

June 19, 1923.

1,459,436

C. D. BONSALE

METAL CAR ROOF

Filed March 11, 1922

2 Sheets-Sheet 1

Fig. 1.

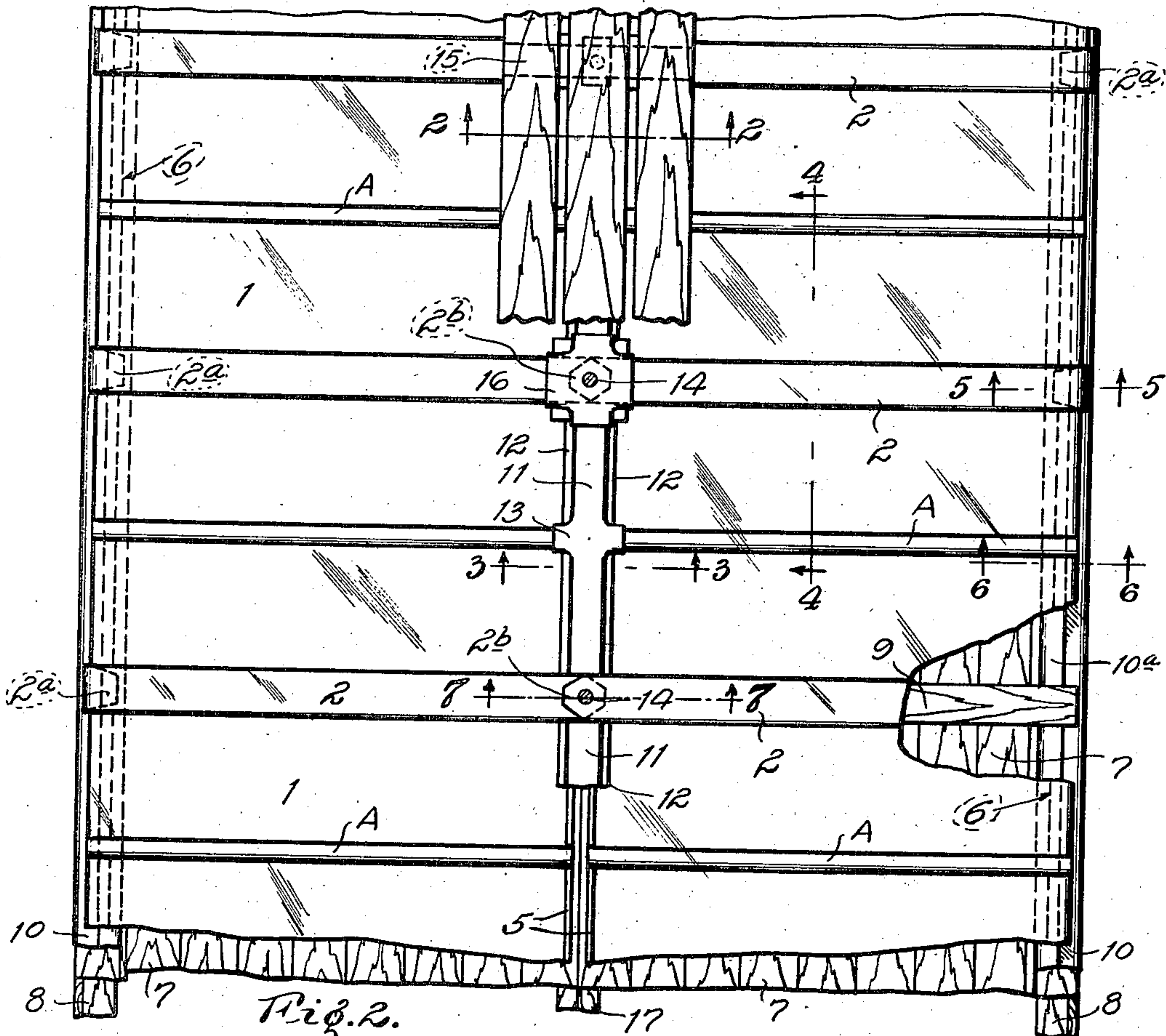
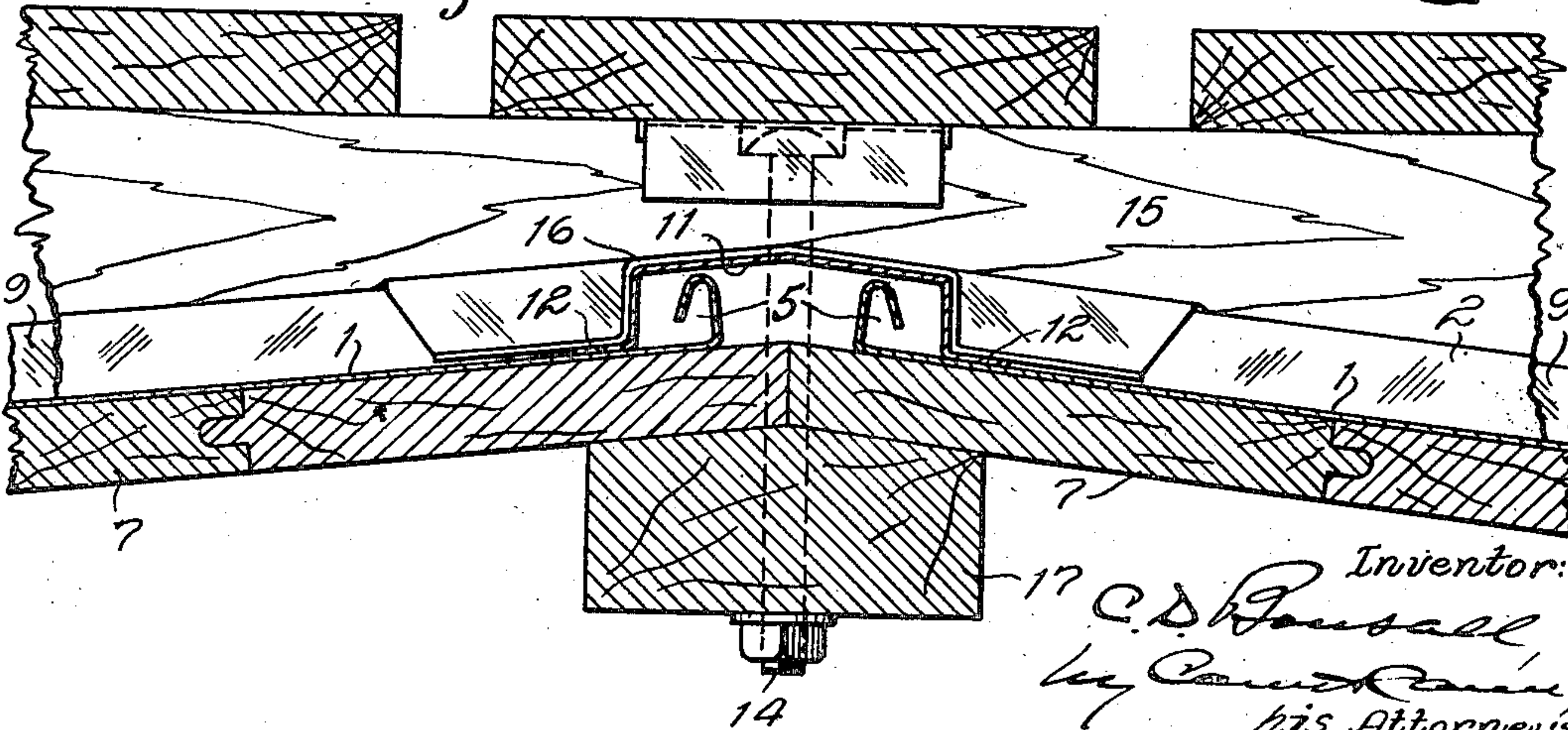


Fig. 2.



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2 Sheets-Sheet 2

Fig. 4.

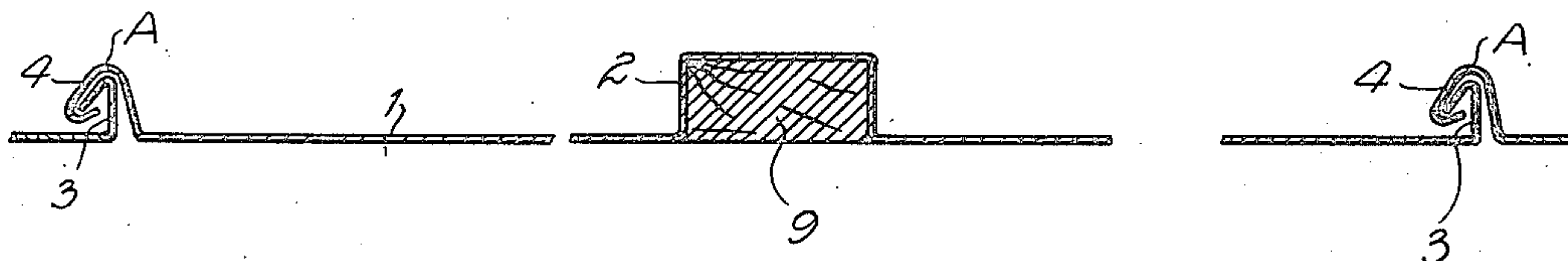


Fig. 3.

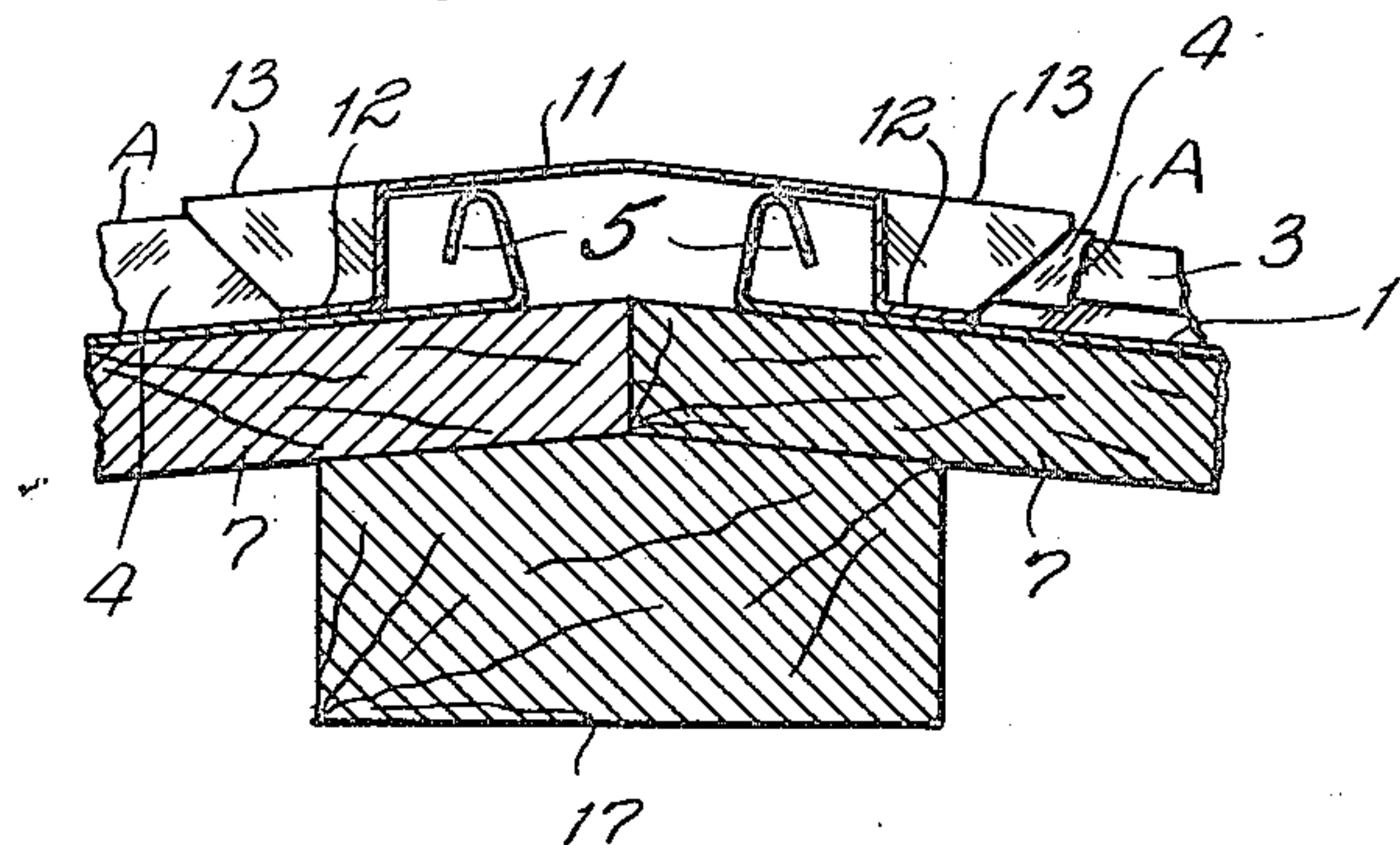


Fig. 5.

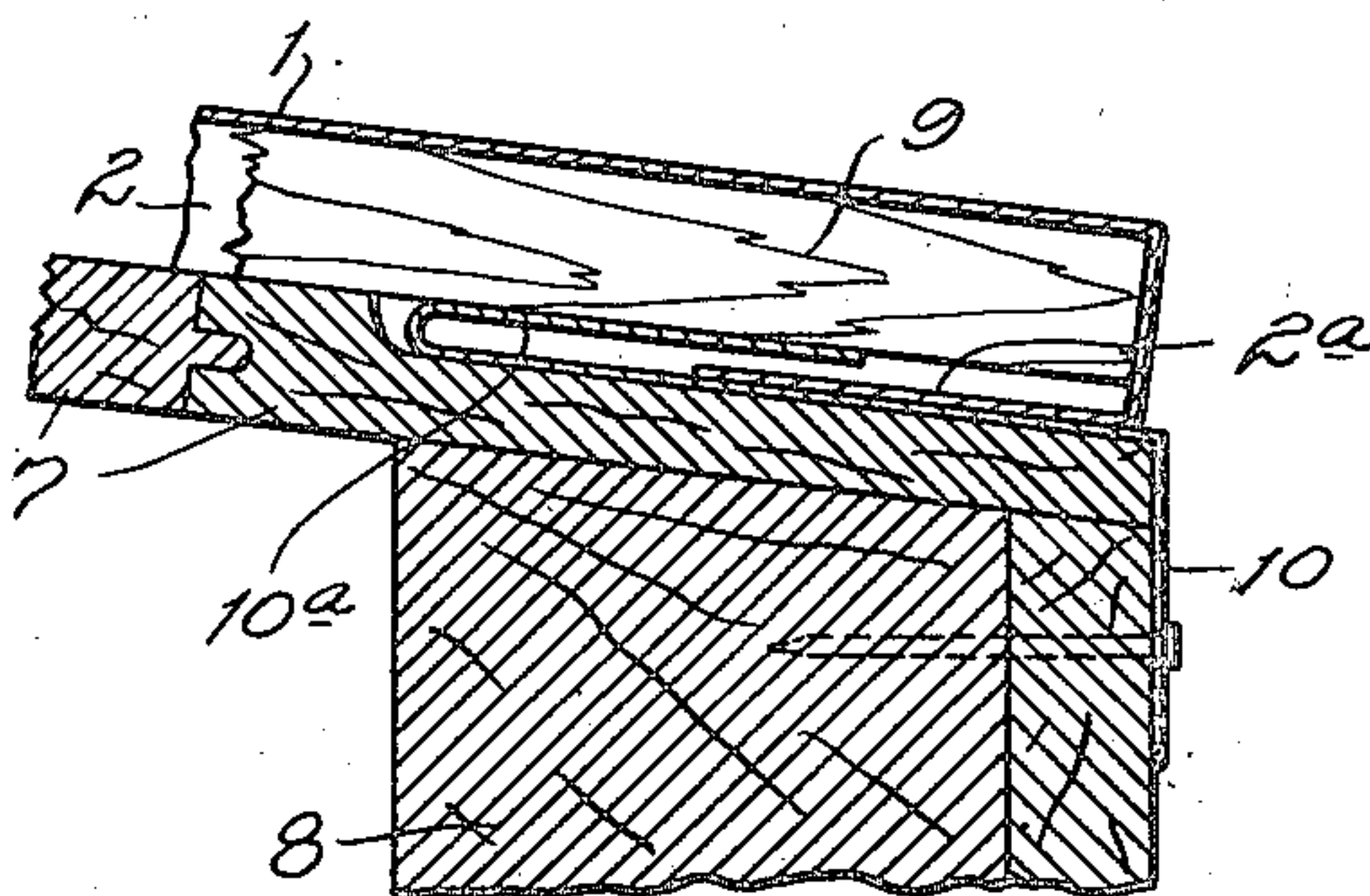
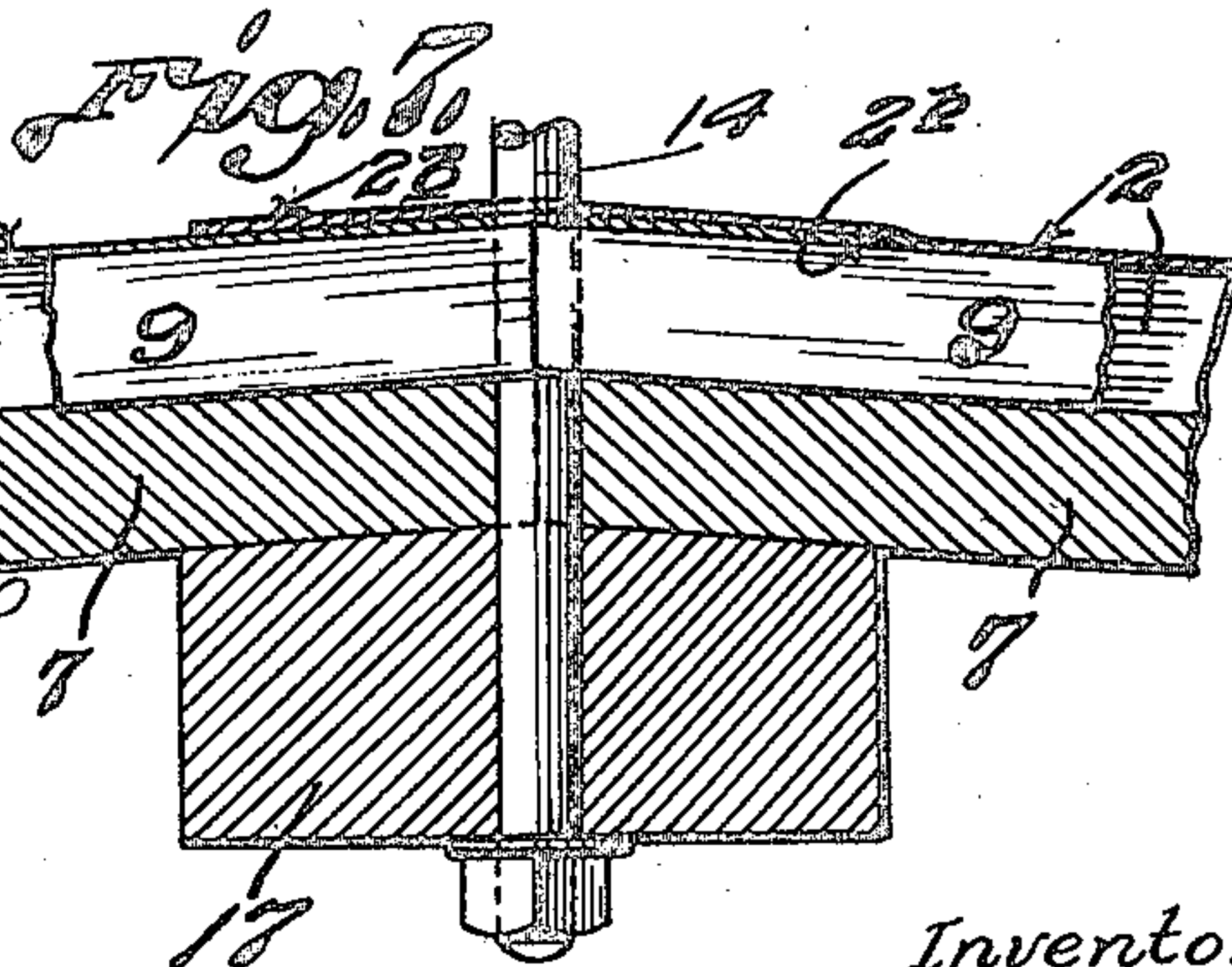
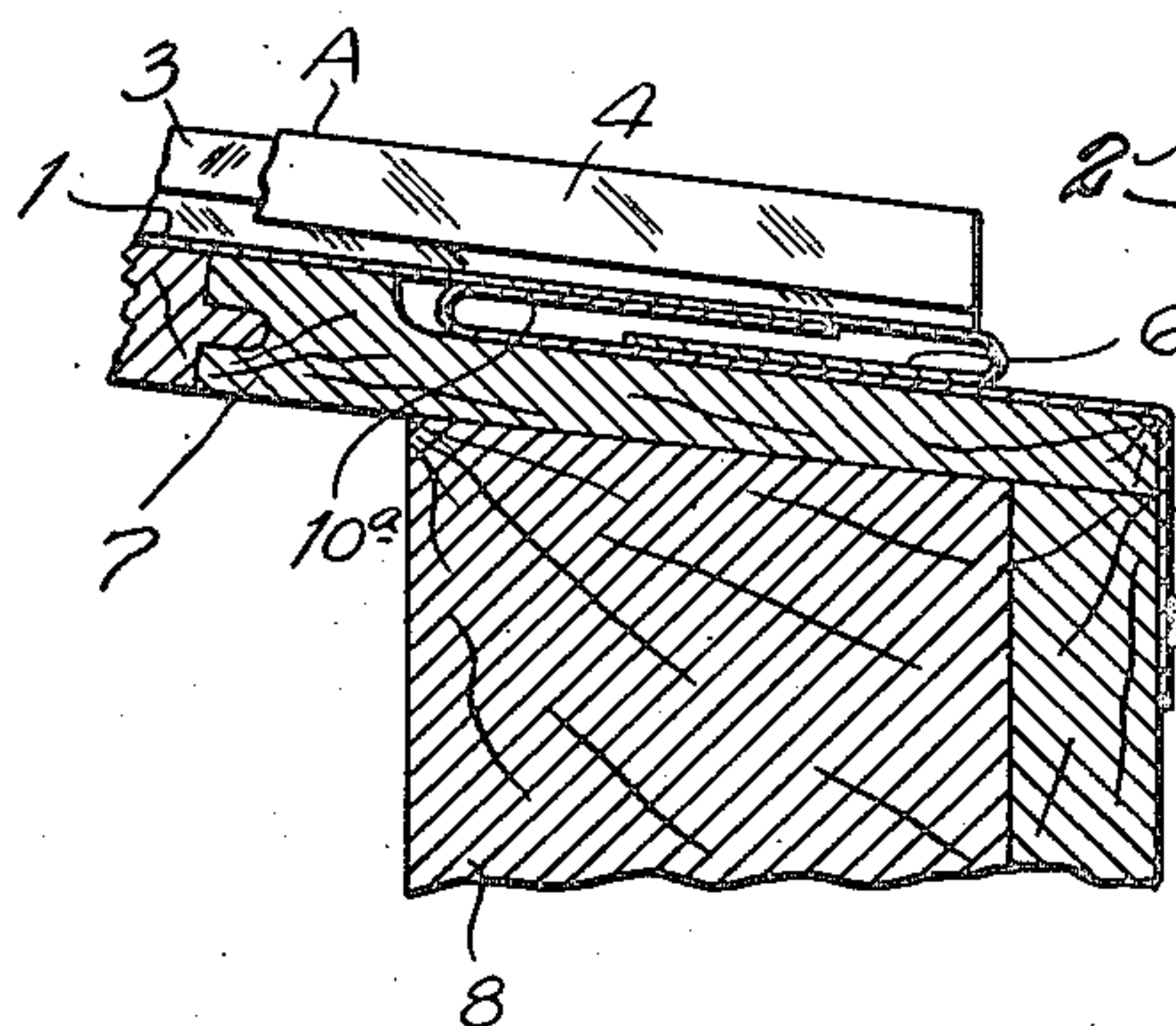


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES DAVID BONSALE, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO P. H. MURPHY COMPANY, OF NEW KENSINGTON, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

METAL CAR ROOF.

Application filed March 11, 1922. Serial No. 542,858.

To all whom it may concern:

Be it known that I, CHARLES DAVID BONSALE, a citizen of the United States, and a resident of the city of Pittsburgh, county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Metal Car Roofs, of which the following is a specification.

My invention relates to that type of outside metal car roofs, wherein the individual roofing sheets are movable relative to one another to a limited extent so as to be able to accommodate themselves automatically to the distortions of the car-body. Under service conditions, one side plate of the car is liable to move longitudinally relative to the opposite side plate, in which case, each roofing sheet slides or oscillates individually around some middle region of the sheet as a center; and as an incident of this movement, one side margin of a sheet moves inwardly and the other side margin of the same sheet (and likewise the adjacent margin of the next sheet) moves outwardly at the same time, producing at the eaves what is commonly known as a saw-tooth effect. Usually the adjacent roofing sheets are spaced apart and the intervening space provided with a wooden-batten which in turn is covered with a seam-cap or cover adapted to cooperate with the marginal portions of the respective sheets to form watertight seams, such seam caps being specially designed or supplemented with accessory devices for controlling and limiting the movement of the sheets. When such roofs are properly applied and kept in proper condition, they are very servicable and satisfactory; but otherwise there is liable to be considerable rubbing and wearing of the roof sheets against the seam cap and accessory devices. Likewise, where the frame of the car is knocked out of square by sudden excessive bumps, the roof sheets have difficulty in adjusting themselves quickly enough to prevent injury.

The principal objects of the present invention are to overcome the disadvantages above stated; that is, one of the principal objects is to dispense with the seam-cap and accessory devices and thereby eliminate the cost thereof and the liability of such devices to rub and wear the sheets; and another principal object is to enable the sheets to follow the distortions of the car quickly

and without undue strain on any portion thereof. The invention consists principally in forming in each roof sheet a hollow rib extending from ridge to eaves and adapted to fit over a batten provided therefor on the roof sheathing or supporting frame; it also consists in the parts and in the combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings, which form part of this specification and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a plan view of a portion of a car roof embodying my invention, parts being shown broken away to more clearly illustrate the invention;

Fig. 2 is an enlarged transverse section through the ridge portion of the roof, the section being taken adjacent to one of the roof mullions on the line 2—2 in Fig. 1;

Fig. 3 is a similar ridge section, taken adjacent to a roof seam on the line 3—3 in Fig. 1;

Fig. 4 is a longitudinal section through the roof on the line 4—4 in Fig. 1;

Fig. 5 is cross-section through the eaves portion of the roof, the section being taken through a roof mullion on the line 5—5 in Fig. 1;

Fig. 6 is a similar eaves section taken adjacent to one of the roof seams on the line 6—6 in Fig. 1; and

Fig. 7 is a transverse section through the ridge portion of the roof, the section being taken through the lapping portions of the roof sheet ribs on the line 7—7 in Fig. 1.

In the construction illustrated in the drawing, the metal roof sheets 1 rest upon a wooden sheathing 7 which is supported on carlines (not shown) whose ends rest upon the side plates 8 of the car. Wooden battens or mullions 9, one for each roof sheet, are arranged transversely of the car and secured on the sheathing. Each roof sheet has a hollow rib 2 formed thereon and extending from ridge end to eaves end thereof at or near the midline thereof; and the rib of each sheet straddle or fits over one of said battens or mullions. The metal roof sheets are arranged in two rows, one on each side of the ridge, the sheets on opposite sides of the ridge being spaced apart, and the sheets on the same side of the ridge being spaced apart. The sheets on the same side

of the ridge are interlocked along their side margins by sliding joints or telescoping seams A. A suitable standing seam for this purpose comprises a rebent flange 3 along the side margin of one sheet, the web portion of said flange extending upwardly and the marginal portion thereof extending downwardly and backwardly to form an open loop to cooperate with the flanged marginal portion 4 of the adjacent sheet. This marginal portion is formed into a three part flange or loop, which extends first upwardly and outwardly at an inclination and thence downwardly and outwardly at an inclination and thence inwardly and upwardly to form an open loop that is adapted to hook into the open loop of the first mentioned sheet. By this arrangement, the margins of the sheets interlock loosely, so that the sheets are not only free to slide or telescope endwise but also have a limited freedom of movement transversely of the seam, these movements being sufficient to permit the sheets to slue relative to each other without bending.

The eaves end of each roof sheet has a doubled-under flange 6 which forms an open loop; and in this open loop hooks a rebent flange 10^a formed by bending back into an open loop the inner margin of a metal flashing strip 10, whereby the eaves end of the roof sheet is free to move in its own plane to a limited extent but is held against vertical movement.

The doubled-under flange at the eaves end of each sheet is interrupted at the middle of the sheet by the hollow rib 2, thus forming a gap in said flange beneath said rib, whereby the portion of the eaves flashing located therebelow is free from engagement with said doubled-under flange.

The eaves ends 2^a of the top portion of the hollow ribs 2 of the roof sheets are turned down over the eaves ends of the transverse mullions 9 and are thence turned under the free portions of the doubled-back flanges 10^a of the eaves flashing strips 10 between the spaced inner ends of the doubled-under eaves flanges 6 of said roof sheets that engage said doubled-back flanges of said flashing strips on opposite sides of said hollow ribs.

As stated above, the sheets on opposite sides of the ridge are spaced apart. This space is covered by a seam-cap or cover 11 of any suitable type that will permit a limited movement of the sheets. As illustrated in the drawing, the ridge ends of the sheets are provided with rebent ridge flanges 5 that extend from the central ribs of the sheets to the side flanges thereof and are flanged upwardly and thence inwardly and downwardly for cooperation with the ridge caps. These ridge caps are of inverted channel section with longitudinally extending

margins 12 at their sides. Transverse inverted channels 13 are formed in said ridge cap of the proper size and in proper position to receive and permit movement of the seam portions A of the sheets.

The ridge ends of the top portions of the hollow ribs 2 of the roof sheets are formed with extensions 2^b which lap at the ridge and are perforated to receive the saddle bolts 14 of running board saddles 15. The ends of the ridge seam caps are located adjacent to the battens or mullions 9 hereinbefore mentioned; and fourway corner caps 16 of any suitable type are used to cover the ends of said ridge seam caps 11 and the lapped ridge ends 2^b of the ribs 2 of the sheets. The running board saddles 15 are located above the corner caps 16 and rest on the hollow ribs 2 of the roof sheets and are supported by the mullions 9 straddled thereby. The corner caps 16 are held in place by the saddle bolts 14 that extend down through the sheathing 7 and the ridge pole 17, whereby the roof sheets are held in place and still allowed limited movement.

The operation of the roof hereinbefore described is generally similar to that of other roofs of the so-called flexible outside metal type. When the car goes out of square, the roof sheets individually slue so as to keep their side margins more or less nearly parallel with the carlines. In the present case, the battens or mullions are secured to the sheathing or frame and move therewith; and as the ribs of the roof sheets fit over said battens or mullions, they move therewith, or rather, they are moved positively by said battens or mullions. The movement of the sheets by the mullions causes one eaves end of the sheet to move outwardly and the other eaves end of said sheet to move inwardly, which movements are permitted by the loose engagement of the sheets by the eaves flashing strips, and by the play afforded the sheets under the ridge cap and the sliding of one sheet longitudinally on the other afforded by the telescopic seam construction. As the movement of the roof frame is transmitted positively to the roof sheet through the batten and mullion, which engages the sheet throughout the length thereof, the sheet is enabled to withstand excessive bumping of the car without injury. The engagement of the rib of the sheet with the batten relieves the margins of the sheet from stresses acting longitudinally of the car and greatly simplifies the problem of making a water-tight seam between adjacent sheets. In fact, it makes it practicable to join the sheets by a seam-telescoping joint and thereby dispenses with the transverse seam covers that have been heretofore used notwithstanding the disadvantages attaching thereto.

The construction hereinbefore described

permits of considerable variation without departing from my invention and I do not wish to be limited to the details of such construction. For instances, the seam construction above described is merely typical and may be replaced with any seam construction that will permit the individual sheets to slue to accommodate themselves to the distortions of the roof frame. The particular seam construction described has the great advantage that it joins adjacent sheets directly together in such manner that they are free to slide crosswise of the car in opposite directions and have sufficient play endwise of the car to permit of the sluing movement. Thus, this particular seam of construction makes it possible to eliminate parts heretofore used in roofs of this general type; but my invention contemplates also the use of seams of other types, such as the cap seams heretofore common with this general type of roof.

What I claim is:

1. A car roof comprising a support having battens arranged transversely thereof and roofing sheets having hollow ribs astraddle said battens, said sheets having portions at both sides of the respective battens that rest flatwise on said support.
2. A car roof comprising a support having battens arranged transversely thereof and roofing sheets having hollow ribs that straddle said battens so as to move therewith, adjacent sheets having their marginal portions interlocked to form sliding seams.
3. A car roof comprising a support having battens arranged transversely thereon and roof sheets having hollow ribs straddling said battens so as to move therewith, the marginal portions of adjacent sheets being connected by sliding joints that allow play endwise of the car sufficient to permit sluing of the sheets.
4. A car roof comprising a support having battens arranged transversely thereof and roofing sheets having hollow ribs astraddle said battens, said sheets having portions

at both sides of the respective battens that rest flatwise on said support, the eaves ends of said hollow ribs being bent under the eaves ends of said battens.

5. A car roof comprising a substructure having battens arranged transversely thereof and roof sheets arranged on each side of the ridge and connected along their ridge and side margins by flexible sliding joints, said roof sheets having hollow ribs straddling said battens, the ridge ends of said hollow ribs being lapped and pivotally secured together.

6. A car roof comprising a substructure having battens arranged transversely thereof and roof sheets arranged on each side of the ridge and connected between battens and along their ridge margins by flexible sliding joints, said roof sheets having hollow ribs straddling said battens, the ridge ends of said hollow ribs being lapped and secured to the car substructure.

7. A car roof comprising a substructure having transversely arranged battens and roof sheets arranged on each side of the ridge and having hollow ribs that straddle said battens, said roof sheets being movably connected between battens and along their ridge margins by loose joints, and an eaves flashing and retaining strip secured to the eaves of the car, the eaves ends of the hollow ribs of said sheets being doubled under said flashing strip.

8. A car roof sheet comprising a body portion having a hollow rib near the middle thereof and extending the full length thereof and adapted to receive and co-operate with a batten, said sheet having side and ridge seam flanges and having its eaves end rebent on its lower side, the ridge end of said hollow rib being extended beyond the body portion of said sheet and the eaves end of said rib being turned under the body portion of said sheet.

Signed at New Kensington, Pa., this 1st day of March, 1922.

CHARLES DAVID BONSALE.