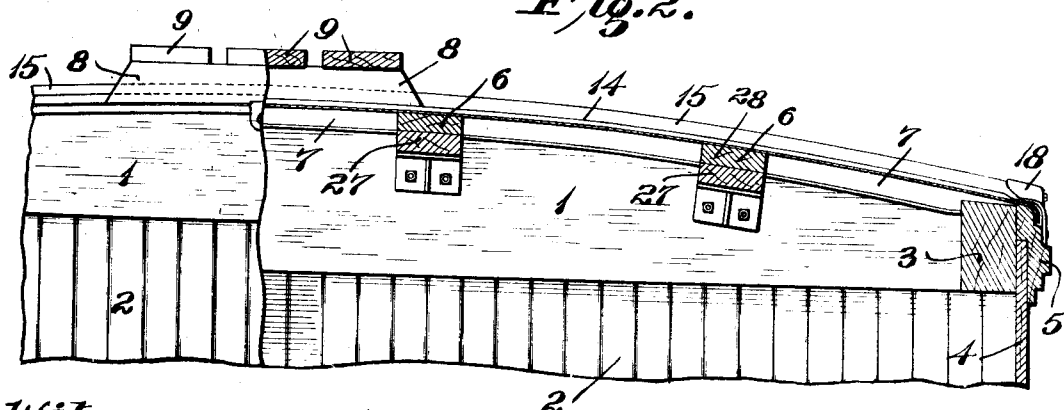
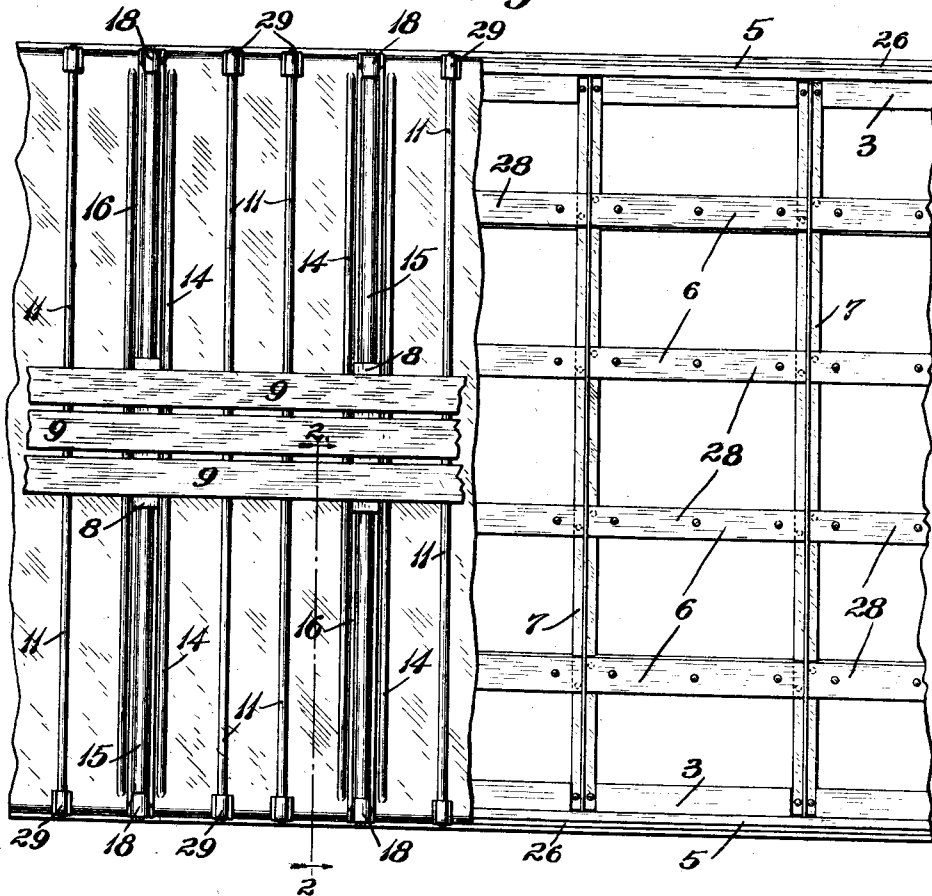


CAR ROOF.

1,030,601.

4 SHEETS—SHEET 1.



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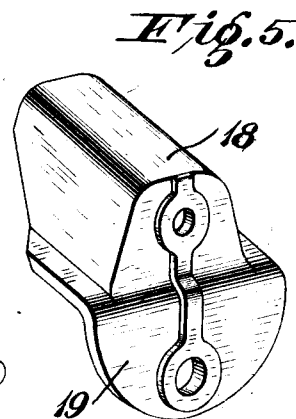
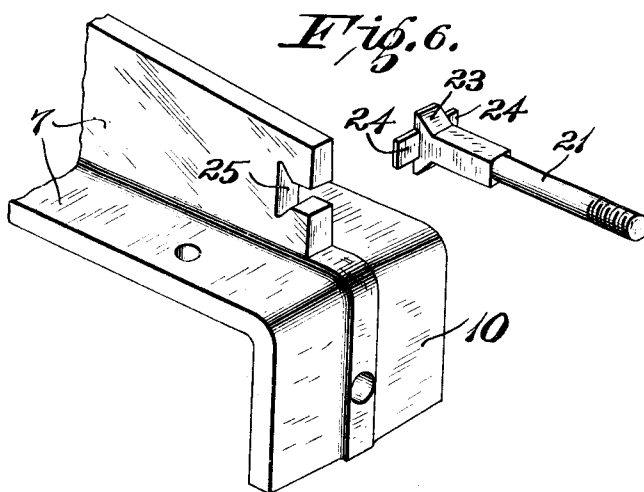
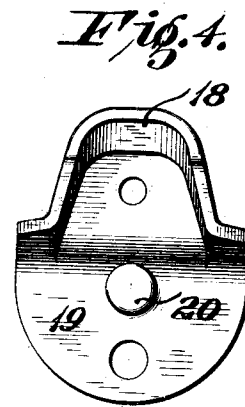
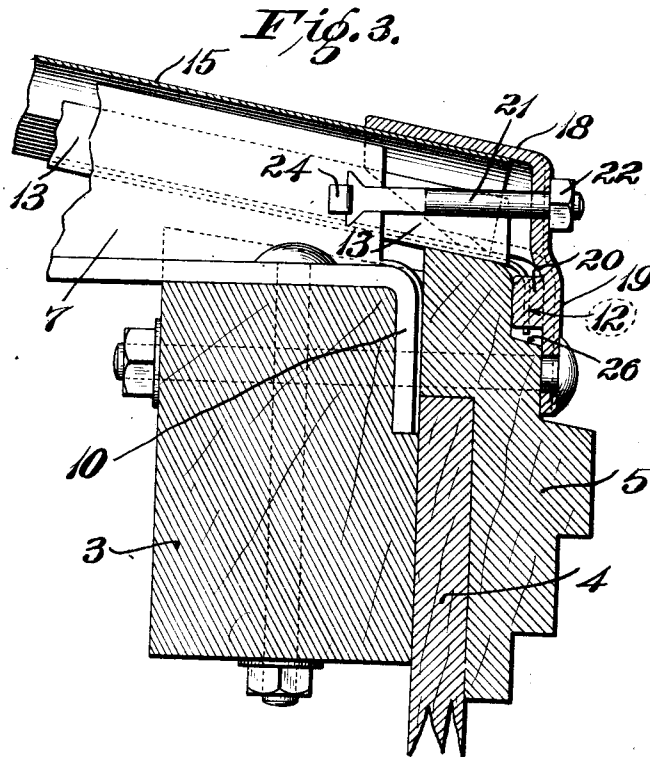
CAR ROOF.

APPLICATION FILED JAN. 23, 1911.

1,030,601.

Patented June 25, 1912.

4 SHEETS—SHEET 2.



Witnesses:

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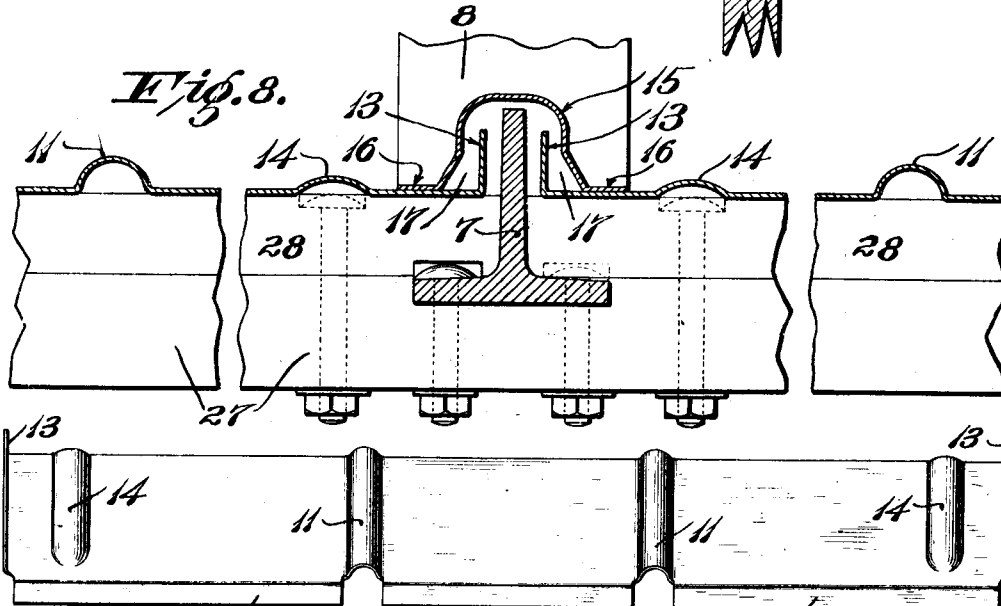
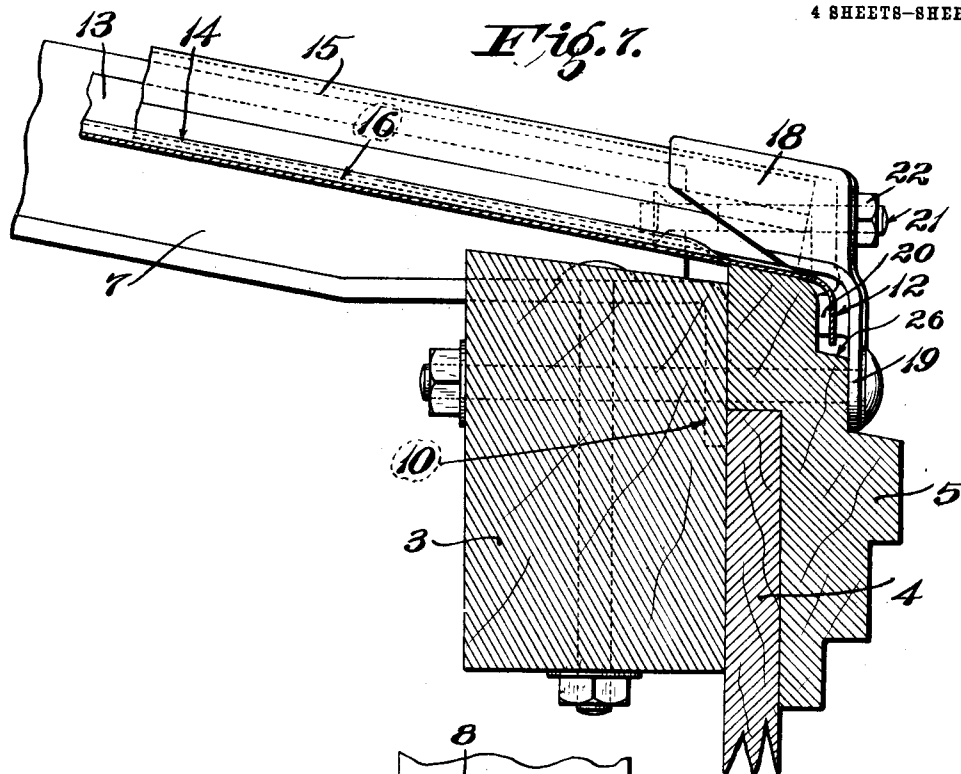
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1,030,601.

Patented June 25, 1912.

4 SHEETS-SHEET 3.



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Fig. 9.
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CAR ROOF.
APPLICATION FILED JAN. 23, 1911.

1,030,601.

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4 SHEETS—SHEET 4.

Fig. 10.

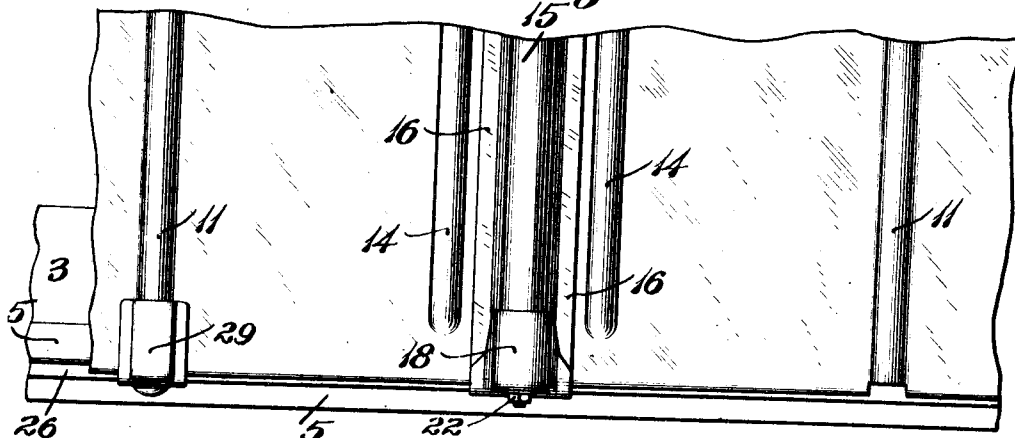


Fig. 11.

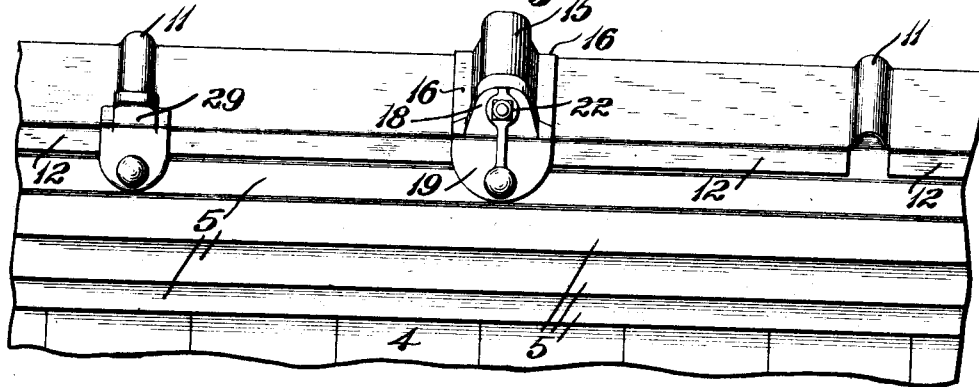
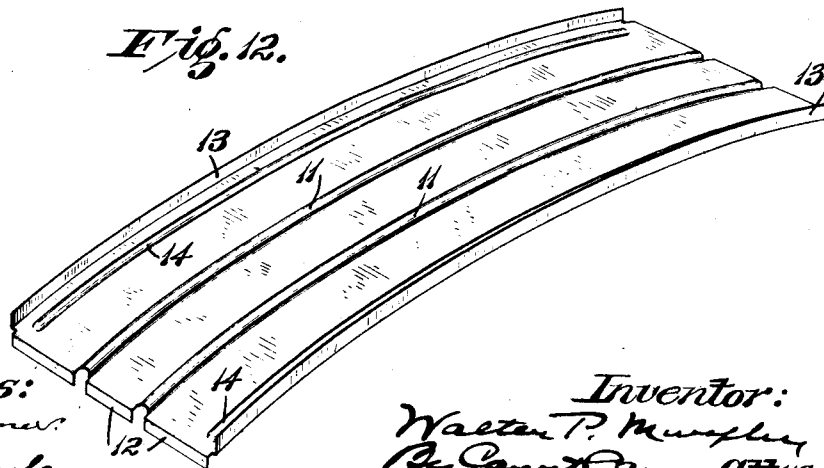


Fig. 12.



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UNITED STATES PATENT OFFICE.

WALTER P. MURPHY, OF CHICAGO, ILLINOIS.

CAR-ROOF.

1,030,601.

Specification of Letters Patent.

Patented June 25, 1912.

Application filed January 23, 1911. Serial No. 604,084.

To all whom it may concern:

Be it known that I, WALTER P. MURPHY, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Car-Roofs, of which the following is a specification.

My invention relates to improvements in metal roofs for freight cars of the type in which a metal roof sheet is supported directly on the purlins forming a part of the roof substructure and extends from eaves to eaves of the car in substantially an arc of a circle.

My invention relates to the construction of the roof substructure, particularly with respect to the arrangement of carlines and purlins, for the purpose of furnishing a suitable skeleton frame on which the roof sheets may be laid directly, dispensing with roof boards.

My invention further relates to the form of the roof sheet and seam cap, and arrangement of these parts with respect to the roof substructure, and to the means used for attaching the assembled metal roof to the roof substructure.

My invention further relates to the particular form of hood clip for covering the end of the seam between the roof sheets and to the means for attaching it to the carline.

My invention further consists in the combination and arrangement of the various parts comprising a car roof as will be more fully described and set forth in connection with the accompanying drawings showing an embodiment thereof, in which drawings like numerals are used to designate like parts throughout the several figures, and which will be particularly pointed out in the claims forming a part of this specification.

In the drawings accompanying this application, Figure 1 is a partial birds-eye view of a car roof, showing a part with the running board and roof sheets removed; Fig. 2 is a partial end view of the top of a car partly in section on the line 2—2 of Fig. 1; Fig. 3 is a partial section through the eaves of the car at a carline showing the end of the carline in side elevation; Fig. 4 is a view in elevation of a roof clip as seen from the inside; Fig. 5 is a perspective view of a roof clip as seen from the outside; Fig. 6 is a perspective view of the end of a carline together with a bolt for attaching the

roof clip to the carline; Fig. 7 is a partial section through the eaves of the car at a point between the carlines; Fig. 8 is a section through the roof of the car along a line parallel with the eaves and adjacent a purlin; Fig. 9 is a side elevation of a roof sheet; Fig. 10 is an enlarged partial top view of a car roof, showing the roof sheets in part and roof clips and seam cap; Fig. 11 is a partial side elevation of the eaves of the car showing the roof sheets in part, and roof clips and seam cap; and Fig. 12 is a perspective view of a roof sheet.

In the several views 1 is the end plate of the car, 2 the end sheathing, 3 the side plate, 4 the side sheathing, 5 the fascia, 6 the purlins, 7 the carlines, 8 the running board saddle and 9 the running boards of a freight car. The carlines are metal substantially T-shaped in cross section, each arranged with the vertical flange or web uppermost, and extending in an arc of a circle from one side plate to the other. They are let into notches in the side plates, and the side flanges, which rest on the side plates, are provided with end lugs 10 embracing the side plates, and are securely fastened to the side plates by bolts extending through each flange. The purlins are of built up wooden construction, comprising a lower part or strip 27 extending from end to end of the car beneath the carlines and bolted thereto, and secured to the end plate at either end by brackets, and an upper part consisting of strips 28 extending from one carline to the next between the carlines from web to web thereof, and supported upon the horizontal flanges of the carlines, and securely bolted to the lower part. The purlins need not necessarily be arranged at right angles to the carlines, or parallel to the side plates, but may extend at an angle to the axis of the car, in which case they serve as diagonal stays to prevent distortion of the roof substructure.

The method of assembling and attaching the purlins, after securing the carlines to the side plates, is to bolt the lower sections 27 to the under side of the carlines by bolts through the side flanges of the latter, then to position the upper sections 28 between the carlines, and bolt them down on the lower sections. As the vertical flanges of the carlines are slightly tapered, that is, thicker near the base than at the top, if the upper sections are cut to fit between adjacent car-

lines at the tops of the flanges, when drawn down into place against the lower sections by the bolts holding the two sections together, a very snug fit will result between the ends of the upper sections and the vertical webs of the carlines. As there is little shrinking of the wood lengthwise of the grain this fit will be maintained, particularly because as the wood of the two sections shrinks transversely and the bolts connecting them are tightened, the upper section will be drawn down more snugly between the tapered vertical flanges of the adjacent carlines.

Ordinary carriage bolts are used to connect the side plates, carlines and purlins, and for securing the two parts of the purlins together. These bolts are so arranged that the nuts are easily accessible from the interior of the car, to permit inspection and tightening from time to time. The bolt holes for the bolts used for connecting the sections of the purlins are countersunk to permit the bolt heads to lie flush with or below the upper surface of the purlins, that they may not interfere with the free movement of the roof sheets on the purlins. This construction provides a rigid substructure easily kept tightened up. The purlins not only form lateral braces for the carlines, but the tops of the purlins form an adequate support for the roof sheets, the upper sections being of such thickness as to bring the roof sheets near the tops of the carlines, giving maximum space for headroom.

The roof sheets, directly supported by the purlins, extend from eaves to eaves of the car between the vertical webs of the carlines, and are provided with down-turned end flanges 12 adapted to project over the eaves of the car and lie in a rabbet 26 in the fascia. The rabbets 26 are wide enough to allow the roof sheets a quarter of an inch play in either direction transverse to the longitudinal axis of the car. The roof sheets have side flanges 13 projecting upwardly and of such height that when the sheet is laid on the purlins between the carlines these flanges will extend upwardly to a height somewhat less than the height of the part of the vertical web of the carlines projecting above the purlins, thus enabling a low seam to be used. The roof sheets have longitudinal stiffening corrugations 11, and are also provided with shallow corrugations 14 adjacent but spaced from the upstanding flanges 13.

The width of the roof sheet is one-half inch or so less than the space between the webs of adjacent carlines, so that when the sheet is in position on the roof, there is left a space of about a quarter of an inch between each of the upstanding flanges 13 and the web of the adjacent carline. The seam cap 15 is placed over the upstanding

flanges 13 and the projecting web of the carline and extends from eaves to eaves of the car. This seam cap is substantially inverted U-shaped with flanges projecting outwardly from its lower edges as shown at 16 in Fig. 8. These flanges lie flat upon the roof sheets between the small corrugations 14 and the upstanding flanges 13. The width of the seam cap is such that when in position on the roof a gap of at least a quarter of an inch is left between the inside of the cap and the adjacent flange 13 on either side of the seam. The shape of the seam cap is such that an additional space is provided between the angle at the base of the upstanding flange 13 of the roof sheet and the lower edge of seam cap as shown at 17 in Fig. 8. The seam cap is secured at either end by hood clips 18 which are fastened to the side plate and to the carline by bolts. This arrangement of sheets and seam caps with respect to the carlines makes provision for sufficient movement of the roof sheets longitudinally of the car to obviate tearing the sheets at the seams in case of deformation of the roof substructure due to the "weaving" or "racking" of the car roof, as frequently occurs in service.

The use of the corrugations 14 in the roof sheets in connection with the enlargement of the spaces 17 between the roof sheets and the seam cap tends to prevent entrance of water under the cap and over the upstanding flange 13 of the roof sheet and thus into the car. The corrugation 14 deflects a sheet of water driven by the force of a storm or the air resistance of a swiftly moving car over the flange 16 of the roof cap and thus lessens the amount of water which otherwise would find its way under the flange 16. The enlargement 17 provides ample space for water entering beneath the flange 16 to run down between the seam cap and the flange 13 and off the eaves. Water which may be driven with considerable force under the flange 16 loses its pressure when it emerges into the enlargement 17, whereas if the seam cap and roof sheet were in contact throughout to the top of the flange the water driven in would go up over the flange, as there would be nothing to break the force of the sheet of water entering between the parallel surfaces. The enlargement 17 is of utility particularly when the flange 13 and inside of the seam cap are in contact due to the straining of the car, as it provides a space in which entering water can collect and then be conducted off the eaves.

The seam clip 18 comprises a hood portion, the interior of which conforms to the contour of the seam cap, and the lower edges of the sides of which hood portion are turned outwardly and bear upon the flanges 16 of the seam cap. Depending from the hood portion on the outside face thereof is

a projection 19 having a hole at its lower extremity for bolting to the fascia, and a protuberance 20 on the inside face extending into the rabbet 26 in the fascia in which the down-turned end flanges 12 of the roof sheets lie. The clip 18 is bolted to the fascia by a bolt extending through the hole in the depending projection and passing through the side frame and held by a nut on the inside of the car. Similar clips 29 are used to cover the ends of the corrugations 11, and provide additional means for loosely securing the roof sheets on the substructure. The seam clip 18 is also secured to the carline by means of a bolt or stud 21 secured in a dove-tail 25 in the end of the web of the carline and passing through a hole in the front side wall of the hood and having a nut 22 thereon bearing against the outside of the wall of the clip. The stud 21 is formed with a beveled T head 23 provided with lateral wings 24 so that when it is inserted in the dove-tail 25 in the end of the web of the carline, the wings 24 may be bent parallel with the web of the carline to retain the stud in position.

The protuberances 20 on the inner faces of the clips extend between the turned down flanges of the roof sheets and provide an additional spacing means for securely positioning the sheets with respect to the fascia. The rabbet in which the end flanges of the roof sheets lie is made wide enough so that the roof sheets can have at least a quarter inch play in either direction transverse to the longitudinal axis of the car, and the space between the protuberances 20 and the turned down flanges is sufficient to allow the same play longitudinally of the car. The protuberances prevent excessive sliding of the roof sheets longitudinally of the car, and thus relieve the seams of any strains from such excessive movement. As, in the form of roof illustrated, there are four clips in engagement with the roof sheet on either end of the same, there are eight points among which the stresses in the sheet due to "weaving" or "racking" of the car may be distributed other than along the lines of the seams themselves, thus amply safeguarding the roof sheet from tearing along the seams, and minimizing the danger of tearing the sheets at the clips. It is evident that a greater or less number of clips may be used as the exigencies of service may require.

While I have shown and described a particular embodiment of my invention, I do not wish to be limited thereto, but

What I desire to secure and protect by Letters Patent is as follows:

1. In a car roof, the combination with side plates, of carlines having side and slightly tapering vertical flanges secured to said side plates, and purlins composed of superimposed strips, some of said strips ex-

tending continuously beneath the carlines, and other strips fitting between the vertical flanges of adjacent carlines and above the horizontal flanges of said carlines and secured to the first mentioned strips by means adapted to draw said upper strips downwardly toward the lower strip.

2. In a car roof, the combination with side plates and carlines extending between the side plates, of built up purlins transverse to the carlines, said purlins each having one section extending continuously past the carlines and other sections fitting between adjacent carlines and forming braces therefor and secured to the first named section by means adapted to draw said upper sections downwardly toward the lower section, and the vertical member of the carlines being thicker at the bottom than at the top.

3. In a car roof, the combination with side plates and flanged metal carlines extending between the side plates, of built up wooden purlins transverse to the carlines, said purlins each having a lower section extending continuously past the carlines and upper sections fitting between adjacent carlines and forming braces therefor and secured lengthwise to the first named section by means adapted to draw said upper sections downwardly toward the lower section, and the vertical member of the carlines being thicker at the bottom than at the top, and roof sheets extending from eaves to eaves of the car and supported on the last mentioned sections of the purlins.

4. In a car roof, the combination with notched side plates, of metal carlines having vertical and horizontal flanges secured in the said notches and having end lugs embracing the side plates, said vertical flanges tapering upwardly, wooden purlins supported by the carlines and composed of upper and lower sections secured together by means adapted to draw the upper sections downwardly toward the lower section, the upper sections extending between the vertical flanges of the carlines and resting on the horizontal flanges of the carlines to provide lateral braces therefor.

5. In a car roof, the combination with a substructure of metal roof sheets movably supported thereon and spaced apart, and metal seam-caps covering the margins of adjacent sheets and clips secured to the substructure beyond the sheets, a roof sheet having upturned side flanges and downturned end flanges and having notches in its ends extending throughout the downturned portions, and longitudinal corrugations extending the full distance from the notch at one end of the sheet to a notch on the other end, whereby said corrugations stiffen the sheet longitudinally and adapt it to yield transversely.

6. In a car roof, the combination with a

substructure of metal roof sheets movably supported thereon and spaced apart, and metal seam-caps covering the margins of adjacent sheets and clips secured to the substructure beyond the sheets, a roof sheet having upturned side flanges and downturned end flanges and having notches in its ends extending throughout the downturned portions, and longitudinal corrugations extending the full distance from the notch at one end of the sheet to a notch on the other end, whereby said corrugations stiffen the sheet longitudinally and adapt it to yield transversely, said clips having hood portions loosely inclosing the open ends of said corrugations.

7. A metal roof sheet for a car roof adapted to extend from eaves to eaves of the car, said roof sheet being curved longitudinally to approach the surface of a cylinder in conformation, and having downturned end flanges, said end flanges having notches extending through the full depth thereof, and longitudinal corrugations extending from the notch at one end of the sheet to a notch at the other end thereof, whereby said corrugations stiffen said sheets longitudinally and adapt them to yield transversely.

8. In a car roof, the combination with roof sheets having longitudinal corrugations, and down-turned end flanges, a fascia having a rabbet in its upper face into which said down-turned end flanges project, said down-turned end flanges being cut away at the ends of the longitudinal corrugations, roof clips attached to the fascia and having portions projecting into the rabbet between the down-turned end flanges at the ends of the longitudinal corrugations, the width of said rabbet being such that a space is left on either side of the down-turned end flanges between the clip and inner wall of the rabbet.

9. In a car roof, the combination with a substructure of roof sheets supported thereby and having up-turned side flanges and longitudinal corrugations adjacent to the side flanges, seam caps covering the side flanges and having lateral flanges terminating short of and below the tops of said longitudinal corrugations.

10. In a car roof, the combination with side plates of carlines having vertical flanges, roof sheets having up-turned side flanges and longitudinal corrugations adjacent the side flanges, seam caps covering the side flanges of the roof sheets adjacent a carline and having lateral flanges resting upon said roof sheets between the longitudinal corrugations thereof and the upturned side flanges, said seam caps having the lower parts of their side walls adjacent the lateral flanges bent outward to provide for an enlarged space between the up-turned

side flanges of the roof sheets and lower part of the seam cap. 65

11. In a car roof, the combination with side plates of carlines having vertical flanges, roof sheets having up-turned side flanges and longitudinal corrugations adjacent the side flanges, said roof sheets being arranged between the adjacent carlines with spaces between the vertical flange of the carlines and the side flanges of the roof sheets, seam caps covering the side flanges of the roof sheets adjacent a carline and spaced therefrom, and having lateral flanges resting upon said roof sheets between the longitudinal corrugations thereof and the upturned side flanges, said seam caps having the lower parts of their side walls adjacent the lateral flanges bent outward to provide an enlargement of the space between the upturned side flanges of the roof sheets and lower part of the seam cap. 85

12. In a car roof, the combination with side plates, of carlines having vertical flanges, fasciae secured to the side plates, said fasciae having rabbets in their top edges, roof sheets extending from eaves to eaves and having upstanding side flanges alongside of but slightly spaced from said vertical flanges and down-turned end flanges in said rabbets, each sheet having longitudinal corrugations near each side margin and at an intermediate point, a seam cap embracing the vertical flange of a carline and the adjacent side flanges of the sheets, said seam cap extending to the ends of the side flanges of the sheets and having its margins extending close to or short of the marginal corrugations of the sheets and below the tops of said corrugations and hood clips secured to the carline and embracing the ends of the seam cap. 105

13. In a car roof, the combination with side plates and carlines having vertical flanges, roof sheets extending from eaves to eaves and having upstanding side flanges and down-turned end flanges, a seam cap embracing the vertical flange of a carline and side flanges of the adjacent sheets, said seam cap extending to the ends of the side flanges of the sheets and secured to the carline by hood clips embracing its ends, each carline having a fastening device projecting endwise therefrom and each hood clip being secured to the end of a carline by one of said fastening devices and having a depending portion secured to the side of the car. 120

14. In a car roof, the combination of a carline having a vertical flange extending between the side plates, a fascia secured to the eaves on each side, said fascia having a rabbet in its outer face at the top edge, roof sheets extending from eaves to eaves having upstanding side flanges and down-turned end flanges, the side flanges of the adjacent 125

5 sheets being arranged in proximity to the vertical flange of the carline and with a space therebetween, and the end flanges of said roof sheets extending in the rabbets in the fasciæ, hood clips embracing the ends of the vertical flange of the carlines and side flanges of the adjacent sheets and spaced from the latter, said hood clips each having a depending lug adapted to be secured to the fasciæ below the rabbet and a protuberance projecting from the inner face of the lug and bearing on the fasciæ in the rabbet between the down turned end flanges of the roof sheets, said clips being secured to the ends of the carlines.

15 15. In a car roof composed of roof sheets having longitudinal corrugations and down-turned end flanges cut away at the ends of the corrugations, a clip having a hood portion adapted to cover the end of a corrugation, and a base portion adapted to be secured to the side of the car below the eaves, said base portion having a protuberance from its inner side adapted to bear upon the side of the car between the down-turned end flanges of the roof sheets.

20 16. In a car roof, the combination with the carlines having laterally extending flanges and a tapering vertical flange, of composite wooden purlins, metal roof sheets supported on said purlins, and means for closing the joints between adjacent sheets, a purlin comprising a lower member extending continuously below the carlines and secured thereto and a plurality of upper members respectively fitting endwise against ad-

jacent carlines and means for clamping the upper members downwardly toward the lower member.

40 17. In a car roof, the combination with metal carlines having laterally extending flanges and a slightly tapering vertical flange, of composite wooden purlins, metal roof sheets supported on said purlins between said carlines having vertical side flanges spaced slightly from said carlines, and seam caps covering the respective carlines and the side flanges adjacent thereto, a purlin comprising a lower member extending continuously below the carlines and secured thereto and a plurality of upper members fitting between the respective carlines to form braces therefor and secured to said lower member by means adapted to draw them downwardly toward it.

50 18. In a car roof, a substructure comprising metal carlines each provided with a vertical member and said vertical member having at its ends endwise projecting fastening devices, and roof sheets movably resting on said substructure and having their side margins adjacent to the vertical members of said carlines, and hood clips mounted over the ends of the vertical members of said carlines and of the adjacent portions of the roof sheets and secured to said carlines by said fastening devices.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."