May 25, 1926.

1,585,897

H. O. DAVIDSON

ROOF CONSTRUCTION

Filed Dec. 27, 1922

2 Sheets-Sheet 1

Fig. 1.

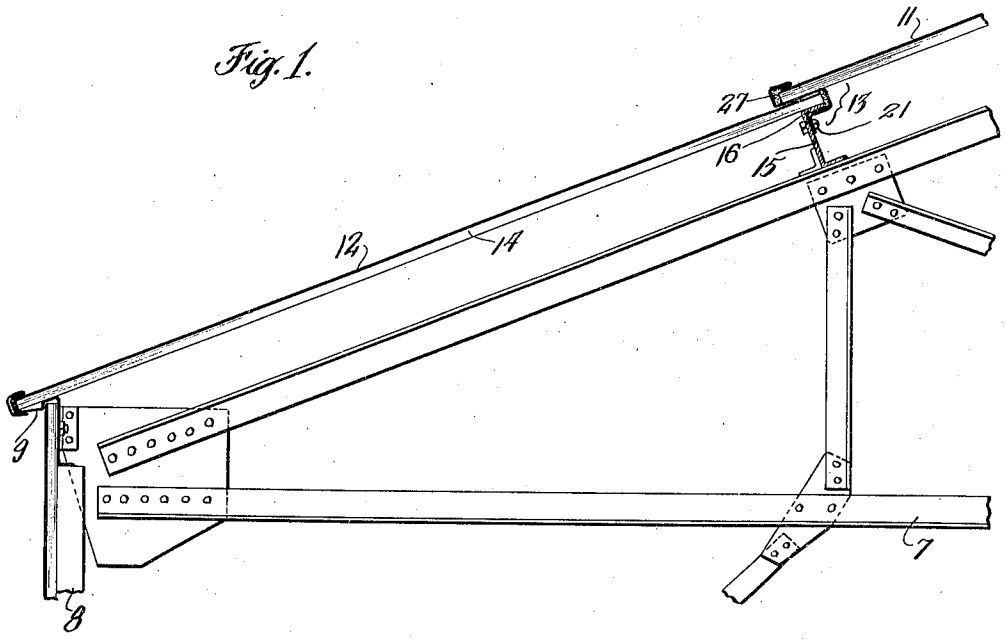


Fig. 4.

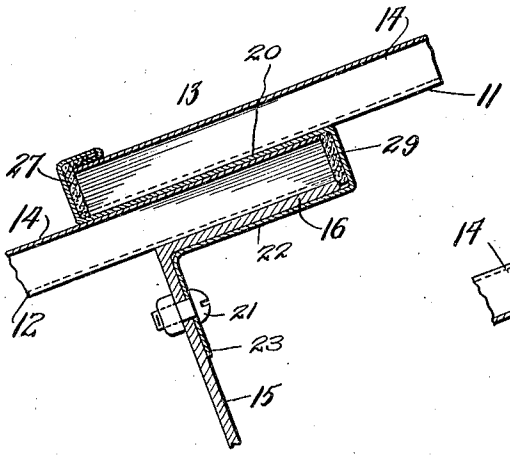
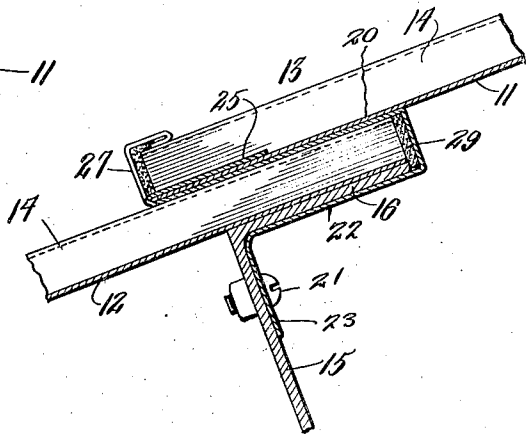


Fig. 3.



WITNESS.

Gustav Genzlinger.

INVENTOR

BY H. O. Davidson

Synnestvedt & Lechner

ATTORNEYS

May 25, 1926.

1,585,897

H. O. DAVIDSON

ROOF CONSTRUCTION

Filed Dec. 27, 1922

2 Sheets-Sheet 2

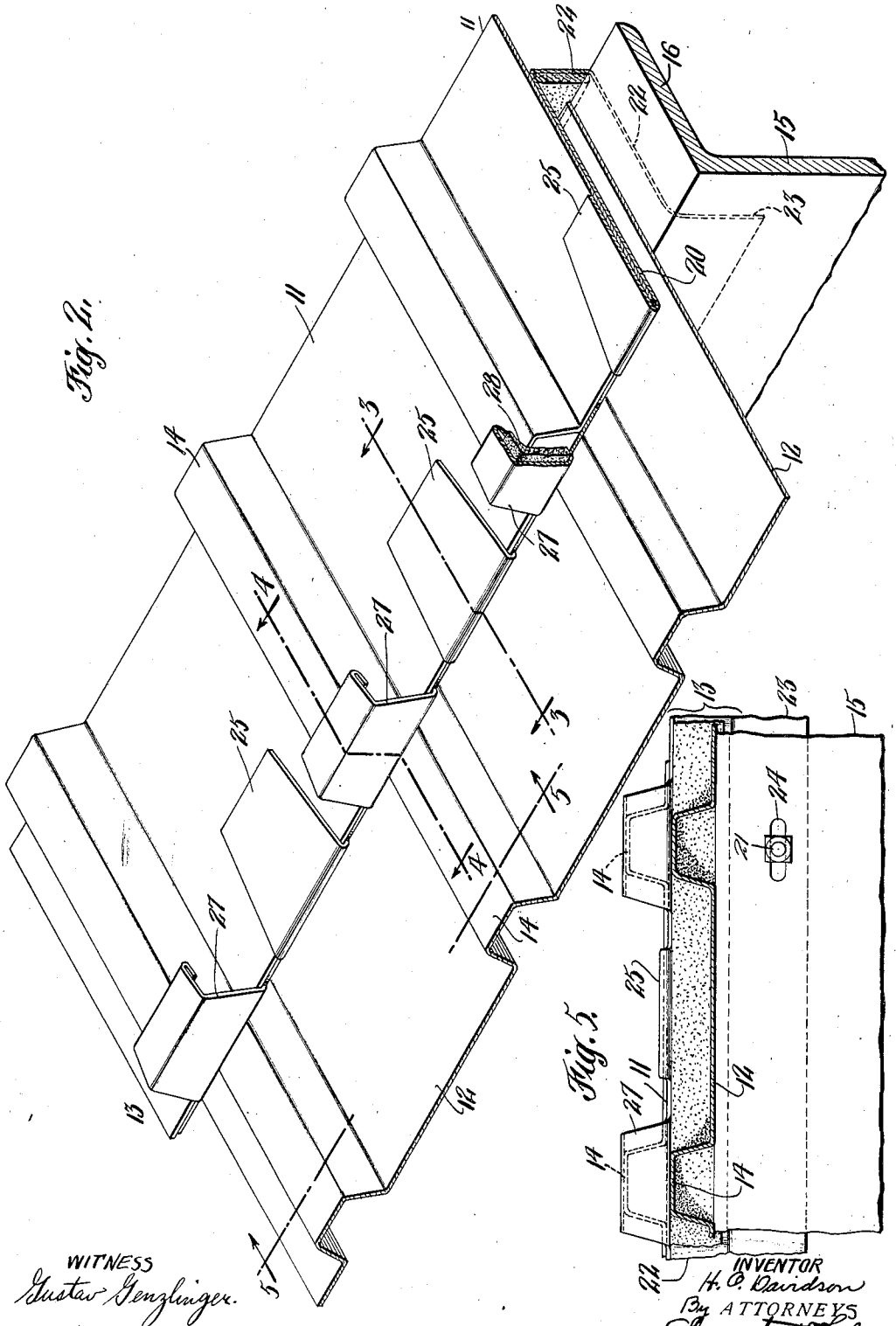


Fig. 2.

Fig. 5.

WITNESS
Gustav Genzlinger.

INVENTOR
H. O. Davidson
By ATTORNEYS
Symmestved & Lechner

Patented May 25, 1926. 1,585,897

UNITED STATES PATENT OFFICE.

HARRY O. DAVIDSON, OF BALTIMORE, MARYLAND, ASSIGNOR TO C. D. PRUDEN CORPORATION, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

ROOF CONSTRUCTION.

Application filed December 27, 1922. Serial No. 609,177.

My invention relates to roof construction, and is especially concerned with the construction at joints in the roofing. Amongst the advantages that can be variously realized through my invention, in a novel manner and to a high degree, are simplicity and lightness of construction; security, durability, and freedom from deterioration in service; unobstructed freedom of run-off from the roof, without pockets for retention of standing water or accumulation of dust; tightness against wind and dust, as well as against water; and avoidance of such undesirable features as putting holes in the roof sheets in order to secure them, or the employment of straps or wires for that purpose. How these and other advantages can be obtained will appear from my description hereinafter of the best embodiment known to me. In this description, a very convenient application of the invention to the roofing of a galvanized iron or steel building such as now marketed under the name of "Prudential buildings" is especially referred to, for the purpose of specific illustration.

In the drawings, Fig. 1 is a fragmentary cross-sectional view, illustrating part of the roof-truss and associated parts of a typical "Prudential" building roofed in accordance with my invention.

Fig. 2 is a fragmentary perspective view of the horizontal joint between roof sheets illustrated in Fig. 1, on a larger scale.

Figs. 3 and 4 show vertical sections through the joint in the direction of the roof pitch, taken as indicated by the lines 3—3 and 4—4 in Fig. 2.

Fig. 5 shows a vertical section parallel to the eaves or the ridge, taken as indicated by the line 5—5 in Fig. 2.

The metal angle-bar roof truss 7 shown in Fig. 1 is supported from the metal side studding 8, etc., as usual in buildings of the type illustrated, and the joint between the metal roof and the metal side sheet is made weather and dust tight by means of the usual sheet metal "eaves channel" 9. Likewise, the galvanized iron roofing sheets 11 and 12 have the usual overlap of some inches at the horizontal roof joint 13 shown, as well as the usual corrugation or embossing at 14 (see Figs. 2–5), in the direction of the roof pitch. In the present instance, the outstanding corrugations or ridges 14 are of trapezodial cross-section, and much narrower than the intermediate depressions or flat portions. Also, a member 15 for supporting and holding the roof—here a horizontal purlin in the form of a channel bar with the lateral flange 16 at its upper edge turned toward the ridge of the roof—extends along beneath the joint 13 on the roof frame, to which it is secured.

In the roofs of such buildings as heretofore constructed, there has been employed at the joint 13 a so-called "roof joint channel", in cross-section somewhat resembling a capital Z or S with pronounced kerns at its extremities, extending along the joint with the intermediate stroke of the Z interposed between the overlapping upper and lower roof sheets 11 and 12 and the kern-like portions hooked over the lower edge of the upper sheet 11 and around the upper edge of the lower sheet 12 under the subjacent purlin flange 16, so as to keep the roof sheets in line and hold them together at the joint without their being pierced with bolt holes. For the purpose of holding down the roof sheets 11 and 12 securely to the purlins 15, "roof-rafters" (so called) of T-shaped cross-section have been provided at the joints between the adjacent sheets 11 of each horizontal roofing "strake", extending in short lengths or sections between adjacent purlins. Each of these roof-rafters had its vertical flange interposed between the horizontally adjacent sheets 11 or 12, and was secured in the joint by inclusion of its T-head flanges within an interlocking cap with inturned edges that was slid over the retroverted edges or "beads" of the sheets 11 or 12 to secure them together and make the joint water-proof. The corresponding roof-rafters to either side of each purlin 15 (and the associated roof-sheets 11 and 12) were anchored and secured to such purlin by metal straps or wires connected between the rafter-ends around or beneath the purlin,—U or V fashion. With roof-rafter sections approximating in length the full distance between the purlins at their ends, and this mode of wiring them together around or across each purlin, displacement of the roof as a whole and of the roof-joint channels sidewise with reference to the purlins 15 was prevented, and thus the channels were kept

from unhooking from the purlins and enabled to afford some assistance in holding down the roof.

Besides structural complications and mechanical short-comings, this construction presented the drawback that the "foot" and "kern" portions of the Z-shaped roof-joint channel that hooked over the lower edge of the upper roof sheet 11 and its outstanding corrugations 14 formed a dam or pocket across the depression between these corrugations, which impeded the run-off and retained standing water to rust the roof. Even if holes were punched to drain these pockets, accumulations of dust and dirt would tend to stop them up, and would at best retain corrosive dampness some time after mere standing water would have been dried up by the heat of the sun. And when the accumulations of dust and dirt did become dry, moreover, they tended to blow up through the hollows of the ridges 14 of the upper sheet 11 into the interior of the building,—something that is often very objectionable.

Through the application of my invention in its preferred form here illustrated and described, all these disadvantages of such roofs as heretofore constructed can be obviated. Roof rafters and wiring can be done away with, and the roof sheets 11 and 12 quite effectually secured together and to the purlins 15 by the "roof-joint channels",—so to term somewhat analogous parts that may be employed in my construction. Interference with run-off and pocket retention of dust and moisture can be eliminated; and the roof can be made sufficiently tight against wind and dust to answer even the rather exacting requirements of storage for Portland cement and the like,—where free air circulation is deleterious because the resulting continual supply of atmospheric moisture tends to cause the cement to set.

In the present instance, then, roof rafters and wiring or the like are dispensed with entirely, and the member 20 extending along the joint 13 is secured to the purlin 15 in a different and more direct manner, as by means of screw bolts 21 taking through facially adjacent portions of purlin and joint member, which are suitably apertured for the purpose. The attachment of the sheet-like joint member 20 here shown to the purlin 15 can be facilitated by forming the retroverted portion 22 of this member 20 (that extends around the upper edge of the lower sheet 12 and hooks under the lateral purlin flange 16) with a downward extending flange 23, and providing the openings 24 for the securing bolts 21 in this flange 23 and in the purlin web, below the purlin flange 16, rather than at the purlin flange 16 itself. As shown, the bolt openings 24 (Fig. 5) in this portion 23 of the member 20 are horizontally elongated slots, so as to permit some longitudinal adjustment of member 20 relatively to the purlin 15. By the attachment to the purlin 15, the member 20 is effectually secured against unhooking displacement (sidewise or otherwise) relatively to the latter.

From its connection to the purlin 15,—located and formed as just described or otherwise,—the member 20 extends down over the upper edge of the lower sheet 12 beneath the superposed lower marginal portion of the upper sheet 11, which is secured to the interlapping portion of said member 20. In the present instance, the member 20 is secured to and secures the lower edge of the upper sheet 11 in very much the same way (broadly speaking) as the upper edge of the lower sheet 12, by retroversion (in the opposite direction) to hook around and up over it. As best shown in Figs. 2, 3, and 5, the retroverted portion or portions 25 of the member 20 principally and preferably relied on for this purpose are closed down sharply upon the lower edge of the upper sheet 11 between the outstanding corrugations 14 (with which the sheet 11 is in the present instance provided), so as to hook it down close against the subjacent interlapping portion of said member 20. Thus, it will be seen, the upper sheet 11 is most securely held without substantial interference with the run-off from the presence of the joint sheet 20, and all the parts are effectually secured to the purlin 15.

Still referring to Figs. 2, 3, 4 and 5, it will be seen that in the present instance the joint member 20 has upstanding portions 27 corresponding to the outstanding corrugations or embossments 14 in the upper sheet 11, and adapted to extend over and close their lower ends against entry of wind or dust. As shown, these upstanding portions 27 are retroverted in correspondence with the height of the corrugations 14, so as to hook over them and hold down the upper sheet 11. The isolation or separation of these portions 27 of the member 20 leaves the intervals between the corrugations 14 correspondingly free and clear for substantially unimpeded run-off. In the present instance, the portions 25 are not merely detached from the portions 27 as entailed by the relative positions of these parts already described, but are also isolated or separated from said portions 27 by an interval or space lengthwise of the joint 13 sufficient to permit absolutely free and unimpeded run-off at either side of each closed down portion 25. This obviates any tendency for water to percolate or collect under or behind these parts 25 and 27.

From the foregoing description, it will be seen that the joint member 20 can be quickly and economically made of galvanized iron or other sheet metal, by very simple, easy shearing or die-cutting and subsequent or concurrent bending operations. If desired, of course, the actual bending up of a

member 20 to its final form may be performed (in part or in whole) on the job instead of in the factory: particularly, for example, the parts 25 and 27 may be only partially bent up and retroverted at the factory and may conveniently and advantageously be finally bent down on the sheet 11 after the parts are all in place. As shown the extreme ends of the portions 27 are bent or tucked under to hold felt or other suitable padding 28 for insuring "draft tightness" at the lower ends of the corrugations 14. Also, a felt packing strip 29 extends along the upper edge of the sheets 12, in the bend of the joint sheet portion 22 beyond and around said edge, for a similar purpose.

It will be seen, of course, that while both portions 25 and 27 of the joint member 20 serve to hold down the upper roof sheet 11 and resist any influence or force tending to slide it down the roof, the sharp retroversion of the parts 25 (on the mere thickness of the sheet 11) make them much more effective for this purpose, especially when the member 20 is of sheet metal,—in view of the leverage on the portions 27 represented by the height of the corrugations 14. In other words, when parts 25 and 27 are both employed, as here shown, the parts 25 protect the parts 27 from the weight of the sheet 11 and prevent creation of an opening under the sheet 11 by bending back of the parts 27 or lifting of the sheet.

I claim:

1. In roof construction, the combination with lap-joined roof sheets and a member with lateral flange at its upper edge extending along beneath the joint, of an interlapping sheet extending along the joint and securing the edge of the upper sheet, and having a retroverted portion hooked under the aforesaid flange of said member and bent downward and secured to the member below said flange.

2. In roof construction, the combination with lap-joined roof sheets, comprising a lower roof sheet and a corrugated upper roof sheet overlapping it, and a supporting member extending along beneath the joint, of an interlapping member extending along the joint having a retroverted portion extending around the edge of the lower sheet, hooked under said supporting member and secured thereto against unhooking displacement, and also having an oppositely retroverted portion hooked over and closed down upon the edge of the upper sheet between its outstanding corrugations.

3. In roof construction, the combination with a lower roof sheet and an overlapping corrugated upper roof sheet, of an interlapping sheet extending along their joint secured to the lower sheet and having portions retroverted around and closed down upon the edge of the upper sheet between its outstanding corrugations, and also portions bent up over the ends of such corrugations.

4. In roof construction, the combination with a lower roof sheet and an overlapping corrugated upper roof sheet, of an interlapping sheet extending along their joint secured to the lower sheet and having isolated portions retroverted upon the ends of the outstanding corrugations of the upper sheet to close them and hold it down, the intervals between corrugations being correspondingly free and clear for substantially unimpeded run-off.

5. A joint sheet for interlap and cooperation with a lower roof sheet and an overlapping corrugated upper roof sheet, having means for securing the upper edge of the lower sheet and isolated portions for hooking over and closing the ends of the outstanding corrugations of the upper sheet, so that the intervals between corrugations may be correspondingly free and clear for substantially unimpeded run-off.

6. A joint sheet for interlap and cooperation with a lower roof sheet and an overlapping corrugated upper roof sheet, having means for securing the upper edge of the lower sheet and portions for hooking the lower edge of the upper sheet between its outstanding corrugations close against the subjacent portions of the joint sheet, and also portions for closing the ends of such corrugations.

7. A joint sheet for roof construction comprising a portion for extending along between overlapping roof sheets at their joint, a retroverted portion for hooking under a supporting member apertured for attachment to a facially adjacent portion of said member, and means for securing the edge of the upper roof sheet.

8. A joint sheet for roof construction comprising a portion for extending along between overlapping roof sheets at their joint, a retroverted portion for hooking under a lateral purlin flange, said portion being flanged downward for attachment to the purlin below its said flange, and means for securing the lower edge of the upper sheet.

In testimony whereof, I have hereunto signed my name.

HARRY O. DAVIDSON.