

No. 676,434.

Patented June 18, 1901.

E. R. HUTCHINS & S. HERBERT.

RAILWAY CAR ROOF.

(Application filed Jan. 11, 1900.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

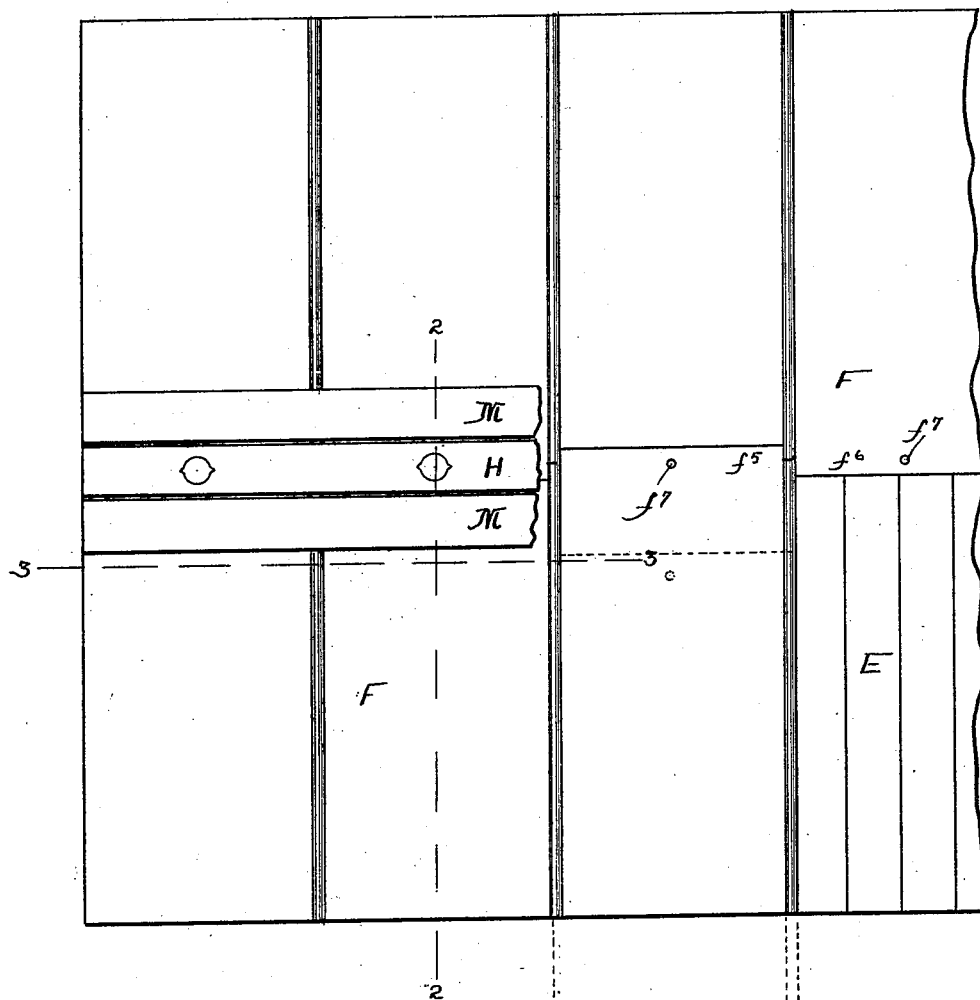
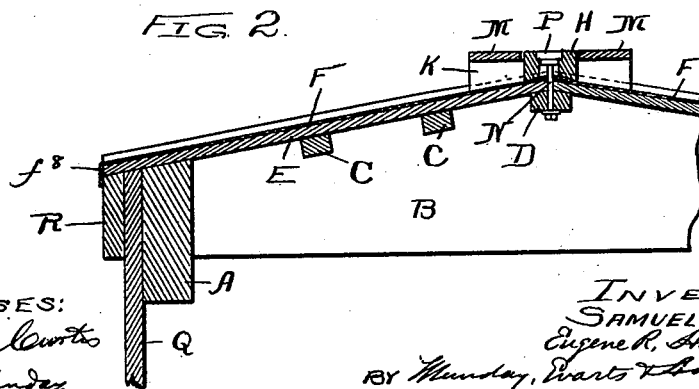


FIG. 2.



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RAILWAY CAR ROOF.

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(No Model.)

2 Sheets—Sheet 2.

FIG. 3.

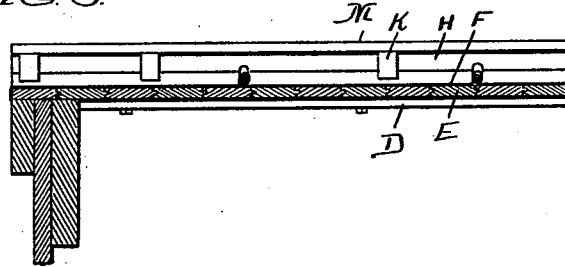


FIG. 4.

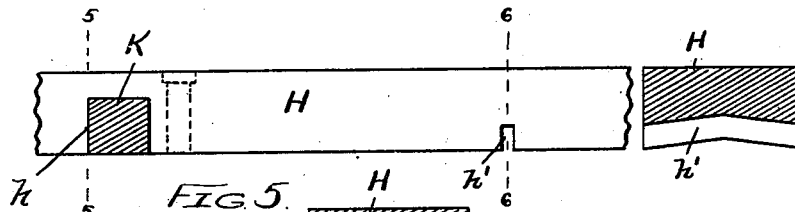


FIG. 6.

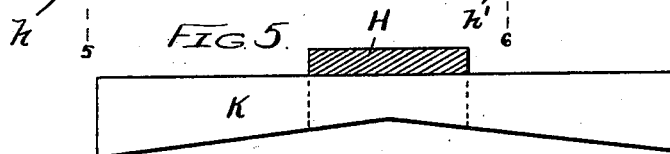


FIG. 7.



FIG. 8.

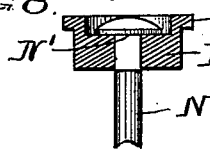


FIG. 9.

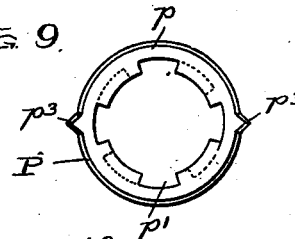


FIG. 10.

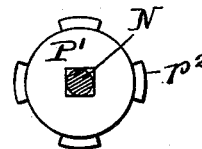
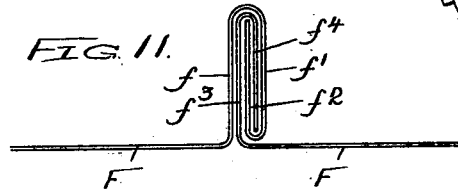


FIG. 11.



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RAILWAY-CAR ROOF.

SPECIFICATION forming part of Letters Patent No. 676,434, dated June 18, 1901.

Application filed January 11, 1900. Serial No. 1,166. (No model.)

To all whom it may concern:

Be it known that we, EUGENE R. HUTCHINS, residing at Chicago, in the county of Cook and State of Illinois, and SAMUEL HERBERT, residing at Detroit, in the county of Wayne, in the State of Michigan, citizens of the United States, have invented a new and useful Improvement in Railway-Car Roofs, of which the following is a specification.

Our invention relates to improvements in roofs for railway-cars, and more particularly to the kind or class of car-roofs which are commonly known as "iron" roofs or "outside" iron roofs, and in which an outer sheathing of sheet metal is employed and relied upon to make the roof water-tight. In this class or kind of car-roofs, where the outer sheet-metal sheathing is relied upon to make the roof water-tight, the metal plates of the roof are ordinarily laid or supported upon an inner sheathing of boards to give support to the sheet metal; but the inner sheathing of boards is not intended or calculated to make the roof water-tight in case water should get through the outer sheet-metal roof, and therefore the meeting edges of the separate sheet-metal plates or strips of which the outer iron roof is composed have heretofore been united together rigidly and firmly by soldered joints or by close-folded seams, or both, said soldered or folded seams being thus made water-tight. In this old construction, where the meeting edges of the plates forming the outside iron roof are secured firmly together by rigid soldered or folded seams or joints, the sheet-metal roof as a whole has the operation and effect of being in one solid or integral piece of sheet metal, and the difficulty heretofore has been that such roofs are exceedingly liable to injury or destruction by reason of the constant jars and shocks and torsional or weaving and buckling strains to which the car is being constantly subjected while the train is in motion or to which it is liable to be subjected by corners of cars striking against each other on switch-tracks. Where the separate plates of the outside iron roof are united together at their meeting edges by soldered, folded, or other rigid joints, such strains tend to speedily crack the sheet metal and cause leaks.

The object of our invention is to produce an outside iron roof for railway-cars of such construction that the joints between the separate plates of the roof will at once be effectually water-tight, so that the roof cannot leak, and which will at the same time leave the outside iron roof flexible, so that the strains will be taken by the wood framework and the layer of boards, and thus relieve the sheet metal, which requires to be water-tight, from strain and liability to injury. In this connection it will of course be understood by those skilled in the art that the wood framework of the roof possesses naturally, from its wood construction, a degree of flexibility that adapts it to yield under severe weaving or torsional strains sufficiently to prevent serious injury thereto, and in our invention we combine with the wood framework a flexible outside iron roof having water-tight joints, the flexibility of the iron roof being by our peculiar construction of the water-tight joints between the metal plates sufficiently yielding or flexible to prevent injurious strain on the sheet metal.

Our invention consists in the novel combination of parts and devices and novel construction of parts and devices herein shown and described, and specified in the claims.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts throughout the several views, Figure 1 is a plan view of a portion of a roof embodying our invention. Fig. 2 is a vertical cross-section on line 2 2 of Fig. 1. Fig. 3 is a vertical longitudinal section on line 3 3 of Fig. 1. Fig. 4 is a side elevation of a portion of the ridge-pole. Fig. 5 is a cross-section on line 5 5 of Fig. 4, showing one of the saddles that supports the running-boards. Fig. 6 is a cross-section on line 6 6 of Fig. 4. Figs. 7, 8, 9, and 10 are detail views showing the bolt and cap construction for connecting the ridge-pole to the center purlin of the roof-frame by a water-tight connection, and Fig. 11 is an enlarged detail view of the lower flexible water-tight joint uniting the meeting edges of the separate plates comprising the outside iron roof.

In the drawings, A represents one of the

eave-plates of the car-roof frame; B, the main carlines; C C, the purlins, and D the ridge-purlin.

E E represent the inner sheathing of boards upon which the metal plates F F, composing the outside iron roof, are laid and by which they are supported or stiffened. The metal plates F extend from the eaves of the roof to the ridge-pole, their meeting ends overlapping each other at the ridge, as illustrated in the drawings. The adjacent metal plates F F are united together at their side edges by a water-tight loose flexible joint comprising a high upright flange f , an outwardly-turned downward flange f' and an inwardly-turned upright flange f^2 , formed on the edge of one sheet, and a high upright flange f^3 and an inwardly-turned downward flange f^4 on the side edge of the adjacent sheet. It will thus be seen that on the meeting edge of one sheet there are three folds or flanges f , f' , and f^2 , the same extending outwardly from the side margin of the sheet, and on the side edge of the adjacent sheet there are two flanges or folds f^3 f^4 , and that the same extend inwardly or toward the sheet. These several folds or flanges are made open or loose, so that the separate sheets or plates F F will have sufficient play or movement to and from each other to give the necessary required flexibility to the sheet-metal roof as a whole to relieve it from strain, and although the joint thus formed between the adjacent sheets of the iron roof is a loose one composed of open flanges f f' f^2 and f^3 f^4 , still the joint is completely and perfectly water-tight against the fiercest driving rain from whatever direction it may be driving or the wind blowing, because the open folds f f' form a hood over the folds or flanges f^2 , f^3 , and f^4 , so that rain driving from the side of the flange f is simply carried over the joint and is deposited upon the adjacent plate F, while rain driving from the other side of the joint would be simply carried up the flange f^3 and returned by the flange f^2 to the plate F itself, or else if it passed over the extreme edge of the flange f^2 and followed down the flange f^4 it would be deposited in the gutter or trough formed by the flanges f' f^2 , and thus be carried down to the eave and be discharged. By this particular construction of joint we are enabled to produce a perfectly water-tight connection between the side edges of the roof-plates and at the same time have the connection so loose and free that the outside iron roof can readily accommodate itself to any yielding, weaving, or torsional movements that the wood frame of the car-roof may have or be subjected to. We thus relieve our outside water-tight metal roof from all injurious strains tending to crack, injure, or destroy it and produce a thoroughly efficient and durable car-roof. As the metal plates F F are secured together at their side edges by loose free joints composed of open folds or flanges, we are also enabled by our invention to fur-

nish a roof of a very cheap construction, as the separate metal plates of the roof can be quickly put together by simply slipping or telescoping one upon another. This also enables the roof to be very easily and quickly repaired by simply slipping out an injured plate and replacing it by another.

At the ridge the meeting ends of the roof-plates F F overlap each other at f^5 f^6 .

H is the ridge-pole, and K represents the saddles which support the running-boards M. The ridge-pole H is furnished with notches h to receive the saddles K, and we thus bring the upper surface of the ridge-pole flush with the running-boards M M, which rest on the saddles, so that the ridge-pole itself serves as the middle running-board. To secure a perfectly water-tight connection between the ridge-pole H and the ridge-purlin D, we provide the bolts N, that pass through the two to secure the same together, with bung-shaped or bung-acting caps P, having tapering or beveled flanges p , so that they may be forced or driven water-tight into the openings formed to receive them in the ridge-pole. These bung-caps for the connecting-bolts N are provided with angular slots or bayonet-catches p' on their inside to receive the corresponding cap P', which surrounds the head N' of the connecting-bolt N, the cap P' having projections p^2 to enter the angular slots p' on the interior of the bung-cap P. The bung-cap P is also furnished with one or more teeth p^3 on its outer edges to prevent the same turning in the ridge-pole.

In bolting the ridge-pole and ridge-purlin together the bolt is first inserted through the cap P' and then the bung-cap P is applied to the cap P' and turned, so as to lock the two together, and then the bolt is passed through the ridge-pole and ridge-purlin and the bung-cap forced into the ridge-pole water-tight.

The ridge-pole H is provided at intervals with notches h' to receive the high-standing joints which unite the side edges of the separate plates forming the outside iron roof. The bolts N, which connect the ridge-pole and ridge-purlin together, extend through the lapped portions f^5 f^6 of the iron roof plates or sheets F, and thus hold the individual loose plates from slipping downward or toward the eaves, the roof-plates F being provided with holes f' for the bolts to pass through. As the roof-plates lap over each other at the ridge, the roof is made thoroughly water-tight, and as the bolts N, which alone extend through the roof-plates, are furnished with water-tight or bung caps there is no possibility of any leakage at the bolt-holes. The ridge-pole also adds to the water-tight character at the ridge.

Q represents the siding, and R the fascia. The roof-plates F are preferably furnished with downturned ends or flanges f^8 at the eave, overlapping the fascia.

We claim—

1. In a car-roof the combination with the

roof-frame, of an outside flexible sheet-metal or iron roof composed of a series of sheet-metal plates adapted to be telescoped longitudinally into position upon each other and
 5 united together at their side edges by water-tight, loose, open joints, composed each of a high upright flange, a downward flange and an inwardly-turned upright flange formed on the meeting edge of one sheet or plate, and a
 10 high upright flange and a downturned flange on the meeting edge of the adjacent sheet, with open spaces between the joint-flanges on one sheet and those on the other, whereby the necessary movement or play between the
 15 sheets of the roof is provided for to give flexibility to the roof as a whole and to permit any sheet to be removed or replaced by sliding or telescoping it upon its adjacent sheets, while the joint is made water-tight, substantially as
 20 specified.

2. In a car-roof, the combination with the roof-frame and inner layer of boards thereon, of a loose, flexible outside sheet-metal or iron roof resting thereon and composed of a series
 25 of metal sheets or plates adapted to be telescoped longitudinally into position upon each other and united together at their side edges by water-tight, loose, high-standing joints, composed each of three flanges or folds on the
 30 side edge of one sheet engaging two flanges or folds on the side edge of the adjacent sheet with open spaces between the joint-flanges on one sheet and those on the other to give flexibility to the roof as a whole and permit sliding
 35 or telescoping of the sheets upon each other, while at the same time said joint is water-tight, substantially as specified.

3. In a car-roof the combination with the roof-frame, of an outside sheet-metal or iron
 40 roof composed of a series of sheet-metal plates united together at their side edges by water-tight, loose, open joints, composed each of a high upright flange, a downward flange and an inwardly-turned upright flange formed on the meeting edge of one sheet or plate, and a
 45 high upright flange and a downturned flange on the meeting edge of the adjacent sheet, whereby the necessary movement or play between the sheets of the roof is provided for, while the joint is made water-tight, said sheet-metal plates having their meeting ends lapped
 50 one over the other at the ridge of the roof, a ridge-pole and ridge-purlin and connecting-bolts extending through the same and through the lapped meeting ends of the sheet-metal
 55 roof-plates at the ridge, each of said connecting-bolts being furnished at its upper end or head with a tight-fitting, bung-acting cap, and a detachable connection between said
 60 bung-cap and the bolt-head, substantially as specified.

4. In a car-roof, the combination with the roof-frame and inner layer of boards thereon, of a loose, flexible outside sheet-metal or
 65 iron roof resting thereon and composed of a series of metal sheets or plates united together at their side edges by water-tight loose,

high-standing joints composed each of three flanges or folds on the side edge of one sheet engaging two flanges or folds on the side edge
 70 of the adjacent sheet, said sheet-metal plates having their meeting ends lapped one over the other at the ridge of the roof, a ridge-pole and ridge-purlin, and connecting-bolts extending through the same and through the
 75 lapped meeting ends of the sheet-metal roof-plates at the ridge, each of said connecting-bolts being furnished at its upper end or head with a tight-fitting, bung-acting cap, and a detachable connection between said bung-cap
 80 and the bolt-head consisting of angle-slots on the interior of the bung-cap, and a supplemental cap having projections engaging said angle-slots, substantially as specified.

5. In a car-roof, the combination with the
 85 roof-frame and inner layer of boards thereon, of a loose, flexible outside sheet-metal or iron roof resting thereon and composed of a series of metal sheets or plates adapted to be telescoped longitudinally into position upon each
 90 other and united together at their side edges by water-tight, loose, high-standing joints composed each of three flanges or folds on the side edge of one sheet engaging two flanges or folds on the side edge of the adjacent sheet, with
 95 open spaces between the joint-flanges on one sheet and those on the other to give flexibility to the roof as a whole and permit sliding or telescoping of the sheets upon each other, while at the same time said joint is
 100 water-tight, said metal sheets or plates having their meeting ends lapped one over the other at the ridge, substantially as specified.

6. In a car-roof, the combination with the
 105 roof-frame and inner layer of boards thereon, of a loose, flexible outside sheet-metal or iron roof resting thereon and composed of a series of metal sheets or plates united together at their side edges by water-tight, loose, high-standing joints composed each of three flanges
 110 or folds on the side edge of one sheet engaging two flanges or folds on the side edge of the adjacent sheet, said metal sheets or plates having their meeting ends lapped one over the other at the ridge, and bolts extending through
 115 said metal sheets or plates and the ridge-purlin at the lapped portions of said sheets or plates, substantially as specified.

7. In a car-roof, the combination with a
 120 roof-frame and inner layer of boards thereon, of a loose, flexible outside sheet-metal or iron roof resting thereon and composed of a series of metal sheets or plates united together at their side edges by water-tight, loose, high-standing joints composed each of three flanges
 125 or folds on the side edge of one sheet engaging two flanges or folds on the side edge of the adjacent sheet, said metal sheets or plates having their meeting ends lapped one over the other at the ridge, and bolts extending
 130 through said metal sheets or plates and the ridge-purlin at the lapped portions of said sheets or plates, said ridge-pole having saddles notched thereon for supporting running-

boards and running-boards flush with the upper face of said ridge-pole on each side thereof, substantially as specified.

8. The combination with the ridge-purlin
5 of a ridge-pole, and saddles fitting in notches in the ridge-pole, substantially as specified.

9. The combination with the ridge-purlin of a ridge-pole, and saddles fitting in notches
10 in the ridge-pole, and running-boards flush with the upper face of the ridge-pole on each side thereof, substantially as specified.

10. The combination with the ridge-purlin of a ridge-pole, and saddles fitting in notches in the ridge-pole, and bolts extending through

said ridge-pole and ridge-purlin having bung- 15
caps fitting water-tight in the openings in the ridge-pole, substantially as specified.

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