June 7, 1932. G. L. BENNETT 1,861,998

SHEET METAL ROOFING

Filed Feb. 7, 1929

Fig. 1.

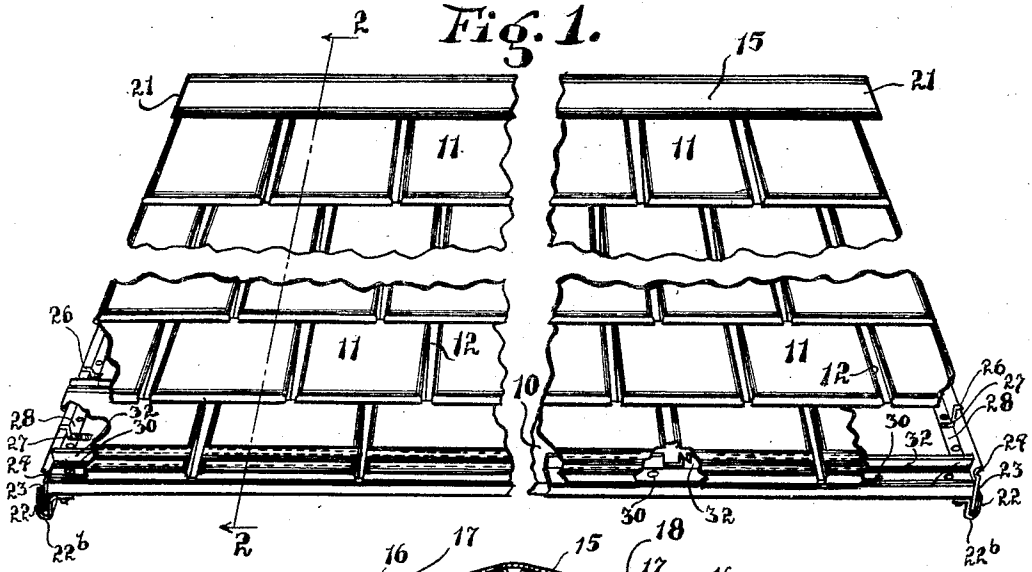


Fig. 2.

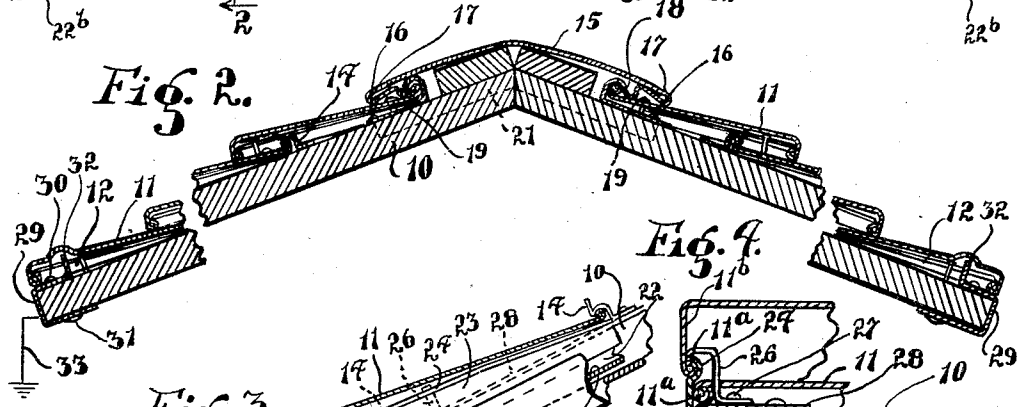


Fig. 4.

Fig. 3.

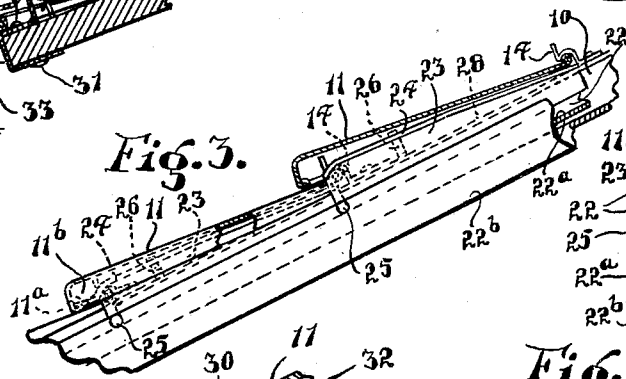


Fig. 5.

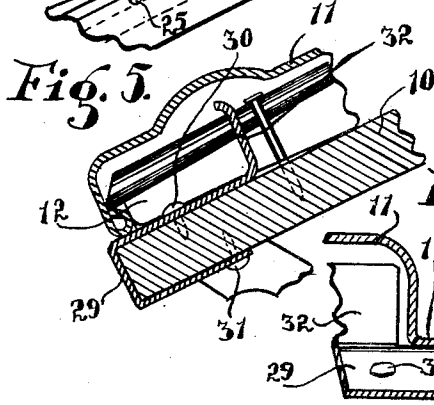


Fig. 7

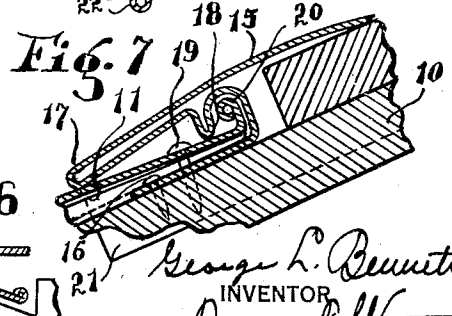
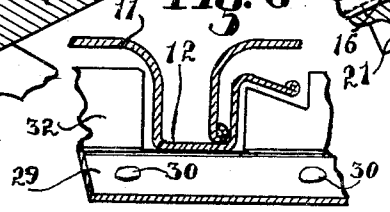


Fig. 6



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UNITED STATES PATENT OFFICE

GEORGE L. BENNETT, OF CLEVELAND HEIGHTS, OHIO

SHEET METAL ROOFING

Application filed February 7, 1929. Serial No. 338,121.

My invention relates to sheet metal roofing, and more particularly to a roofing composed of sheet metal tiles.

Sheet metal tile roofing, of the type to which my invention relates, is composed of a plurality of separate dished tiles, each having a gutter formed along one edge thereof in which the flange of an adjacent tile is seated. These tiles have a vitreous coating and possess sufficient rigidity to require their being set upon the roof decking and secured in place without the possibility of bending or otherwise fitting the tiles. With such tile roofing, the securing means for the tiles in one course are protected by the tiles of the next higher course. There is, in such roofing, a tendency during a heavy rainstorm accompanied by high winds for the tiles to lift slightly, and for the rains to drive between the tiles and the decking. While means operative upon the separate tiles may be employed to counteract the action of the wind and to prevent the forcing of water beneath the tiles. I have found it necessary, in order to procure a perfectly tight roof throughout, to provide a roofing structure with suitable protecting means at the ridge, eaves and gables which will provide adequate protection to these parts against the elements without interfering with the laying of the tiles.

So far as my present invention is concerned, the detail construction and arrangement of the tiles forming the roof is of secondary importance as compared with the construction at the ridge, eaves and gables.

In the roofing embodying my invention, a ridge roll is used which laps the upper edge of the tiles upon opposite sides of the ridge and is secured to the roof decking by means protected by the tiles, while the ridge roll protects the means securing the tiles in relation thereto and to the roof. This ridge roll also forms a dam adjacent the upper edge of the topmost courses of tiles with which it cooperates in effectively preventing the forcing of water beyond the edge of the tile.

The eaves construction need not be relied upon in any way except to protect the edge of the roof decking, and form a dam which will effectively prevent the flow of water past the eaves flashing and upon the roof decking. Owing to the overhang of the eaves, deterioration of the roof from leakage at this point is merely a local matter, and the effects of leakage at this point are not as serious as about the ridge and at other portions of the roofing, particularly as the overhang of the eaves ordinarily is greater than the length of a single tile and the construction throughout the body of the roof limits the areas which can be affected by water being forced beneath the tiles adjacent the eaves.

In the gable construction, the conditions, so far as seepage or flow of water is concerned, closely resemble those at the eaves. There is, however, at the gables, the problem of preventing the lifting of the outer side edge of the tiles by the wind, which is not present at the eaves.

Hence, I provide a construction wherein the action of the tiling at the ridge, eaves and gables of the house, in securing a weatherproof roofing, will be supplemented by flashings forming dams or barriers within or adjacent the flanges of the tiles, and, as to the gables, will also co-operate in preventing displacement of the edges of the tiles co-operating therewith by the elements.

The roofing construction of my invention readily adapts itself to the incorporation therein of protection against damage by lightning.

The invention consists in the novel features of construction and combination of parts, hereinafter set forth and described and more particularly pointed out in the claims hereto appended.

Referring to the drawing,

Fig. 1 is a perspective condensed view of a roofing embodying the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1 upon a larger scale showing more particularly the ridge and eaves construction of the roofing;

Fig 3 is a fragmentary showing, partly in section, of the gable construction from the right of Fig. 1;

Fig. 4 is an enlarged detail view of the flashing and lock at a gable;

Fig. 5 is an enlarged detail view of the flashing construction at the eaves;

Fig. 6 is a fragmentary portion of the flashing at the eaves; and

Fig. 7 is an enlarged detail view at one side of the ridge illustrating the construction of the ridge cap.

Like numerals refer to like parts throughout the several views.

In the embodiment of the invention shown in the drawing, the roof decking 10, of any desired construction, is covered with metallic tiling, the individual tiles 11 of which have, along one edge thereof, gutter forming means 12 adapted to receive one of the side flanges of an adjacent tile. Means are provided, acting upon each tile adjacent the deep butt flange thereof and co-operating with the troughed portion of the tile, for preventing the lifting of one side of the tile by the wind, the troughed portion of one tile interlocking with the adjacent tile so as to hold the contiguous portion of that tile against such displacement.

This construction is not shown in detail, since it forms no part of the present invention and is described merely to enable a full understanding of the present invention which assumes that the various tiles of which the roof is composed are secured to the roof with sufficient firmness, except at the gables, to afford a desired tightness in the roof.

A further feature of the sheet metal tile roof construction is the employment of dam strips 14 projecting across, over and above the beaded upper edge of each course of tiles for preventing the passage of water along the upper surface of, and about the upper edge of, each tile. This, so far as the present invention is concerned, is also old in the art.

It is obvious that the construction relied upon throughout the main portion of the roof to protect the securing means of each tile cannot be resorted to at the ridge of the roof. To meet this condition, I provide a ridge roll 15 extending across the ridge of the roof and secured along the edges thereof upon opposite sides of the peak in any desired manner, as by means of nails 16. The ridge roll may be formed of any desired number of sections secured in relation to each other to form a continuous roll without possibility of the presence of leaks. This ridge roll is secured in position before the uppermost course of tiles upon each side of the ridge is placed in position, and is made of copper, zinc or other suitable material which may be readily bent so as to leave a clear field for the securing of the tiles of the uppermost courses in position in relation thereto.

Intermediate the edges of the roll secured to the decking, and the top of the roll, the material along each edge thereof is bent to provide an overhanging guard 17 adapted to be engaged with the top of the tiles to provide a fairly close joint therewith, and so formed as to afford a depending tongue or dam ridge 18 between the guard and the bead at the upper edge of the tiling, and a pocket adapted to receive and inclose said bead. By this construction, no water is permitted to pass the uppermost course of tiles. The tiles 11 of the uppermost course protect the nails 16 from the elements, and the guard 17 protects the nails 19 used for securing the tiles in position in relation to the decking.

This construction and arrangement as to one side of the peak is clearly shown in Fig. 7 of the drawing, including the form of the bead 20 along the upper edge of the tile 11.

The ends 21 of the ridge roll 15, from the end of one guard 17 to the end of the other guard 17, are extended beyond the roll proper, as shown to the right of Fig. 1, so that they may be bent downwardly against the edge of the decking and secured in position, as shown to the left of Fig. 1, for the purpose of sealing the opposite ends of the ridge roll against the elements. This construction is preferable as it affords no joints at the gable ends. Of course, if desired, instead of merely forming the end flashings 21 integrally with the ridge roll, they may be fitted thereto and soldered in place.

While the gutters 12 may be formed upon either side of the tile, it is obvious that the tiles at one gable, or the other, will have no gutter formed along either side edge thereof, and that at both gables there will be a depending flange 11*b*, having a bead 11*a* extending from adjacent the butt to the top of the tile, as illustrated in Fig. 4, and that this flange may be so positioned as to project slightly beyond the edge of the roof decking.

The various tiles in the different courses of a roof embodying my invention are held in position by means of a hooked member acting upon the edge of the gutter 12 of each tile. This construction results in an absence of securing means acting upon the edges of the tiles at the gable ends of the roof, notwithstanding that such tiles are particularly exposed to the elements and are peculiarly subject to being lifted by the wind. This condition presents a problem of not only holding the edges of the tiles at the gable firmly upon the decking, but of providing a barrier which will adequately prevent the passage of water across and below the side flanges of such tiles to upon the roof decking.

To meet the above requirements, I secure to the decking along each gable edge of the roof a continuous gable facing 22, preferably of soft copper, looped upon itself, as shown, to form a trough 22*a* and a drip edge 22*b*. This strip is secured to the roof decking by being nailed to the under side of the gable, as shown.

Adjacent each tile is what may be termed a gable cover 23, consisting of a plate of a

length extending from the upper or top edge of the tile to a point adjacent the butt, and beyond the dam strip 14 co-operating with the tiles of the next lower course. The upper edge of this plate is recessed as shown at 24 so as to have a snug fit with the bead 11*b* of the side flange 11*a* of the tile with which the cover co-operates, thus not only affording an effective barrier against the passage of water between the tile and the roof decking, but also as a guard against the lifting of the tile by the wind.

The gable covers 23, throughout the entire length of the gable, form a substantially continuous barrier against the elements. These covers or plates have the lower edges thereof inserted in the troughed portion 22*a* of the gable facing, nails 25 being driven through said gable facing and said gable covers so as to not only secure the covers to the roof decking, but close the troughed portion 22*a* upon said covers. The gable covers are formed, preferably of copper of harder stock than the facing.

If desired, clips 26 may be secured to the roof decking in a position to pass over and engage the recessed portion 24 of the cover plates 23, thus supplementing the action of said plates in holding the tiles against being lifted. These clips may be dispensed with, however, if found unnecessary. They are secured in position by means of nails 27, which nails are protected by the tile with which the clip co-operates.

The recessed portions 24 of the plates 23 conform to the configuration of the bead 11*b* of the tile so as to have a close interlocking fit therewith.

The gable covers or plates 23 may be brought to the peak of the roof and be overlapped by the ends 21 of the ridge roll 15.

Enclosing the edge of the eaves is a dam strip 29 troughed so as to straddle the roof decking and secured in position by means of ordinary nails 30 and 31. Carried by and formed integrally with the strip 29 is an upwardly and forwardly extending flange 32, acting as a dam for checking the flow of water below the eaves tiles 11. This strip, like the dam strips 14, as shown in Fig. 6, is cut away to accommodate the troughs 12 of the tiles 11 in the lowermost course.

The strip 29 has no function except to protect the edge of the decking and check the flow of water in the manner above described. It may be made of copper, zinc or any other desired material which may be readily worked upon the job in laying the tiles upon the roof.

The ridge roll 15 and the various dam strips 14 are electrically connected with the gable facing 22 and the gable covers or plates 23, and with the eaves flashing strip 29, thus forming a sort of "Faraday" cage which affords a very effective means of protecting the entire roof from damage by lightning if an ordinary conductor rod 33 be connected with any portion of this cage structure and with ground.

In order to secure the desired electrical connection between the gable facing strips and the various dam strips, I provide the former with an overhang 28 engaging the roof decking upon which the ends of the dam strips 14 rest and are in electrical connection.

In laying a roof embodying the invention, the eaves flashings 29, the gable facings 22 and the ridge roll 15 may be applied to the roof before any of the tiles are laid. The dam strips 14 may be positioned immediately prior to the laying of each course of tiles, the ends of the strip for each tile course seating upon the overhang 28. If the gutters 12 are upon the right hand side of the tiles, the tiles in each course will be laid from left to right, and this is the condition assumed in the drawing. By reason of the width of the gutters 12, as compared with the thickness of the side flange of the adjoining tile entering same, the various tiles in a course may be adjusted in relation to each other so as to ensure a proper length in the entire course of tiles to reach from gable to gable. This applies to the roof construction shown in the drawing.

Mounting the first tile of a course to the left, the bead on the left side flange thereof will be engaged with the recessed portion 24 of the co-operating gable cover or plate 23 before driving the nails securing the tile in place. The mere laying of the tile will establish the proper relation between the dam 32 and the tile, the deep butt flange of the tile resting upon the flashing strip 29, shown particularly in Fig. 5. Each tile on the lowermost course is then positioned solely with relation to previously laid tiles and the dam strip 32, until the extreme right hand tile 11 is laid. When this is done, the right side flange of this tile is engaged with the recessed portion 24 of a right hand gable cover or plate 23, as shown more particularly in Figs. 1 and 4, the bead 11*b* of the flange 11*a* being fitted to the gable cover.

The manner of laying each course of tiles is a mere repetition of that above referred to. Before laying the uppermost course, however, the adjacent guard 17 of a ridge roll 15 is bent upwardly sufficiently to permit the nails 19 to be driven through the nail openings in the tile. After all or a desired number of the tiles 11 of the uppermost course have been laid, the guard 17 is forced downwardly bringing the dam loop 18 between the guard 17 and the rolled edge 20 of the tile. The engagement of the guard 17 with the top surface of each tile in a course, excepting at the gutters, will afford an effective barrier preventing the flow of water along the top surface of the tile.

The portion of the ridge roll strip form-

ing the pocket receiving the beaded or rolled flange 20, will prevent any material quantity of water which may pass the guard and the dam 18, passing to the roof decking. The gable facing 22 and the gable cover or plate 23, extending as it does within the side flanges of each tile, and being in close contact with the bead 11*b* of the side flange 11*a* of such tile, will practically exclude all water from below the tile co-operating therewith.

Since adjacent the upper flange 20, the gutters 12 will have been reduced to a point where they will have substantially no depth, there is little danger of any material quantity of water passing below the dam 18. The fold of the material of the ridge roll between the edge portion thereof and the dam bead 18 will supplement the action of said bead in preventing the forcing of water beyond the top of the uppermost course of tiles.

The ridge roll, as embodied in the roofing structure, presents edge portions adapted to be secured to the roof decking, the upper portions of the topmost course of tiles lapping and seating upon such edge portions, a top portion spanning the peak of the roof; the material of the ridge roll, intermediate this top portion being bent upon itself to form, adjacent each edge portion, a guard overhanging the edge portion, said edge portions and said guards being spaced apart so that the tiles of said uppermost course will be received between and engaged by an edge portion and its adjacent guard. At the juncture of the edge portion and the guard, the material of the ridge roll is, as described, so formed as to inclose the upper edge of the tiles and project downwardly in the form of a dam bead to present a pocket in which the reinforced beaded upper edge of the tiles are snugly seated. This construction, in addition to securing the sealing effect of the ordinary flashing along the ridge of the roof, completely incloses and effectively seals against the elements, the upper edges of the tiles of the top course, and protects the securing means for these tiles from the elements, the tiles themselves effectively protecting the securing means for the roll.

The character of the invention is such that it is practically impossible to present drawings with any degree of accuracy as to the relative scale of the various parts. The thickness of the metal stock shown in the drawing, as compared with that of other parts, is excessive, but necessary in order to show dimension.

It is not my intention to limit the invention to the precise details of construction and arrangement of parts shown in the drawing, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. A roofing of the class formed of flanged sheet metal tiles arranged in parallel courses, each tile having a depending butt flange and side flanges of progressively increasing depth from the top of the tile toward said butt flange embodying therein a metallic gable cover secured to the gable end of the roof decking and projecting upwardly to within the depending side flange of a metal tile adjacent said gable end, the top edge of said cover conforming to the varying depth of the side flange of the tile with which it co-operates.

2. A roofing of the class formed of flanged sheet metal tiles arranged in parallel courses, each tile having a depending butt flange and side flanges of progressively increasing depth from the top of the tile toward said butt flange, embodying therein a metallic gable cover secured to the gable end of the roof decking and projecting upwardly to within the depending side flange of a metal tile adjacent said gable end, the side flange of each tile being provided with edge beading, and said gable cover varying in depth to conform to the varying depth of the side flange of the tile with which it co-operates and being recessed to conform to and have a close interlocking fit with said edge beading.

3. A roofing of the class formed of flanged sheet metal tiles embodying therein a gable facing strip having a troughed portion formed therein along the edge of the gable, a metallic gable cover having the lower portion thereof seated in said troughed portion of said facing strip, the upper portion of said gable cover projecting upwardly to within the flanged side of a metallic tile adjacent said gable end, the side flanges of each tile being provided with edge beading, and said gable cover being recessed to conform to and have a close interlocking fit with said edge bead, and means passing through the troughed portion of said gable facing strip and said gable cover holding the latter firmly in position.

4. A roofing of the class formed of flanged sheet metal tiles embodying therein a gable facing strip having a troughed portion formed therein along the edge of the gable, a metallic gable cover having the lower portion thereof, seated in said troughed portion of said facing strip, the upper portion of said gable cover projecting upwardly to within the flanged side of a metallic tile adjacent said gable end, the side flanges of each tile being provided with edge beading, and said gable cover being recessed to conform to and have a close interlocking fit with said edge bead, means passing through the troughed portion of said gable facing strip and said gable cover holding the latter firmly in posi-

tion, and clips secured to the roof decking overlaying and engaging said edge beading and said recessed portion of said gable cover.

In witness whereof I have hereunto affixed my signature, this 4th day of February, 1929.

GEORGE L. BENNETT.