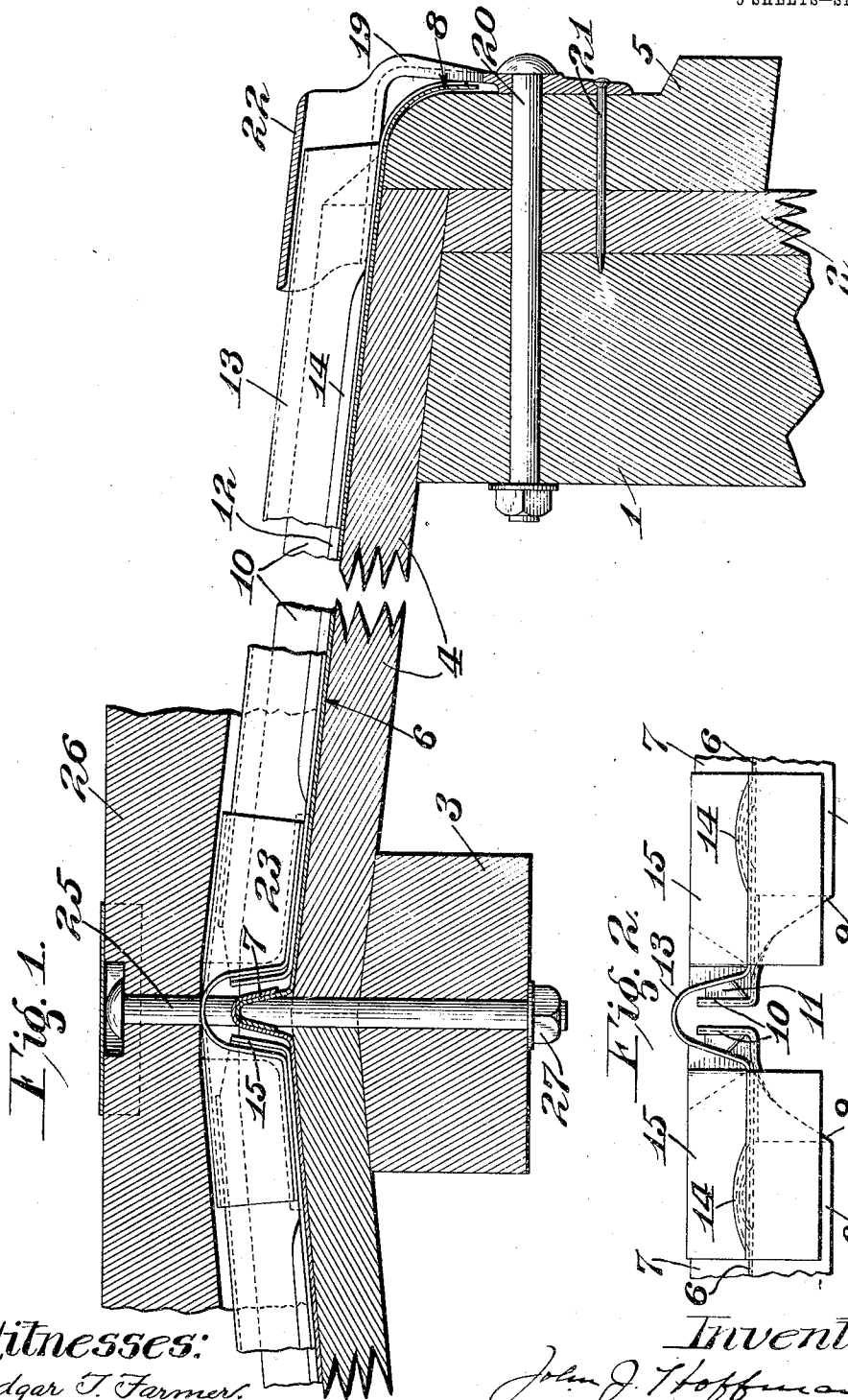


J. J. HOFFMAN.
 OUTSIDE METAL CAR ROOF.
 APPLICATION FILED JAN. 22, 1909.

946,729.

Patented Jan. 18, 1910.

5 SHEETS—SHEET 1.



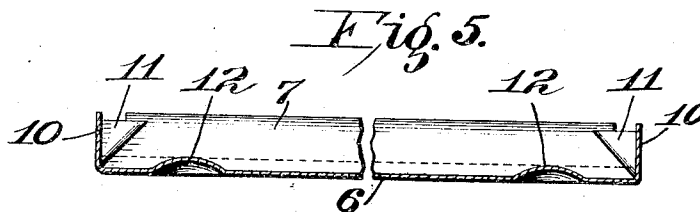
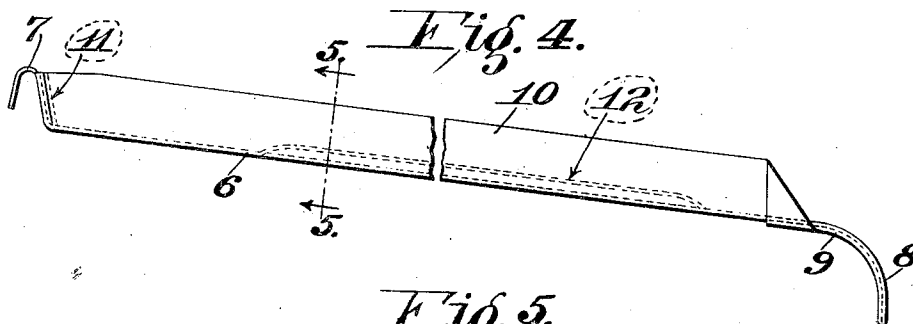
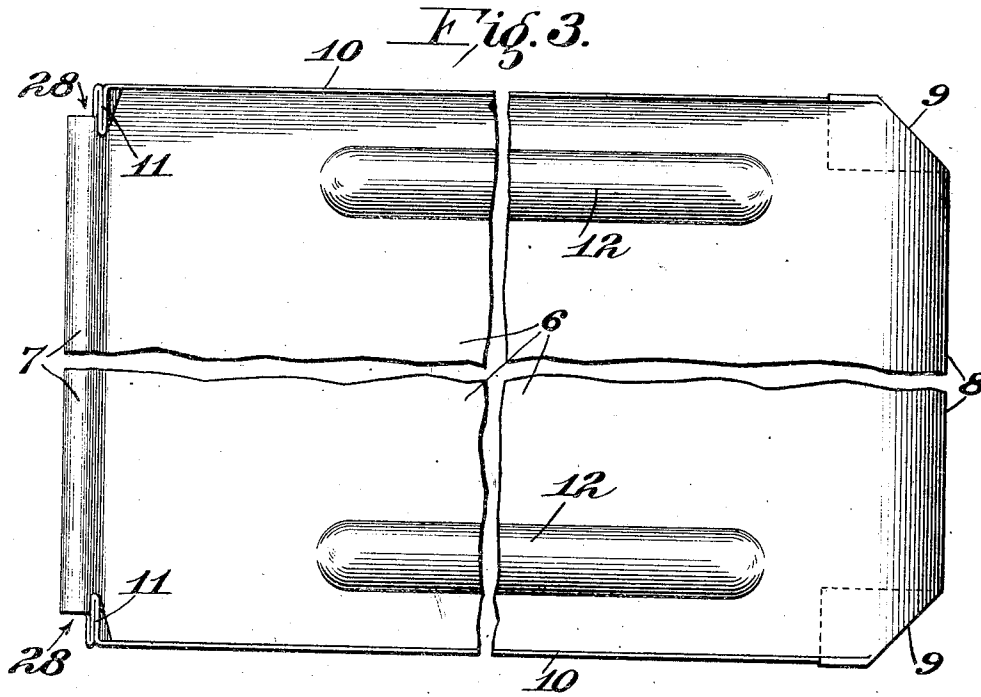
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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

Fig. 6.

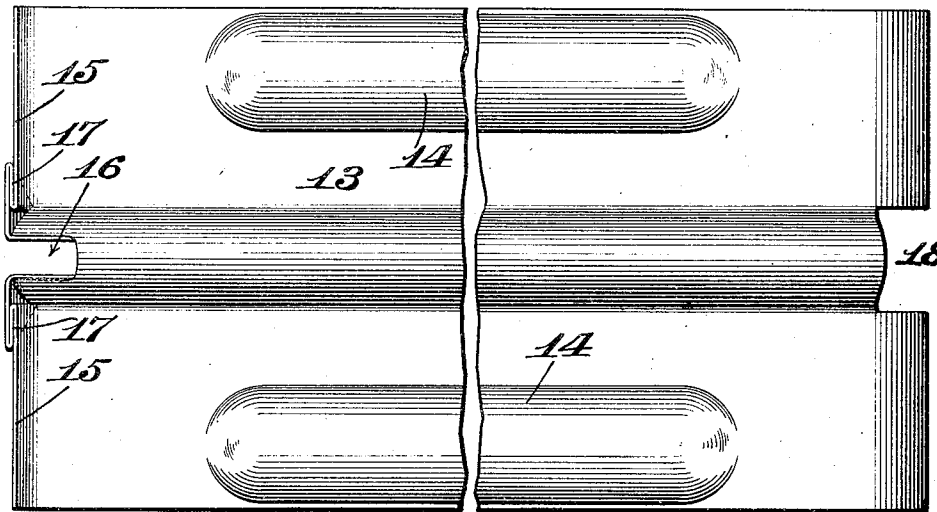


Fig. 7.

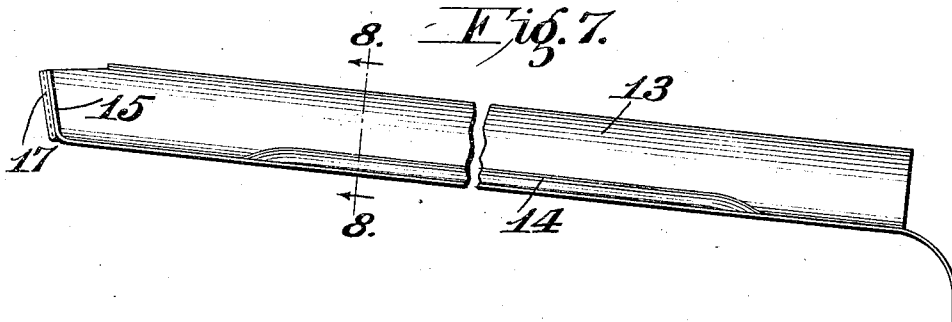
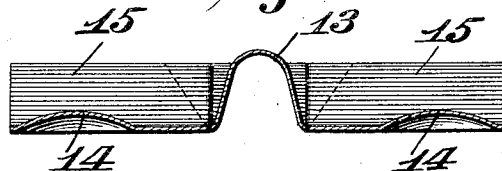


Fig. 8.



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5 SHEETS—SHEET 4.

Fig. 9.
2-11.

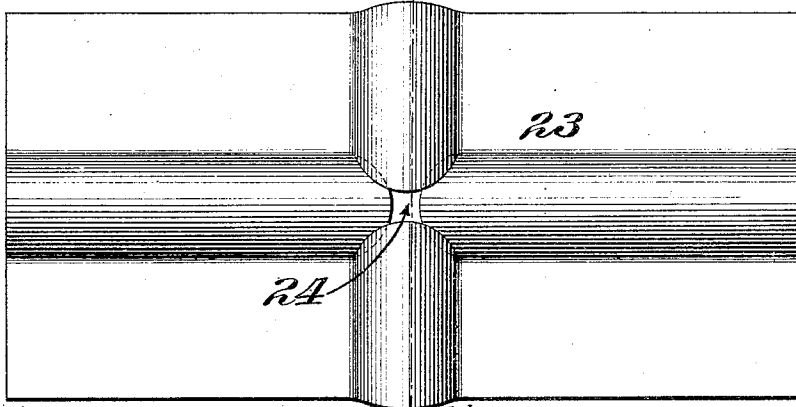


Fig. 10.
11.

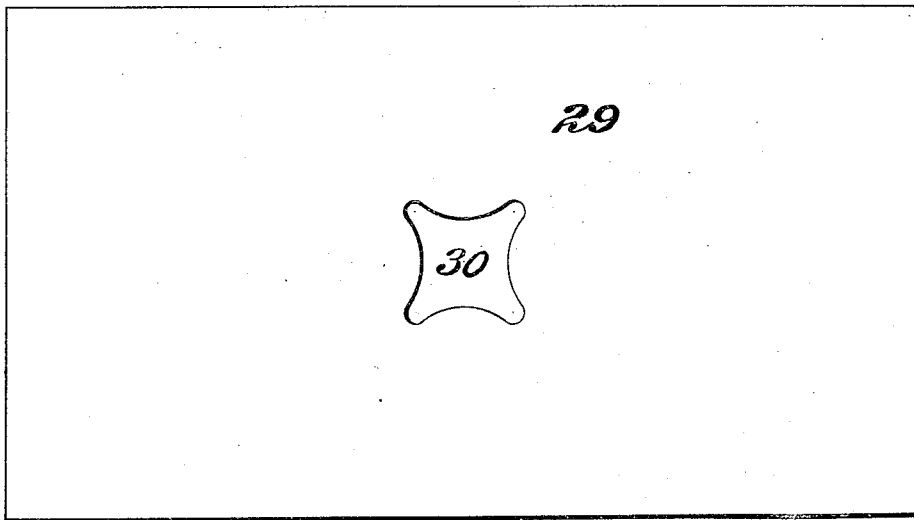


Fig. 11. 24 23



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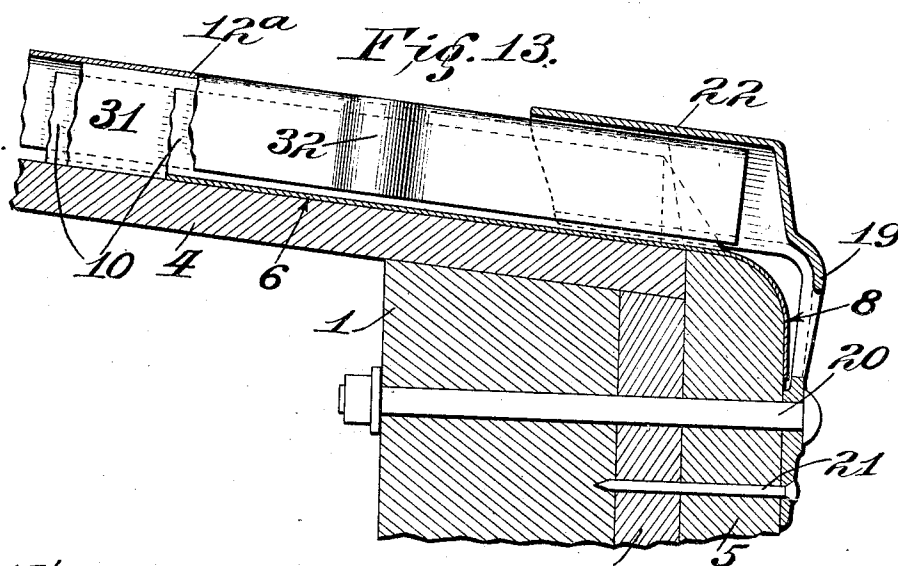
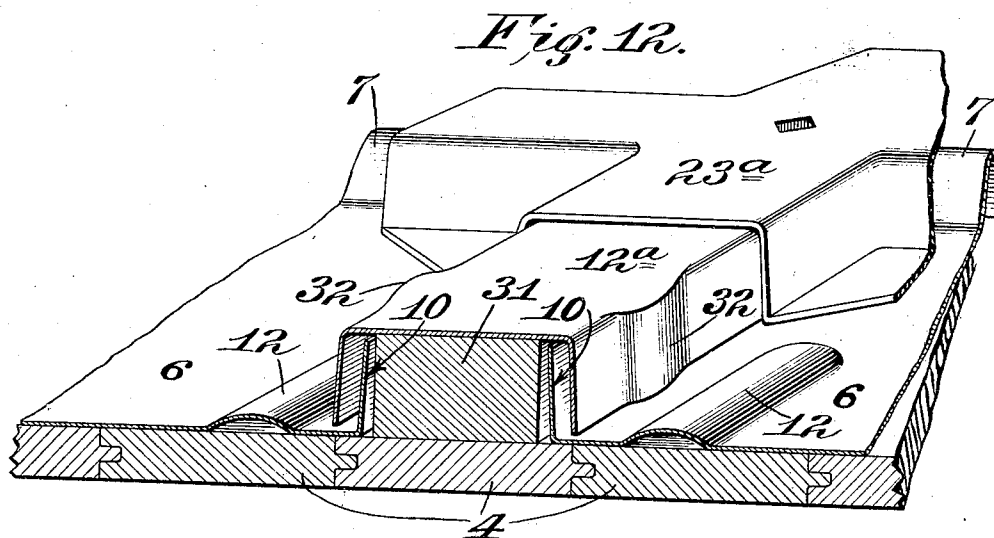
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Patented Jan. 18, 1910.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

JOHN J. HOFFMAN, OF ST. LOUIS, MISSOURI, ASSIGNOR TO PETER H. MURPHY, OF ST. LOUIS, MISSOURI.

OUTSIDE METAL CAR-ROOF.

946,729.

Specification of Letters Patent.

Patented Jan. 18, 1910.

Application filed January 22, 1909. Serial No. 473,610.

To all whom it may concern:

Be it known that I, JOHN J. HOFFMAN, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a certain new and useful Improvement in Outside Metal Car-Roofs, of which the following is a specification.

My invention relates to outside metal car roofs and has for its principal objects to secure the roofing sheets in such a manner as to permit them to move freely relative to each other and to the fastening devices; also to reinforce the side margins of the sheet at the eaves and guard against the tendency to tear at this point; also to provide a suitable joint cap for cooperation with the side margins of adjacent sheets; also to provide a suitable corner cap; and to attain other advantages hereinafter appearing.

The invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawing, which forms part of this specification, and wherein like symbols refer to like parts wherever they occur, Figure 1 is a vertical cross sectional view of a portion of a car provided with my roof; Fig. 2 is a detail elevation at the end of a joint, with the securing clip removed; Fig. 3 is a detail plan view of a roofing sheet; Fig. 4 is a side elevation of a roof sheet; Fig. 5 is a cross section on the line 5-5 of Fig. 4; Fig. 6 is a plan view of a joint cap; Fig. 7 is a side elevation of a joint cap; Fig. 8 is a cross section of a joint cap on the line 8-8 of Fig. 7; Fig. 9 is a plan view of a corner cap; Fig. 10 is a plan view of the blank from which the corner cap is made; Fig. 11 is a cross section of the corner cap on the line 11-11 of Fig. 9; Fig. 12 is a longitudinal sectional view illustrating a modified form of construction, the parts back of the section plane being in perspective; and, Fig. 13 is a cross section of a portion of a roof embodying the construction of Fig. 12.

The substructure of the car is of any suitable type. In the construction illustrated in the drawing, the car comprises a side plate 1, side sheathing 2, a ridge pole 3, wooden roof sheathing 4, and a fascia 5, whose upper surface is flush with the roof sheathing and whose outer edge is rounded.

The metal roof sheets 6 extend from the eaves to the ridge and at their ridge ends are provided with rebent upstanding flanges 7. The ridge flange of one sheet overlaps the ridge flange of the sheet on the opposite side of the car; but, with this exception, the several sheets do not interlock directly with each other at any point. The outer end 8 of each sheet is bent in a curve conforming to the curvature of the rounded edge of the eaves and projects a slight distance downwardly alongside of the fascia.

Experience teaches that, in ordinary types of metal car roofs, there is a tendency for the roof sheets to tear lengthwise of the car, such tear beginning at a point in the side margin of the sheet close to the eaves. In order to guard against this tendency, the outer corners 9 of the sheets of the present roof are doubled back far enough to present a double thickness of metal at their side margins for a short distance above the eaves. Preferably, the metal is bent back along a line of approximately forty-five degrees inclination to the side and end margins of the sheet. The side margins of the roof sheets are bent upwardly to form vertical flanges 10 which continue at the outer end of the sheet through the doubled corner portions thereof. At the ridge ends of the sheet, the surplus metal is removed or folded back as desired.

As illustrated in Fig. 3, the surplus metal 11 is doubled back flatwise against the outer surface of the upstanding portion of the rebent flange. In order to stiffen the side marginal portions of the roof sheets, shallow corrugations or upstanding ribs 12 are formed parallel with the edges without perforating the sheets. The adjacent sheets do not interlock directly with each other at the sides, but their side marginal portions are covered by a joint cap 13 which extends to and over the eaves. The joint cap comprises a sheet metal strip whose middle portion is grooved to receive the upstanding side flanges of the respective sheets, which are normally spaced slightly apart from each other. The side portions of the joint caps or strips are provided with upstanding corrugations or ribs 14 which are somewhat wider than the stiffening corrugations or ribs 12 on the respective sheets, whereby the roof sheets may slide to a limited extent with-

out lifting the joint cap. The ridge end of the joint cap is turned upwardly to form an upstanding flange 15; and in order to provide for the bending upwardly of such flange, a slot 16 is cut in the ridge end of the groove and the surplus metal 17 at each side of the groove is doubled back flatwise against the upstanding flange. Likewise, the metal of the uppermost part of the groove at the eaves end is removed, as indicated at 18; to permit the bending downwardly of the sides of the joint cap at the eaves.

The roof is secured at the eaves by metal clips 19 which are secured to the substructure by any suitable means. As illustrated, each clip is secured by a bolt 20 which extends entirely through the fascia, side sheathing and side plate of the car; and each clip is further secured by a nail 21 that serves to prevent the turning thereof. The fastening devices extend through the clips without perforating either the roof sheets or the joint caps. The portion of the clip above the fastening device is offset to provide a space, between it and the eaves, which is adapted to receive the downturned end of the joint cap without binding it. The upper portion of the clip has an inwardly projecting grooved or hooded portion 22 adapted to overlap the upstanding portion of the joint cap without binding it. Preferably, this clip embodies the construction described in detail in the copending application of Walter P. Murphy, No. 467,479 to which reference is made for more specific description.

As stated above, the ridge flanges of the roof sheets interlock with each other. The joint caps, however, terminate short of said interlocking flanges. The parts are secured at the ridge by means of corner caps 23, which are provided with intersecting grooves adapted to receive the upstanding portions of the roof sheets and of the joint caps. In the central portion of the corner cap is a hole 24 for the securing bolt 25 which extends downwardly through the running board saddle 26 (which rests on the corner caps), the corner cap, the roof sheathing and the ridge pole, and is secured by a nut 27 on the interior of the car. By this arrangement, the parts are secured without perforating either the joint caps or the roof sheets. In order, however, to give the sheets a wider play, the metal at the endmost portions of the ridge flange of the roof sheets is cut away to a limited extent, as indicated at 28. The longitudinal corrugations of the corner caps are slightly wider than the normal distance between the lines at which opposite joint caps are turned up at the ridge; and the transverse grooves in the corner cap are slightly wider than the

maximum width of the corrugations of the joint caps.

A suitable corner cap may be made from an oblong blank 29 of sheet metal which is provided at the center with a hole 30 of the form illustrated in Fig. 10. As illustrated in this figure, the margin of the hole has four concave arcs or reentrant sides which are spaced apart at the corners by short convex arcs. The intersecting channels or grooves are formed in this blank so that each of the concave arcs constitutes the end margin of a groove. The width of the hole, however, is slightly less than the portion of the strip that is bent to form the corresponding groove or channel. In the process of bending, the portions of the metal on opposite sides of the hole are brought closer together, while the corner portions of adjacent sides are caused to overlap. By this arrangement, all but the middle portion of the hole is closed, so that the corner cap is substantially water tight except at the uppermost portion thereof which is adjacent to the bolt. The sides of the corner caps are inclined to conform to the pitch of the roof.

In the construction illustrated in Figs. 12 and 13, the corner cap 23^a is made as a malleable casting. In this construction, a wooden batten or spacing strip 31 is secured to the roof sheathing between the upstanding side edges or flanges of adjacent roof sheets, the batten being slightly higher than such upstanding edges. The joint cap 12^a rests upon this batten and is secured by the corner cap at the ridge and by the roof clip at the eaves. This joint cap is a strip of sheet metal whose marginal portions extend over and beyond the side margins of the respective roof sheets and are thence bent downwardly to overlap the same. By this construction, space is provided to permit free movement of the side flanges of the roof sheets between the batten and the joint cap. In order to stiffen the joint cap, its downward marginal portions are provided with vertical corrugations 32.

Obviously, my device admits of considerable modification without departing from my invention, and therefore I do not wish to be limited to the specific construction shown and described.

What I claim is:

1. A car roof comprising roof sheets extending from the eaves toward the ridge, joint caps overlapping the adjacent side margins of said sheets without binding said sheets, and means for securing said joint caps, said sheets being provided with upstanding flanges at their margins and with upstanding corrugations adjacent to said margins, and the joint caps being provided with an upstanding grooved portion adapt-

ed to receive said flanges and with upstanding corrugations adapted to bear against both sides of the corrugations in the roof sheets and thereby aid in positioning said sheets.

2. A car roof comprising roof sheets arranged transversely of the car and having their outer end portions extending beyond the eaves, and means for securing said roof sheets in place, the outer corners of said roof sheets being doubled back far enough to secure a double thickness of the metal at the margins for a short distance above the eaves.

3. A car roof comprising roof sheets arranged transversely of the car and having their outer end portions extending beyond the eaves, and means for securing said roof sheets movably in place, the outer corners of said roof sheets being doubled back far enough to secure a double thickness of the metal at the side margins for a short distance above the eaves.

4. A blank for a corner cap having a hole therein which has four reentrant sides spaced apart at the corners.

5. A corner cap comprising a sheet metal blank having two intersecting grooves therein, and a hole at such intersection, the edges of said hole being concave arcs which extend nearly the full width of the respective grooves.

6. A sheet for a car roof comprising a blank, the corners at one end of which are doubled back and whose side margins are bent to form upstanding flanges which continue through said doubled corners.

7. A sheet for a car roof comprising a blank, the corners at one end of which are doubled back, and whose side margins are bent to form upstanding flanges which continue through such doubled corners, said end being turned downwardly through said double corners.

8. A sheet for a car roof comprising a blank, the corners at one end of which are doubled back, and whose side margins are bent to form upstanding flanges which con-

tinue through said doubled corners, said end being turned downwardly and the opposite end having a rebent flange, and the metal in the angles between the top and side flanges being doubled flatwise alongside of the top flange.

9. A sheet for a car roof comprising a blank, the corners at one end of which are doubled back, and whose side margins are bent to form upstanding flanges which continue through said doubled corners, said end being turned downwardly and the opposite end having a rebent upstanding flange whose endmost portions are notched, and the metal in the angles between the top and side flanges being doubled flatwise alongside of the top flange.

10. A joint cap for a car roof comprising a metal strip having an upstanding longitudinal groove and notches at the ends of said groove, one end of said sheet having upstanding flanges and the other end of said sheet being bent downwardly.

11. A joint cap for a car roof comprising a metal strip having an upstanding longitudinal groove and notches at the ends of said groove, one end of said sheet having upstanding flanges, the surplus metal between the groove and the flanges being folded back to form solid corners.

12. An outside metal car roof comprising wooden sheathing and metal roof sheets resting flatwise thereon, said roof sheets extending from the eaves toward the ridge and having upstanding side flanges, joint caps having an upstanding grooved portion adapted to receive side flanges without binding them and having the sides of their grooves corrugated vertically to stiffen them, and clips at the eaves for securing said joint caps without binding them.

Signed at St. Louis, Missouri, this 19th day of January, 1909.

JOHN J. HOFFMAN.

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