Apr. 3, 1923.

1,450,243

C. D. BONSALL

CAR ROOF

Filed May 24, 1922

Fig. 1.

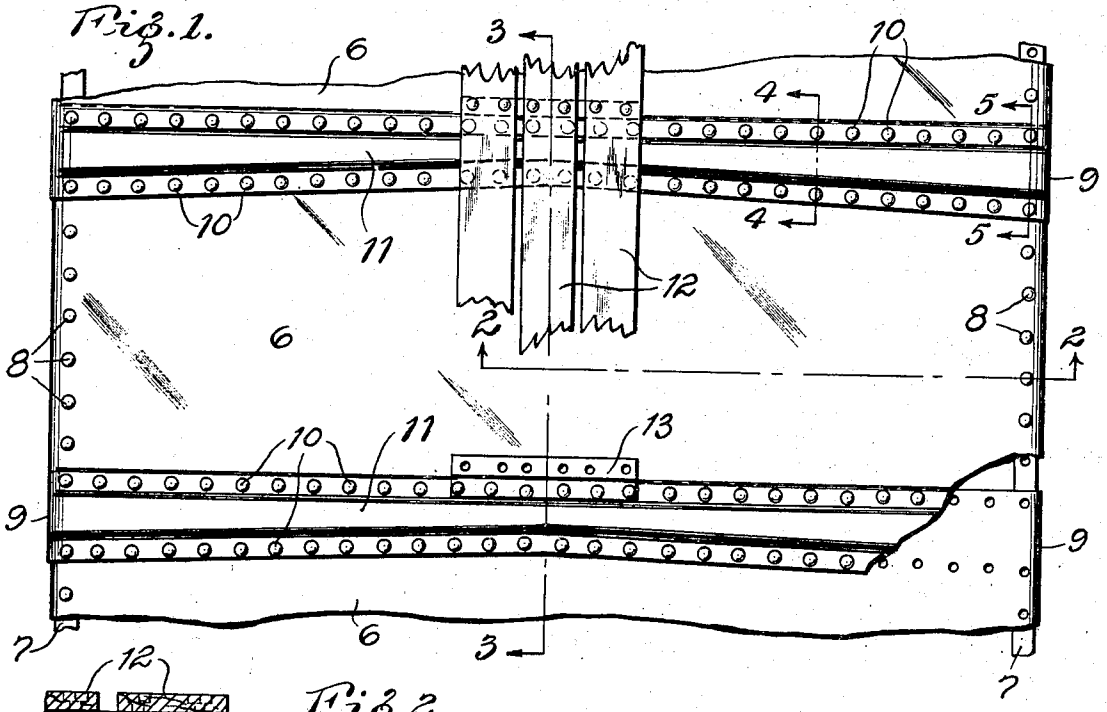



Fig. 2.

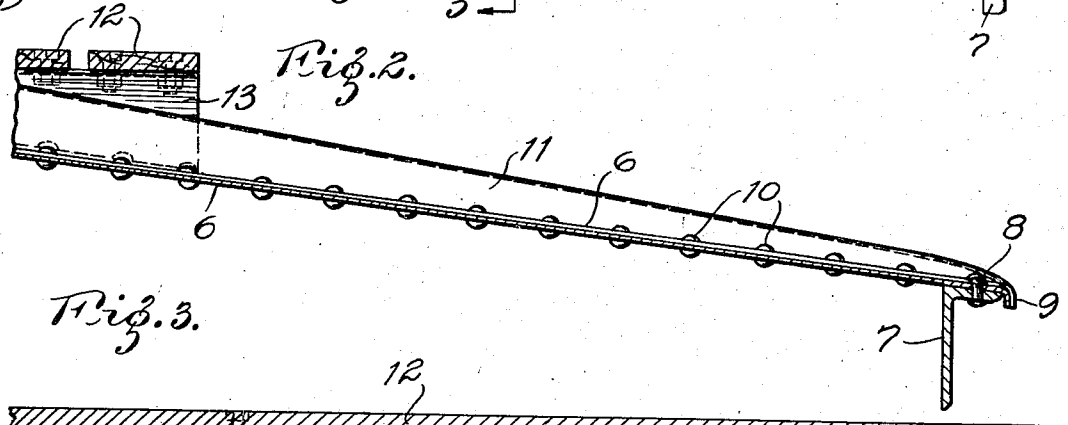



Fig. 3.

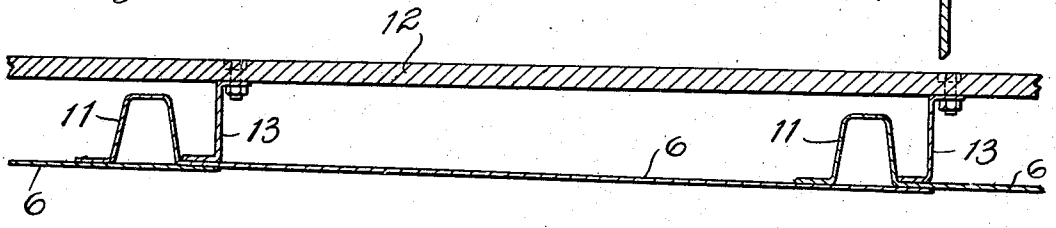



Fig. 4.

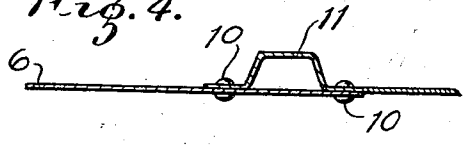
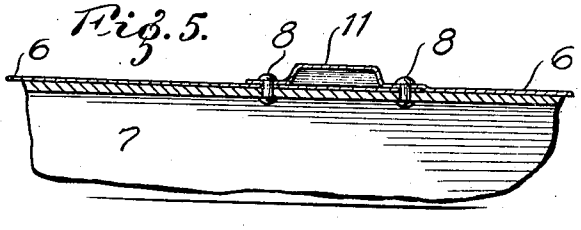



Fig. 5.




Inventor:
Charles D. Bonsall,
by Carr & Carr
his Attorneys.

Patented Apr. 3, 1923. 1,450,243

# UNITED STATES PATENT OFFICE.

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

## CAR ROOF.

Application filed May 24, 1922. Serial No. 563,225.

*To all whom it may concern:*

Be it known that I, CHARLES DAVID BONSALL, 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 Car Roofs, of which the following is a specification.

This invention relates to car roofs of the all-steel riveted-up type wherein heavy gage roofing sheets extend from side to side of the car and are rigidly secured together and to each other to form a load sustaining structure; and it relates more particularly to roofs of the kind wherein the side marginal portions of adjacent sheets cooperate to form weather proofing hollow box-girder seams or joints that function as carlines.

The present invention has for its principal object to increase the strength or rigidity of the roof by improving the sectional shape and arrangement of the cooperating side marginal portions of adjacent roof sheets. Other objects are to simplify the construction of the roof and to cheapen the cost of manufacture.

The invention consists principally in the improved weather proofing box-girder seam or joint construction hereinafter shown and described; and it also consists in the combinations and arrangements 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,

Fig. 1 is a plan view of a portion of a car roof embodying my invention;

Fig. 2 is an enlarged transverse section through one half of the roof on the line 2—2 in Fig. 1;

Fig. 3 is a longitudinal section along the ridge line of the roof on the line 3—3 in Fig. 1;

Fig. 4 is a vertical cross-section through one of the box-girder seams midway of the ridge and eaves on the line 4—4 in Fig. 1; and

Fig. 5 is a similar section through said box-girder seam, the section being taken adjacent to the eaves on the line 5—5 in Fig. 1.

The present roof comprises transversely arranged load sustaining roofing sheets 6, which extend from eaves to eaves of the car. The roof sheets are supported at their eaves ends on the outwardly projecting uppermost flanges of angle-bar side plate 7 and are rigidly secured to said supporting flanges by means of rivets 8. The eaves ends of the sheets are provided with depending eaves portions 9 which overhang the outer edges of the top flanges of the side plates and constitute drip flanges.

The roof sheets slope upwardly from the eaves to the ridge to form a hip roof and are assembled on the carframe by lapping their side marginal portions which are rigidly secured together along two lines by double row of rivets 10. The overlapping portion of each sheet between the two lines of rivets 10 is formed into an inverted channel 11 which cooperates with the underlapping portion of the next adjacent sheet between said lines to form a hollow box-girder seam or joint. Thus, each sheet has the inverted channel or stiffening rib 11 formed in one side marginal portion only, which channel or ribbed portion overlaps the plain margin of the next adjacent sheet and is rigidly secured thereto on opposite sides of said ribbed portion to form the hollow box-girder joint.

Running boards 12 extend longitudinally of the car at the ridge and are supported on the uppermost lateral flanges of Z-shaped running board saddles 13, whose lower flanges rest on and are rigidly secured to the lapping portions of the sheets by the rivets 10.

The pressed up ribs 11 are deepest at the ridge and gradually decrease in depth towards the eaves where they merge into the plane of the body of the sheets; and said ribs have a minimum width at the ridge and widen gradually to the eaves.

It is noted that the sheet blanks, from which the sheets are pressed, are of rectangular shape. Therefore, such rectangular blanks may be pressed up without any trimming thereof to form ribs of gradually decreasing depth and gradually increasing width from ridge to eaves.

The inner wall of each upstanding hollow rib 11 of a sheet extends in a straight line transversely of the car from eaves to eaves thereof; and the outer wall of said rib, together with the marginal portion of the sheet located beyond the rib, diverges from said inner wall on each side of the

ridge towards the eaves. Thus, the ribbed overlapping marginal portions of the sheets are substantially K-shaped in plan and function as box-girder carlines to brace and stiffen the car-body against horizontal stresses, which tend to twist the carlines and buckle the roof sheets, and to increase the load carrying capacity of the roof.

What I claim is:

1. A car roof comprising a series of roof sheets connected along their side margins by hollow box-girder seams, one wall of a seam extending in a straight line transversely of the car substantially at right angles to the eaves ends of the sheets, and the opposite wall of said seam diverging from said transversely extending straight wall on opposite sides of the ridge.

2. A car roof comprising a series of roof sheets connected along their side margins by hollow box-girder seams of varying depth from ridge to eaves, one side wall of a seam extending in a straight line transversely of the car substantially at right angles to the eaves ends of the sheets, and the opposite side wall of said seam diverging from said straight side wall on opposite sides of the ridge.

3. A car roof comprising a series of roof sheets connected along their side margins by hollow seams, one wall of a seam extending in a straight line from eaves to eaves substantially at right angles thereto, and the opposite wall of said seam extending from eaves to eaves in the form of an obtuse angle.

4. A car roof comprising a series of roof sheets connected along their side margins by hollow upstanding seams of gradually decreasing height from ridge to eaves, one side wall of a seam extending in a straight line from eaves to eaves, substantially at right angles thereto, and the opposite side wall of said seam extending from eaves to eaves in the form of an obtuse angle whose vertex is located at the ridge.

5. A car roof comprising a plurality of metal roof sheets extending from eaves to eaves and having their side margins overlapped and riveted together along two rows to form a rigid lap-joint, one line of rivets of a joint extending transversely of the car from eaves to eaves substantially at right angles thereto, and the other line of rivets of said joint diverging from said transverse line on opposite sides of the ridge.

6. A car roof comprising a plurality of metal roof sheets extending from eaves to eaves and having their side margins overlapped and riveted together along two rows to form a rigid lap-joint, one line of rivets of a joint extending transversely of the car from eaves to eaves substantially at right angles thereto, and the other line of rivets of said joint extending from eaves to eaves in the form of an obtuse angle whose vertex is located at the ridge.

7. A car roof comprising a plurality of roof sheets extending from eaves to eaves and having their side marginal portions overlapped, the overlapping portion of a sheet being formed with an upstanding hollow rib, one wall of which is straight and extends transversely of the car substantially at right angles to the sides thereof, the opposite wall of said rib diverging from said transversely extending wall on opposite sides of the ridge.

8. A car roof comprising a plurality of roof sheets extending from eaves to eaves with their side marginal portions overlapped and rigidly secured together, one only of the lapped margins of a sheet being formed with a stiffening rib the inner side wall of which extends transversely of the car, substantially at right angles to the eaves line thereof, the outer side wall of said rib diverging from said transversely extending inner side wall on opposite sides of the ridge.

9. A car roof comprising a plurality of metal roof sheets extending from eaves to eaves and having their side marginal portions overlapped to form hollow box-girder joints, the lapping portions of said sheets being rigidly secured together on opposite sides of said box-girders, one side wall of a box-girder extending transversely of the car from eaves to eaves substantially at right angles thereto, and the opposite side wall of said box-girder diverging from said transversely extending wall on opposite sides of the ridge.

10. A car roof comprising a plurality of roof sheets extending from eaves to eaves with their side margins lapping each other and riveted together along two lines, the portion of one sheet between said lines being formed with a hollow stiffening rib, one side wall of a rib, together with the line of rivets adjacent thereto, extending transversely of the car from eaves to eaves substantially at right angles thereto, and the opposite side wall of said rib, together with the line of rivets adjacent thereto, diverging from said transversely extending wall and rivets from ridge to eaves.

11. A car roof sheet having a hollow rib formed therein, one wall of which is straight and extends longitudinally of the sheet substantially at right angles to the eaves ends thereof, the opposite wall of said rib diverging from said longitudinally extending wall on opposite sides of the ridge line of said sheet.

12. A car roof sheet having a hollow rib formed therein of varying depth from ridge to eaves, one wall of which is straight and extends longitudinally of the sheet substan-

tially at right angles to the eaves ends thereof, the opposite wall of said rib diverging from said longitudinally extending wall on opposite sides of the ridge line of said sheet.

13. A car roof sheet having a hollow rib formed therein, one wall of which is straight and extends longitudinally of the sheet from end to end thereof substantially at right angles to said ends, the opposite wall of said rib extending from end to end of the sheet in the form of an obtuse angle.

14. A car roof sheet having a hollow rib formed therein, one wall of which is straight and extends longitudinally of the sheet from end to end thereof substantially at right angles to said ends, the opposite wall of said rib extending from end to end of the sheet in the form of an obtuse angle, whose vertex is located at the ridge.

Signed at New Kensington, Pa., this 19th day of May, 1922.

CHARLES DAVID BONSALL.