Dec. 10, 1946. O. HOLM-HANSEN 2,412,401

ROOFING CONSTRUCTION

Filed Dec. 2, 1944

Fig. 1.

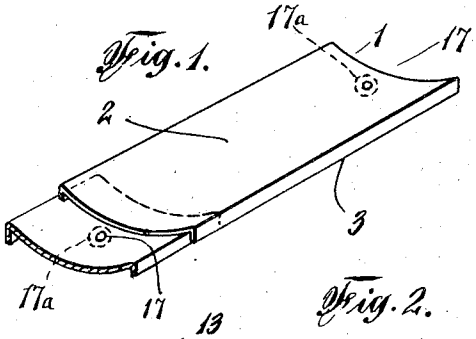


Fig. 7.

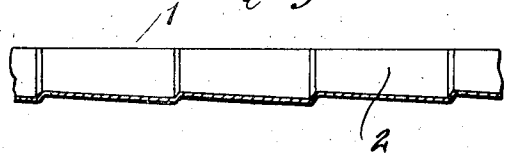


Fig. 2.

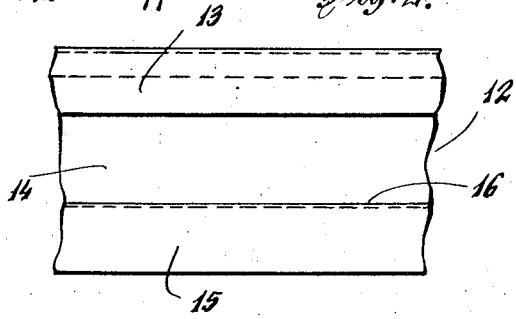


Fig. 3.

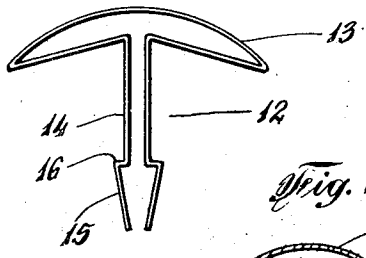


Fig. 8.

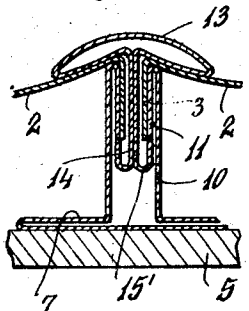


Fig. 4.

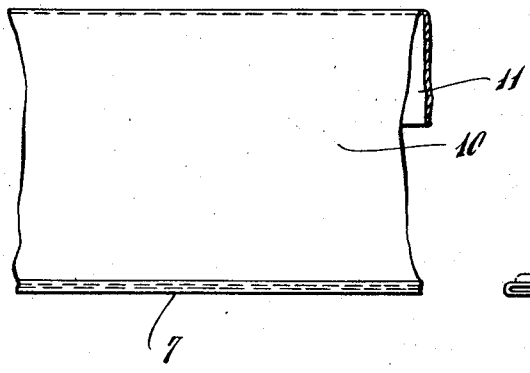


Fig. 5.

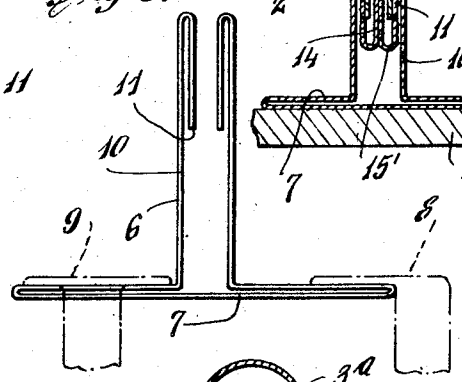


Fig. 6.

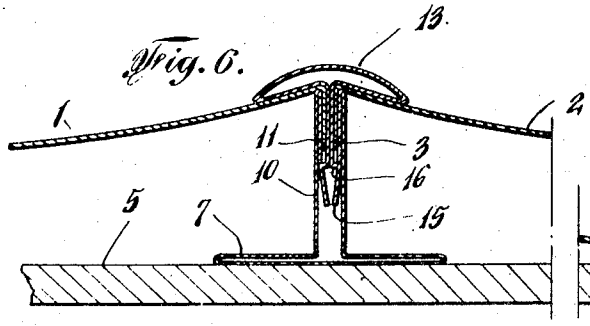
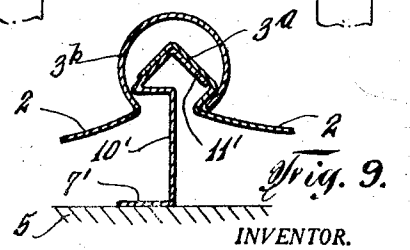


Fig. 9.



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Patented Dec. 10, 1946 2,412,401

UNITED STATES PATENT OFFICE

2,412,401

ROOFING CONSTRUCTION

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Application December 2, 1944, Serial No. 566,262

6 Claims. (Cl.108—13)

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This invention relates to an improvement in roofing construction; and particularly to a novel roofing element and means for affixing same in position.

An object of the invention is to provide a roofing element or shingle shaped out of metal and capable of being quickly and inexpensively produced by machine, and means whereby such an element can be easily and firmly secured in place, and adapted to make a perfectly tight and durable outer covering for any type of edifice.

Another object of the invention is to provide improvements in roofing members which can be mounted and attached by unskilled help, with a minimum amount of overlapping of parts; which is of such shape as to be able to carry a load to advantage when covered with snow or sleet; and yet require nothing but light material to produce same; and which further is of such design as to permit contraction and expansion caused by temperature changes without strain, deformation, or impairment of any kind.

The advantages of the invention will appear from the ensuing description, taken with the accompanying drawing, which discloses the best form of the improvement now known to me. But the disclosure is of course by way of explanation only, and not by way of limitation; and in practice, I reserve the right to make various changes in details which do not conflict with the principle of the invention or go beyond its scope.

On said drawing:

Figure 1 is a perspective view of my improved roofing element or shingle.

Figure 2 is a side view of part of a fastening or locking strip to hold the shingles in position on a roof.

Figure 3 is an end elevation of such a strip.

Figure 4 is a side view of part of a holding or mounting strip for the roofing element.

Figure 5 is an end elevation of the holding or mounting strip.

Figure 6 is a cross sectional view of part of a roof showing how the shingles are secured in place by the holding and locking bars or strips.

Figure 7 is a longitudinal section through a modified form of shingle, and

Figures 8 and 9 are cross sections of modifications.

The same numerals identify the same parts throughout.

The roofing element is indicated as a whole at 1. It is made in a suitable machine, with a concave face 2, and with its opposite longitudinal edges turned over towards the other face, as indicated, to form flanges 3. In practice the transverse curvature of the shingle 1 conforms to a catenary or a parabola; because when loaded with snow, for example, it tends to bend in accordingly. The size will ordinarily be about a foot in width and six or eight feet long. When made of copper it will be only some .006 inch thick. Besides copper I may also use phosphor bronze, copper and aluminum alloy, steel sheets, oxidized, colored, painted or covered with porcelain enamel. Copper of course will oxidize and turn green in time. The material is light and its cost is small, and when it weathers, it has the desired patina.

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The upper or outer concave surface 2 may be smooth, as in Figure 1 or ribbed crosswise as shown at 4 in Figure 7. Here the shingle is laid so that it slopes downward from right to left. The form thus resembles ordinary shingles or Spanish tiles.

To mount and hold the elements on the outer or upper surface of the roof 5 (Figure 6) and facilitate fastening them in position I employ the members illustrated in Figures 2, 3, 4 and 5. These consist of a mounting and holding strip 6 to support the shingles; and a locking strip or member 12. Both are made of metal strips formed by machine.

Each holder strip has a wide flanged base 7, which is affixed to the roof 5 by means of fastening devices 9 driven through the base; or nails 8 having heads that overlap the edge of the base. From the base rise opposing ribs 10, with their upper edges turned downward and inward, as at 11. The locking strips 12 have a convex head or top 13; and a web 14, consisting of parallel sides 15 with shoulders 16. The edges of the sides are spaced apart and converge beyond the shoulders 16. The sides can be forced towards each other to fit into the mounting strips between the sides 10 thereof and the sides 10 will yield enough to allow the shoulders 16 to pass the inturned edges 11. These edges will abut the shoulders 15 when the mounting and locking strips are in full engagement.

To attach the shingles 1, these are laid as presented in Figure 6. The mounting and locking strips are affixed to the roof as far apart as the width of the shingles and the latter rest on the sides 10 of the strips 6, with their parts or flanges 3 between said sides. When the locking strips are added the shoulders 16 catch or detent portions pass below the extremities of the inturned edges 11, holding the part 3 in tight contact with the parts 11, and a binding fit results. The head

13 overlaps the ribs 10 and the joint between the sides of the shingles thus is sealed.

The shingles and strips are laid down the slope of the roof; and when the roof has two sides, usually no more than two shingles are needed; the upper overlapping the lower. The shingles are all nailed at one end only in the middle, as indicated at 17. They approach but do not quite make contact with the roof 5, and the nailing is done at the point closest to the roof surface. The shingles are then free to expand or contract lengthwise, and any crosswise changes due to a rise or fall in temperature are free to occur because of the curvature of the shingles. At the ridge of the roof the ends of the shingles are covered or screened in any feasible manner, this is not being a part of the invention herein.

From the foregoing description, it is apparent that I have perfected a roofing construction which fully realizes all the aims and purposes of my invention.

When the shingles are nailed to the roof, a washer 17*a* can be employed under each point where a nail is driven to keep the shingle from being bent down into actual contact with the roof 5. Where the shingles overlap, the lower only is fastened at its top in this way, the other being secured at a point near the upper end; as shown in Figure 1.

In Figure 8 the construction is shown with a slight change. Instead of having shoulders 16, the ends of the edges of the web portions 14 of the receiving strips are simply turned over and up. When the locking members secure the shingles in the receiving members 6, which are the same as before, the turned-over extremities 15' simply slip down past the edges of the parts 11 and go under them; serving as detent or catches, like the shoulders 16.

The modification of Figure 9 shows a mounting or supporting strip or rib 10' with a base or flange 7' attached to the roof 5. This member 10' has a triangular bead 11' extending along the top. Along one edge the shingles each will have a channel-shaped bead 3*a* arranged at a slant so that it fits upon this bead 11'. Along the opposite side edges the shingles are shaped so as to present a hollow round bead 3*b*, which forms a locking member integral with the shingle and fits upon and over the bead 11' and the bead part 3*a* of the adjacent shingle along its length. The fit is made right enough to hold the shingles permanently in place; and the edge of the member 3*b* serves as a catch to secure the bead part 3*a* against the bent part 11' along the length of the rib 10.

Having described my invention what I believe to be new is:

1. Roofing construction comprising mounting strips, each having a base with ribs thereon, roofing surface elements supported by said ribs, said elements having downturned flanges along their edges received between said ribs and locking strips having webs received between said ribs and engaging said flanges, and heads overlapping said ribs.

2. Covering for a building comprising mounting strips each having a base with ribs thereon, surface elements supported by said ribs, said elements having downturned flanges along their edges received between said ribs, said elements having concave outer surfaces, and being affixed at one end only, and locking strips having webs received between said ribs and engaging said flanges and heads overlapping said ribs.

3. Roofing construction comprising mounting strips each having a base and ribs thereon, the tops of said ribs being turned down into the space between said ribs, roofing surface elements supported on said ribs and having downturned flanges along their sides received between said ribs, and locking strips having webs formed of separated detent portions between said ribs and engaging said flanges and the edges of said tops, and heads overlapping said ribs.

4. Covering for a building comprising mounting strips each having a base with ribs thereon, surface elements supported by said ribs, said elements having downturned flanges along their edges received between said ribs, said elements having concave outer surfaces and being affixed at one end only, the tops of said ribs being turned down into the space between them, and locking strips having webs formed of separated detent portions received between said ribs and engaging said flanges and the edges of said tops, and heads overlapping said ribs.

5. Roofing construction comprising mounting strips each having a base and spaced ribs thereon, the tops of said ribs being turned down into the space between said ribs, roofing surface elements supported on said ribs and having downturned flanges along their sides received between said ribs, and locking strips having webs formed of separated portions with edges presented outward between said ribs and engaging said flanges and the edges of said tops, and heads overlapping said ribs.

6. Covering for a building comprising mounting strips each having a base with ribs thereon, surface elements supported by said ribs, said elements having downturned flanges along their edges received between said ribs, said elements having concave outer surfaces and being affixed at one end only, the tops of said ribs being turned down into the space between them, and locking strips having webs formed of separated detent portions received between said ribs and engaging said flanges and the edges of said tops, and heads overlapping said ribs.

OSMUND HOLM-HANSEN.