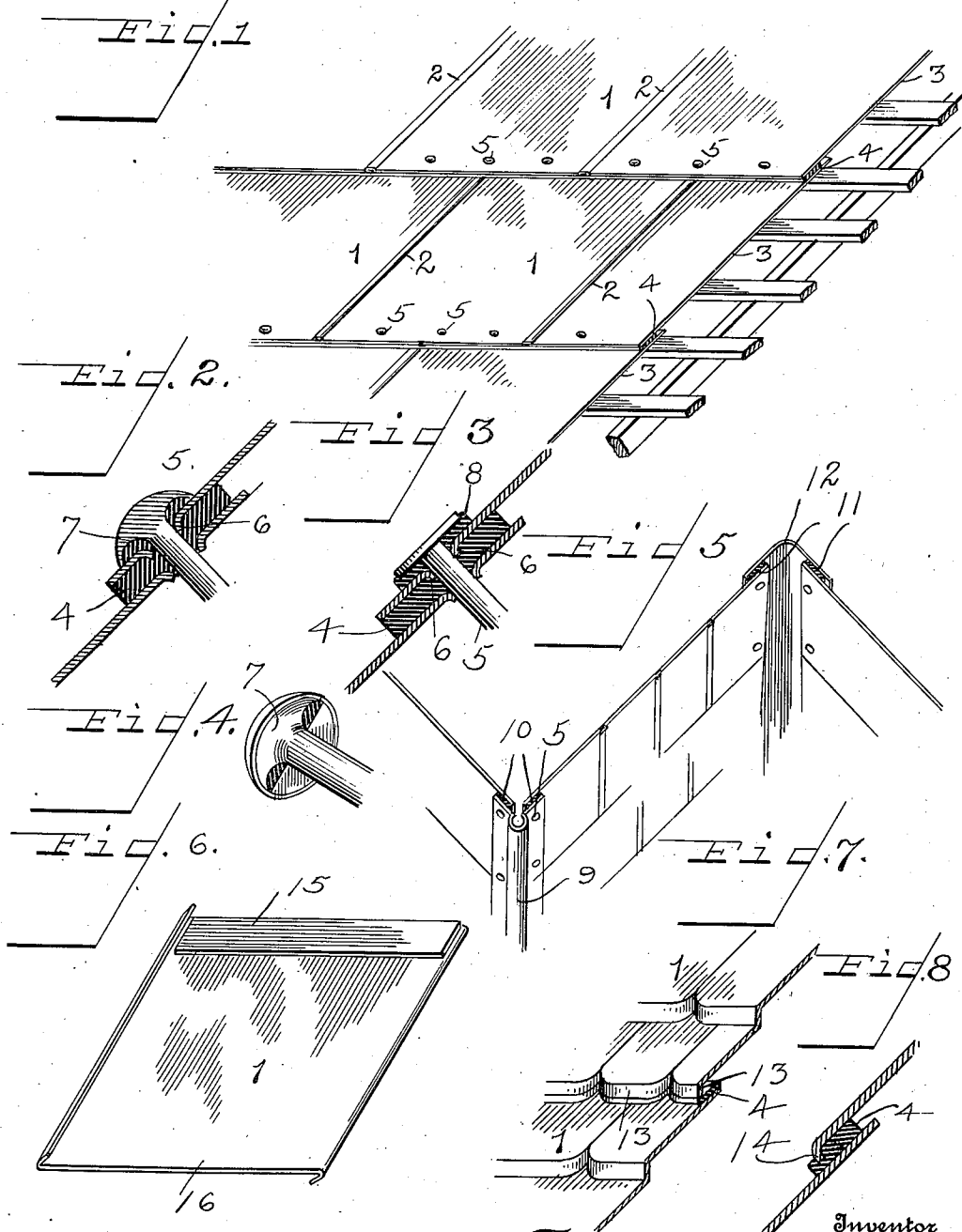


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ROOFING.
APPLICATION FILED APR. 22, 1915.

1,335,756.

Patented Apr. 6, 1920.



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ROOFING.

1,335,756.

Specification of Letters Patent.

Patented Apr. 6, 1920.

Application filed April 22, 1915. Serial No. 23,103.

To all whom it may concern:

Be it known that I, TRUMAN MERRILL SCARFF, citizen of the United States, residing at Springvalley, in the county of Greene and State of Ohio, have invented certain new and useful Improvements in Roofing, of which the following is a specification.

My invention relates to sheet metal roofing and particularly to the use of a protective packing therefor.

The object of the invention is to improve and simplify the application of sheet metal roofing whereby the joints between successive courses or sections will be effectually closed to prevent leakage or seepage and to prevent wind or moisture being driven between the overlapping edges and further to prevent moisture being drawn into the joint by capillary attraction.

A further object of the present invention is to enable sheet metal roofing to be applied by unskilled labor and to enable the roofing sheets to be nailed at exposed points and to effectually seal such nail holes and protect the exposed edges of the sheet and nail against rust or corrosion.

A further object of the invention is to provide an improved form of sectional or sheet metal roofing embodying the features of advantage before enumerated.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the drawings, Figure 1 is a perspective view of a portion of a sheet metal roof to which the invention forming the subject matter hereof has been applied. Fig. 2 is an enlarged detail view illustrating the method of sealing nail holes and protecting the broken edges of the sheet and the nail. Fig. 3 is a modification thereof. Fig. 4 is a detail view of a special form of nail. Fig. 5 is a sectional plan view of a portion of a hip roof showing the application of the sealing or packing material to a hip or ridge roll and to a valley. Fig. 6 is a detail perspective view of a roofing sheet with the packing material attached. Fig. 7 is a detail perspective view of the application of the invention to pressed sheet metal

roofing or metal imitation shingles. Fig. 8 is a detail sectional view of a modification of the roofing sheet and its application.

Like parts are indicated by similar characters of reference throughout the several views.

It is customary to employ sheet metal roofing in sections or sheets connected one to the other by either a standing seam or a flat seam, these sheets or sections being attached to the building structure by nails concealed beneath the overlapping portions of said seam. Various forms of interlocking joints and different constructions of seams have been commonly employed. Sheets or sections of roofing being commonly laid in courses or tiers, the lower edge of each course or tier is made to overlie or overlap the next succeeding course. Being ordinarily only attached at their seamed edges to the building structure, the sheets or sections, either due to expansion and contraction of the material itself or to poor workmanship in applying the same, are frequently inclined to buckle or warp, thereby affording spaces or openings in the overlap of succeeding courses through which rain and snow may be blown or wind may enter to the interior of the building. It has also been found that when the sheets merely rest one upon the other, more or less moisture is drawn therebetween by capillary attraction. It has heretofore been impractical to nail these loose or overlapping edges with exposed nails for the reason that the puncturing of the sheets or sections and breaking the galvanizing or protecting coating of the sheet permits moisture to reach the metal immediately surrounding the nail hole which is caused to rust or corrode. Furthermore, it is found that in such cases the moisture collects around the nails and passes through the nail holes to the interior of the building and in so doing causes the nail itself to corrode. To provide a form of packing which will effectually seal the joints between successive courses or tiers and which will afford protection to the nail and exposed edges of the sheet surrounding the nail, thereby enabling the use of nails in exposed positions, are primary objects of the present invention.

In the drawings, 1 1 represent successive sheets or sections of metallic roofing connected one to the other by ordinary flat

seams 2 2 and arranged in overlapping courses or tiers 3 3. In applying the invention to a roof the metallic sections or sheets may be connected and laid in the ordinary manner, the connections being made by any of the forms of seams which are now in common use, such as the flat seam, standing seam, interlocking crimp, or that which is known as the two, three, or five V style, and the sheets or sections may be attached to the structure by concealed nails in the usual manner.

After having applied the roof in the usual way, the overlapping joints between successive courses or tiers are forced open and a strip of elastic or semi plastic packing material is inserted therein, as indicated at 4. This packing strip may be formed of any moisture resisting material which is yielding or slightly compressible, such as material embodying rubber or gutta percha, pitch, tar, or asphaltum, or it may comprise a section of cloth, fabric, or felt filled or covered with any of the aforementioned materials or other similar material, or layers of felt may be used without such material. In actual practice strips of commercial tar or asphalt roofing material are employed, preferably an asphalt felt material which is cut into strips several inches wide and is inserted intermediate the overlapping portions of the sections or sheets. These sections are then nailed at exposed points, as indicated at 5, by nails which are driven through the overlapping portions of the sections and through the intermediate packing strip 4.

The puncturing of the roofing sheet exposes the metal of the sheet about the hole where the galvanizing or protective coating of the sheet has been destroyed. Moisture reaching this exposed edge would rust or corrode the metal of the sheet. However, by the use of the interposed packing strip the burr or jagged edges of the hole are forced downward into and covered by the yielding strip 4 as indicated at 6. Likewise, the puncturing of the strip 4 by the nail 5 will compress the material about the nail, causing the elastic or yielding semi plastic material to cling closely to the shank of the nail, effectually preventing the seepage of water through the puncture.

To prevent the entrance of water beneath the head of the nail, nails of special shape are preferably employed, the heads of which are shaped similar to those of upholsters' nails, being formed concave or recessed on their under sides, as indicated at 7. This recess or groove in the under side of the nail is filled with asphaltum, pitch, tar, or other sealing material which, when the nail is driven to its limit, seals the upper side of the puncture and any recess between the head of the nail and the uppermost sheet 1.

In lieu of the special nails shown in Figs. 2 and 4, ordinary flat headed nails, as now in common use, may be employed, the nail being provided with a washer or collar 8 of packing material similar to the packing material 4 before being driven through the overlapping sheet. This washer or collar will effectually seal the upper side of the puncture and the recess between the head of the nail and the superposed sheet.

The material forming the packing strip and the insert or collar of the nail is preferably such as to be softened by heat. After the sheets have been nailed, as described, heat may be applied to the joints of the sheets and to the nail heads by means of a hot iron or torch, if so desired, to soften or partially melt the material forming the packing, causing it to adhere more closely to the nail and to the edges and faces of the overlapping sheets. However, it will be found that under ordinary circumstances such application of heat will not be necessary, as the heat of the sun during warm weather will sufficiently warm or soften the packing material to cause it to conform to the nail or sheets to form a perfect joint.

The packing material is applied, as described, not only to the overlapping joints between the successive courses or tiers of roofing sections or sheets, but is also applied beneath the edges of the ridge or hip rolls 9, as indicated at 10 in Fig. 5, and beneath the adjacent edges of the roofing sections or sheets, as indicated at 11, on opposite sides of the valley 12.

Sheet metal roofing is sometimes pressed or formed to imitate shingles. In such case the edge of the roofing sheet is flanged as indicated at 13 in Fig. 7. In such cases the packing strips 4 are inserted between the flange 13 and the face of the succeeding sheet or section and the attachment of the overlapping sheet to the building structure tends to sink the flange 13 into the packing strip to form an impervious joint which is further sealed by the partial melting or softening of the packing material when subjected to heat.

In Fig. 8 there is shown a modification in which the lowermost edges of the flat sheet 1 are formed with a bead or flange 14 which is pressed into the packing strip 4 as the material is applied to insure a perfect joint.

It is found in practice that the packing material becomes cemented to the opposing faces of the overlapping sheets and forms a moisture and wind tight joint. While it has been found very convenient to apply separate and independent packing strips to the roof after the overlapping sheets have been laid, as before described, a more convenient and commercial form of the invention is shown in Fig. 6 in which a strip of

yielding or semi plastic packing material 15 is attached to the roofing sheet before being laid. In this form the packing material may be attached by the manufacturer of the roofing sheets. The opposite edge of the sheet is preferably perforated, as indicated at 16, for the reception of securing nails. In Fig. 6 the opposite edges of the sheet have been shown flanged preparatory to forming a simple interlocking seam or joint. It is obvious, however, that the packing strip 15 may be applied to roofing sheets or sections having any other form of joint or seam flanges.

While the form of nails shown in Figs. 2 and 4 is preferred, it is to be understood that this form of nail is not essential but that the washer or collar construction, shown in Fig. 3, is equally efficient. It will be found that the use of the elastic or semi plastic material, as described, prevents any leakage or seepage of moisture about the nail driven through the roofing for if any moisture should pass through the first or overlying sheet, it will be carried off by the interposed packing strip. However, after the packing strip has cemented the opposite faces of the overlapping portions of the sheet, due to compression or to the direct application of heat by means of a hot iron or torch, or due to summer heat, the asphalt will effectually seal the joints to prevent moisture being driven up and under the overlying sheets by high wind pressure, or from being drawn within the joint by capillary attraction. The asphalt or other adhesive material in the packing strip forms a protective coating upon and around the nail and over the exposed edges of the nail hole in the sheet to prevent the rusting or corrosion of such parts. The jagged or burred edges of the hole are forced down into the packing strip and the packing material conforms to the nail and edges of the nail hole and the subsequent partial heating or warming of the material effectually seals the puncture.

As sheet metal roofing is now applied, without such packing material; a skilled workman is required to insure perfect workmanship and impervious joints. However, by the method herein described, unskilled labor may be employed, as the yielding nature of the packing compensates for any irregularities in the laying of the sheets and insures moisture and water tight joints.

The interposed strip of packing material heretofore described is of material advantage in arresting the deterioration of the metallic roofing sheets. It has been found in practice that the entrance of moisture between two overlapping sheets, whether such sheets are on a roof or a number of sheets in a bundle, causes the rapid corrosion of the material. There is always a trace of

acid left upon the surface of the galvanized sheets. This combination of acid and water sets up an electro-chemical action which first strips the galvanizing from the metallic sheets and finally destroys the substance of the roofing sheets. The more recent theory is that the action of acid or water upon iron is due to an exchange of electric charges between the hydrogen ions of the acid or water and the electrically neutral atoms of the metal. The effect of the electrolytic action is accelerated by the presence of the second sheet in contact with the first. The interposed packing strip of asphaltum or similar material serves to insulate the roofing sheets one from the other and thus serves a double purpose, first that of excluding the moisture, and second, that of arresting or preventing electrical action.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular advantages before enumerated as desirable but which obviously is susceptible of modification in its form, proportion, detail construction, or arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to certain structural features, it is to be understood that the invention is not limited to any specific details but that the means and construction herein described comprise but one mode of putting the invention into effect and the invention is therefore claimed broadly in any of its possible forms or modifications within the scope of the appended claims.

Having thus described my invention, I claim:

1. In a sheet metal roof construction, the combination with metallic sheets, of nails driven therethrough, the heads of said nails being of hard metal and being recessed on their under sides contiguous to the shanks thereof, and a body of elastic adhesive material located in the said recesses of the nail heads and adapted to seal the puncture through which the nail passes.

2. In a sheet metal roof construction, the combination with metallic sheets, of nails driven therethrough having cylindrical shanks and solid heads, each of said heads having a circular groove therein extending entirely around the same and having a surface bounding the groove therein which merges smoothly into the cylindrical surface of the corresponding shank, and a plastic adhesive collar in each of said grooves.

3. In a sheet metal roof construction, the combination with metallic sheets, of nails driven therethrough having cylindrical shanks and solid heads, each of said heads having a circular groove therein extending

entirely around the same and having a surface bounding the grooves therein which merges smoothly into the cylindrical surface of the corresponding shank, and a plastic adhesive collar in each of said grooves, each of said heads having the surface of said grooves inclined toward the line of the shank in passing inwardly from the outer edge of the head toward the shank, whereby the material of each collar is pressed toward the shank as the nail is driven home.

4. In a sheet metal roof construction, the combination with a metallic sheet and nails driven therethrough of bodies of plastic sealing material oppositely disposed on the opposite sides of the metallic sheet adapted to unite one with the other through the hole

through which said nail extends substantially as specified.

5. In a sheet metal roof construction the combination with a metallic sheet, of nails driven therethrough, of a body of plastic sealing material underlying said sheet, of plastic sealing material surrounding the nails intermediate the head of the nail and exposed side of the sheet adapted to unite with the underlying body of sealing material through the nail holes.

In testimony whereof, I have hereunto set my hand this 14th day of April, A. D. 1915.

TRUMAN MERRILL SCARFF.

Witnesses:

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