed, and while other features are more or less specifically described and illustrated, I wish it understood that various changes may be resorted to within the scope of the appended claims. Similarly, that the materials and finish of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A roof covering composed of long narrow metal sheets, said sheets having upper and lower parallel edges, a hook-shaped flange formed at the upper edge of a first sheet to receive the lower edge of a second sheet, spaced cleats placed on the hook-shaped flange longitudinally thereof, nails securing the cleats and extending through the hook-shaped flange and the lower edge of the second sheet and securing said lower edge against removal from the hook-shaped flange, said second sheet being bent to overlay the hook-shaped flange and the cleats, and a hook-shaped flange formed at the upper edge of the second sheet to receive the lower edge of a third sheet, said sheets being sufficiently thin to readily be deformed due to expansion without harm to the structure.

2. A roof covering composed of long narrow metal sheets, said sheets having upper and lower parallel edges, a hook-shaped flange formed at the upper edge of a first sheet to receive the lower edge of a second sheet, spaced cleats placed on the hook-shaped flange longitudinally thereof, nails securing the cleats and extending through the hook-shaped flange and the lower edge of the second sheet and securing said lower edge against removal from the hook-shaped flange, said second sheet being bent to overlay the hook-shaped flange and the cleats, a hook-shaped flange formed at the upper edge of the second sheet to receive the lower edge of a third sheet, and wave-like depressions formed longitudinally of each sheet in the edge which overlies the cleats, said depressions being formed in the spaces between the cleats, said sheets being sufficiently thin to readily be deformed due to expansion without harm to the structure.

3. A roof covering composed of long narrow metal sheets, said sheets having upper and lower parallel edges, a hook-shaped flange formed at the upper edge of a first sheet to receive the lower edge of a second sheet, spaced cleats placed on the hook-shaped flange longitudinally thereof, nails securing the cleats and extending through the hook-shaped flange and the lower edge of the second sheet and securing said lower edge against removal from the hook-shaped flange, said second sheet being bent to overlay the hook-shaped flange and the cleats, a hook-shaped flange formed at the upper edge of the second sheet to receive the lower edge of a third sheet, wave-like depressions formed longitudinally of each sheet in the edge which overlies the cleats, said depressions being formed in the spaces between the cleats, and said cleats being tapered at the ends to conform to the wave-like depressions, said sheets being formed of sheet metal having a gauge of approximately six thousandths of an inch to permit deformation of the sheets by expansion without harm to the structure.

4. A roof covering composed of long narrow metal sheets, said sheets having upper and lower parallel edges, a hook-shaped flange formed at the upper edge of a first sheet to receive the lower edge of a second sheet, spaced cleats placed on the hook-shaped flange, means securing the cleats and the hook-shaped flange to the roof, said second sheet being bent to overlay the hook-shaped flange and the cleats and to permit the

formation of wave-like depressions longitudinally of the second sheet, and a hook-shaped flange formed at the upper edge of the second sheet to receive the lower edge of a third sheet, said sheets being sufficiently thin to readily deform due to expansion without harm to the hook-shaped flanges connecting the sheets.

LLOYD M. ABRAHAM.