June 5, 1934. E. MAYHEW 1,961,373

CAR ROOF

Filed Feb. 28, 1931

Fig. 1.

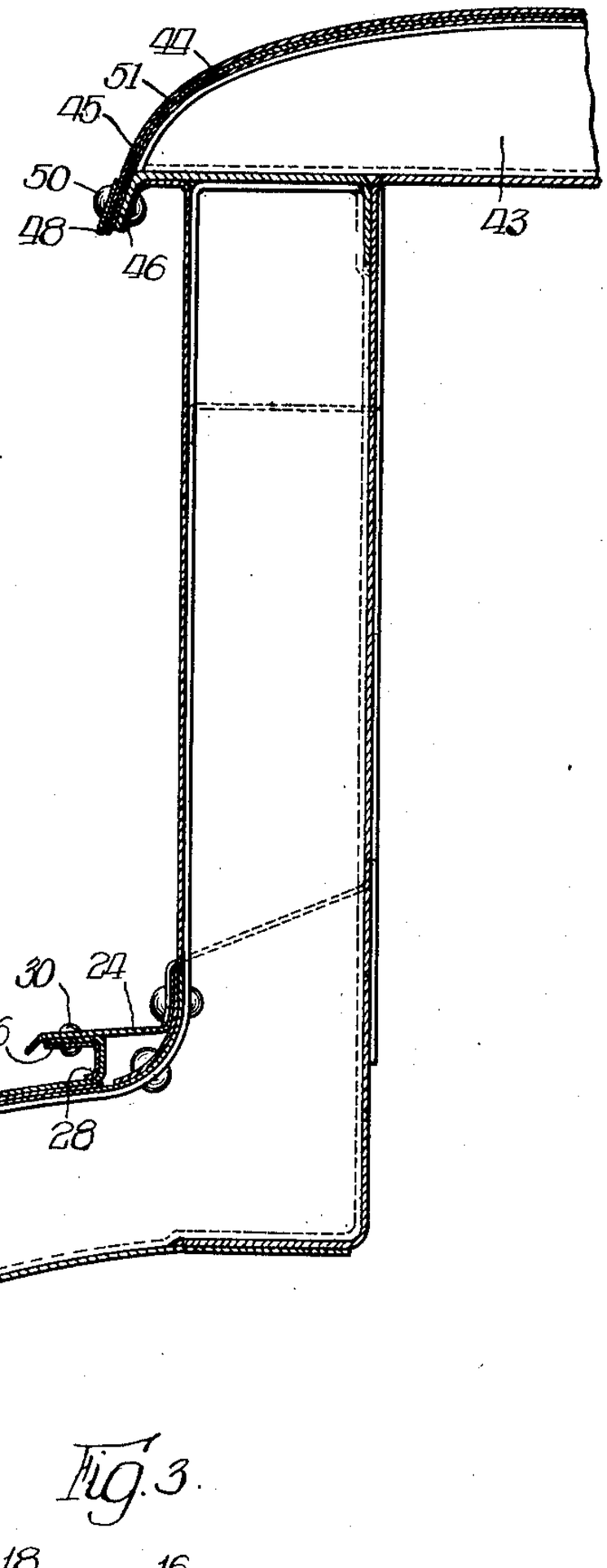


Fig. 2.

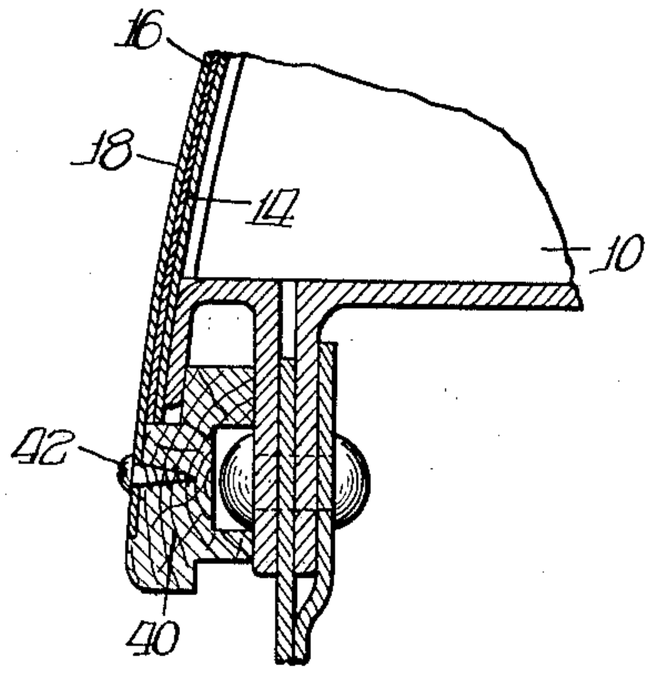
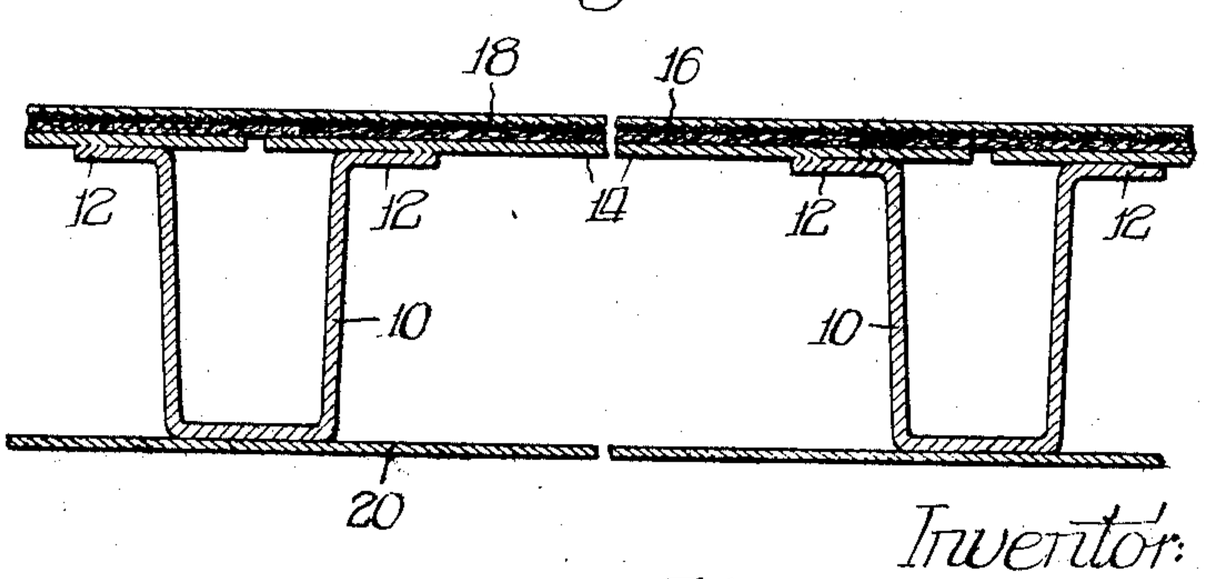


Fig. 3.



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UNITED STATES PATENT OFFICE

1,961,373

CAR ROOF

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Application February 28, 1931, Serial No. 519,034

16 Claims. (Cl. 108—5.1)

This invention relates to roofs, and has been illustrated as embodied in the roof of a railway passenger car, although, of course, in many of its aspects it is suitable for a variety of other uses.

The embodiment of the invention illustrated comprises a roof formed in part at least of flanged U-shaped carlines, roof plates secured between these carlines, preferably welded thereto, but not rigidly secured to each other, together with a one-piece covering of asphalt coated canvas or similar material which is preferably attached entirely externally so that it may be readily replaced without disturbing the interior lining of the car. The metallic roofing plates are preferably slightly spaced apart in order that there may be freedom of movement between them without any overlapping and without injury to the superimposed flexible roofing.

Numerous objects are accomplished by this invention. In the past it has always been considered necessary that the top roof plates be overlapped and riveted together with closely spaced rivets. Each rivet furnished a potential source of leakage and corrosion. It was necessary to use several separate roof plates, as a one-piece or welded roof would buckle and rupture due to the weaving of the car. By the present invention welding has been made practical, the plates being welded to a flexible carline instead of each other. This avoids the difficulties due to rivets and makes practical the use of a flexible covering. Another aspect of the invention makes the use of the flexible roofing entirely satisfactory, by providing for its attachment or replacement entirely from the outside of the roof. The use of a flexible waterproof covering so easily replaced prevents the rusting through of the roof plates, so that it is almost never necessary to repair the metal part of the roof. When it is necessary, this can be done from the outside since there is no riveting, the driving of which would require tearing out the headlining.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation, as will be more fully described and particularly pointed out in the specification, drawing and claims appended hereto.

In the drawing, which illustrate an embodiment of the device, and wherein like reference characters are used to designate like parts,

Figure 1 is a vertical sectional view through my improved form of roofing,

Figure 2 is a fragmentary view corresponding to Figure 1, of a modified form of the roof construction of this invention; and

Figure 3 is a section taken along the line 3—3 of Figure 1.

Although my invention may take many forms, only one has been chosen for illustration, together with a slight modification thereof. The preferred embodiment is illustrated in Figures 1 and 3. The lower deck of the car roof is supported by carlines 10 which may be of any shape, but some of them at least are preferably of the U-shaped type shown in Figure 3, having the flanges 12. Metallic roof plates 14 are secured to one flange of each of two adjacent U-shaped carlines. The roof plates are preferably not more than a third of the length of the roof as a whole and extend the full height of the lower deck. These plates 14 may be spot welded to the flanges 12, and extended almost to the center of the carline so that the edges of two adjacent roof plates are slightly spaced. Since the roof plates are neither abutting nor rigidly connected to each other, the flexing of the carlines provides the necessary play between the plates to prevent buckling and rupture due to the weaving of the car. It should be explained that when the car goes around a curve the outer side legs so that the car and roof are considerably distorted from their normally rectangular outline. In order to provide the utmost flexibility, the roof sheets are welded at just enough points to hold them securely to the frame, and are preferably not welded too close to the rigidly secured ends of the carlines where the flexibility of the carlines is greatly reduced. They may be short enough to just bridge each from one carline to the next.

On top of the roof sheets there is laid a layer 16 of padding material such as asphalt felt which however may be dispensed with if desired. On top of the layer of padding material is laid a layer 18 of flexible roofing material which is preferably in one piece the length of the car, or one piece for the entire deck. This material may very desirably be canvas saturated and coated with asphalt.

Novel features of attaching the flexible roofing are provided whereby the roofing may be attached and removed by operations entirely external of the car, that is, without disturbing the head-lining 20 which forms the ceiling of the car interior and which is secured in place in the usual manner, not shown. The flexible roofing is preferably secured at the top to an inclined water table 24 which is secured to the upstanding portion of the roof between decks. The roofing is held in place by an angle strip 26, the lower end

28 of which is curved so as not to injure the roofing and so located as to hold it close against the padding on the roof plates. The angle strip 26 is secured to the water table 24 by rivets 30, the roofing being secured between the angle strip and the water table. After the roofing has been secured at the top as thus described, it is pulled downwardly over the eaves until it is stretched tight and then it is secured in place by the pressure band 32 which is riveted by the rivets 34 to the eave angle 36. The eave angle 36 is provided with a long enough downwardly projecting flange 38 so that the riveting may be performed entirely externally of the roof. Instead of using the rivets 34 and the band 32 a wooden eave strip 40 may be provided being either locked in place by its shape, or positively secured as by separate bolts passing through it and through the frame of the car. If such a strip is used, the covering is secured thereto by the screws 42, and a protecting band may be used under the heads. In any event the edges of the roofing may be cemented in place though this is not necessary.

The structure of the upper deck is substantially the same as that described, including the flanged U-shaped carlines 43 and roof plates 44, but the outer covering 45 is stretched between two eaves 46 being preferably secured to each by the pressure band 48 and the rivets 50. A felt padding 51 should be provided here also.

All the rivets used for attaching the flexible roofing are cold driven. In driving cold rivets through the asphalt treated fabric, the heat generated by the driving is sufficient to melt the asphalt enough to have it form a seal around the rivet shank when it cools.

From the above description and accompanying drawings the ease with which this roof may be repaired is apparent. The covering securing rivets 30, 34 and 50 may all be removed and replaced with ease entirely from the outside of the car for the purpose of renewing the flexible roofing. As the flexible roofing is substantially of one piece and thoroughly waterproof, the roof plates underneath will be extremely long lived and ordinarily will never have to be replaced. In the rare event that it is necessary to replace them the operation is quite simple. After ripping the old ones off the new ones may be secured by spot welding from the outside, so that in the course of ordinary repair of the roofing it is never necessary to tear out the head lining 20 of the car.

It is to be understood that many other embodiments of the invention, including some in improved form, will be apparent, and in the course of time more will be devised by those skilled in the art. It is not desired that this invention be limited to the details described, for its scope includes all such forms or improvements as come within the spirit of the following claims, construed as broadly as the prior art will permit. Especially it should be noted that the various features of the invention may be used independently of each other, and the roof construction might be quite different, even to the extent of riveting the plates together, though of course in this event the rivets should be well padded.

What is claimed is:

1. A roof including an internal roof having external extensions, a covering for said internal roof engaging said external extensions and riveted thereto by rivets which are replaceable entirely by external operations, the upper edge of said covering being secured solely by such rivets, and the remainder of said covering being secured solely by means replaceable externally.

2. A roof including an internal roof having external extensions, a covering for said internal roof engaging said external extensions and riveted thereto by rivets which are replaceable entirely by external operations, said covering being secured solely by such rivets.

3. A roof including an inclined portion and an upright portion extending thereabove, a watershed projecting from said upright portion, and a covering for said inclined portion secured to said watershed.

4. A roof including portion and an upright portion extending thereabove, a watershed projecting from said upright portion, and a flexible covering for said inclined portion secured to said watershed.

5. A roof including an inclined portion and an upright portion extending thereabove, a watershed projecting from said upright portion, a flexible covering for said inclined portion secured to said watershed, and an angle strip secured to said watershed and pressing said covering adjacent to said plates.

6. A roof including an internal frame, eaves extending therefrom beyond the walls of the car, and a covering riveted to said eaves by rivets which are replaceable externally, and otherwise secured to said roof solely by means which are replaceable externally.

7. A car roof including a metallic supporting structure of sufficient strength and sufficient continuity to withstand all forces to which a roof is ordinarily subjected, a flexible waterproof covering, and means for securing said covering to said metallic roof structure, said means exerting a clamping action along all the edges of said covering and being externally replaceable.

8. A car roof including a metallic supporting structure of sufficient strength and sufficient continuity to withstand all forces to which a roof is ordinarily subjected, a flexible waterproof covering, means for securing said covering to said metallic roof structure, said means exerting a clamping action along all the edges of said covering and being externally replaceable, and means for preventing leakage at any such securing means on an upper edge of said covering means.

9. A roof including an inclined portion, a watershed at the upper edge of said inclined portion, a flexible covering for said inclined portion secured to the under side of said water-shed, and an angle strip secured to said water-shed and pressing said covering adjacent to said inclined portion.

10. A car roof including a metallic supporting structure of sufficient strength and sufficient continuity to withstand all forces to which a roof is ordinarily subjected, a flexible substantially waterproof covering, and means for securing said covering to said metallic roof structure, said means exerting a clamping action along the upper edge of said covering and all securing means being externally replaceable.

11. A car roof including a metallic supporting structure of sufficient strength and sufficient continuity to withstand all forces to which a roof is ordinarily subjected, a flexible substantially waterproof covering, and means for securing said covering to said metallic roof structure including rivets exerting a clamping action along the upper edge of said covering, all securing means being replaceable externally.

12. A car roof including flexible U-shaped carlines the legs of which extend upwardly, and roofing plates spanning the space between the carlines, and having their edges slightly spaced apart above said carlines, said plates being welded to the upper portions of the respective carline legs, and a flexible waterproof covering over the surface of the roof.

13. A car roof including flexible U-shaped carlines the legs of which extend upwardly, and roofing plates spanning the space between the carlines and having their edges so arranged above the carlines as to permit a slight relative shifting of said plates one to another, said plates being secured to the outer portions of the respective carline legs by means located wholly below the surface of the roofing plates, and a flexible waterproof covering over the surface of the roof.

14. A car roof including flexible U-shaped carlines the legs of which extend upwardly, and roofing plates spanning the space between the carlines and having their edges so arranged above the carlines as to permit a slight relative shifting of said plates, one to another, said plates being secured to the outer portions of the respective carline legs by means located wholly below the surface of the roofing plates and at just enough points to secure them reliably to the carlines irrespective of water-tightness, and a flexible waterproof covering over the surface of the roof.

15. A car roof including flexible U-shaped carlines the legs of which extend upwardly, and roofing plates spanning the space between the carlines and having their edges so arranged above the carlines as to permit a slight relative shifting of said plates one to another, said plates being secured to the upper portions of the respective carline legs at just enough points to secure them reliably to the carlines irrespective of water-tightness, and a flexible waterproof covering over the surface of the roof.

16. A car roof including flexible U-shaped carlines the legs of which extend upwardly, and roofing plates spanning the space between the carlines and having their edges so arranged above the carlines as to permit a slight relative shifting of said plates one to another, said plates being secured to the upper portions of the respective carline legs at just enough points to secure them reliably to the carlines irrespective of water-tightness and being secured along their top and bottom edges to longitudinal frame members at just enough points to secure them reliably to said frame members irrespective of water-tightness, and a flexible waterproof covering over the surface of the roof.

EDWARD MAYHEW.

CERTIFICATE OF CORRECTION.

Patent No. 1,961,373. June 5, 1934.

EDWARD MAYHEW.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 82, for "legs" read lags; page 2, line 89, claim 4, after "including" insert an inclined; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 24th day of July, A. D. 1934.

Bryan M. Battey

(Seal) Acting Commissioner of Patents.