

R. E. FRAME.

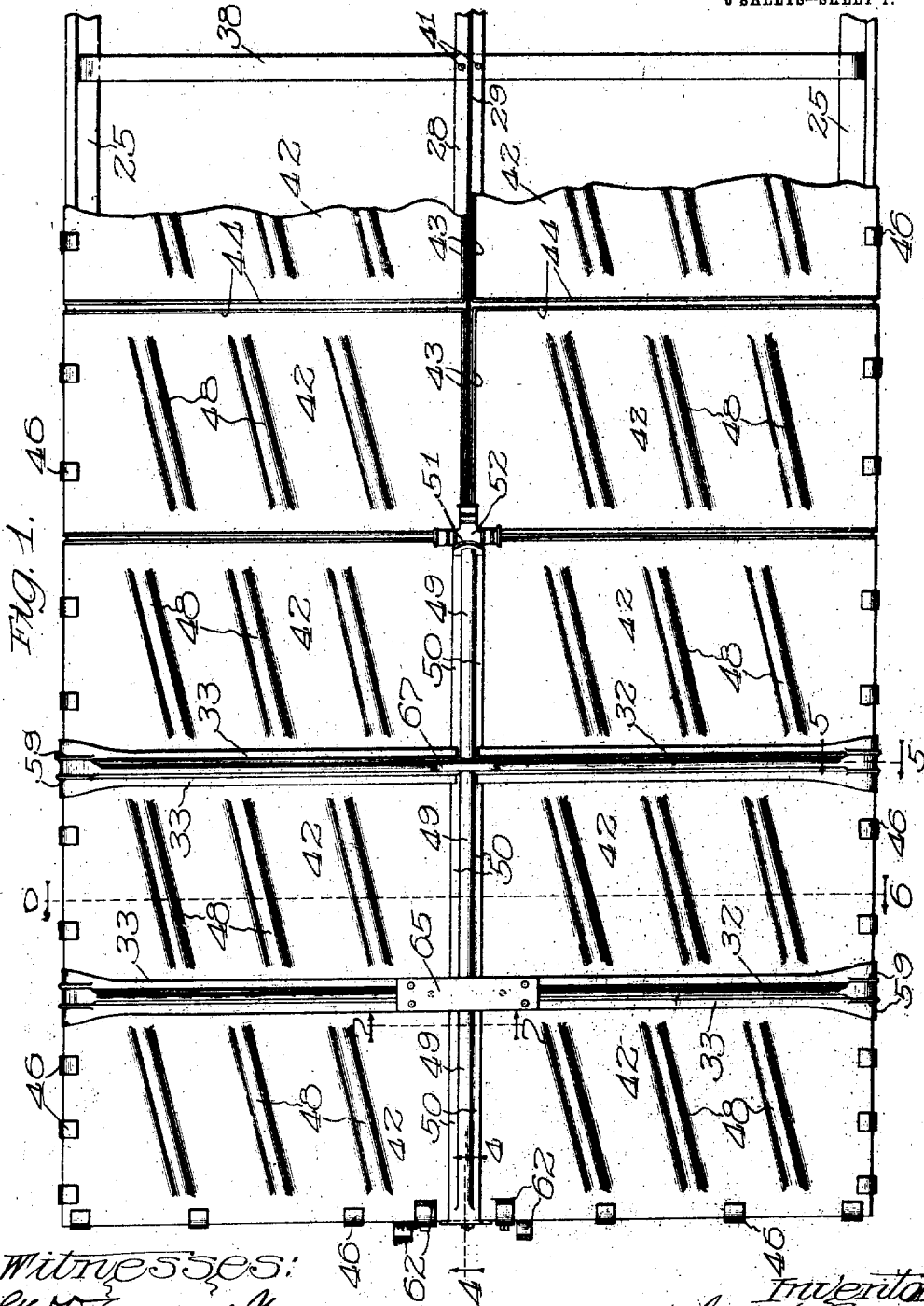
CAR ROOF.

APPLICATION FILED AUG. 7, 1911.

1,037,230.

Patented Sept. 3, 1912.

6 SHEETS—SHEET 1.



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6 SHEETS—SHEET 2.

1,037,230.

FIG. 2.

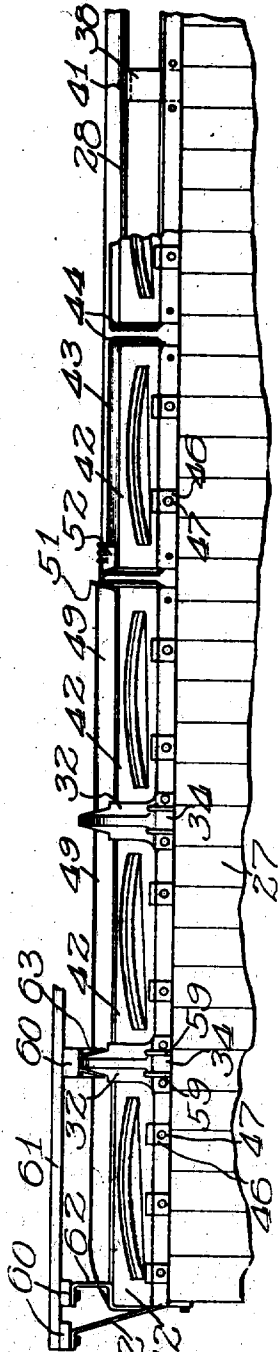


FIG. 3.

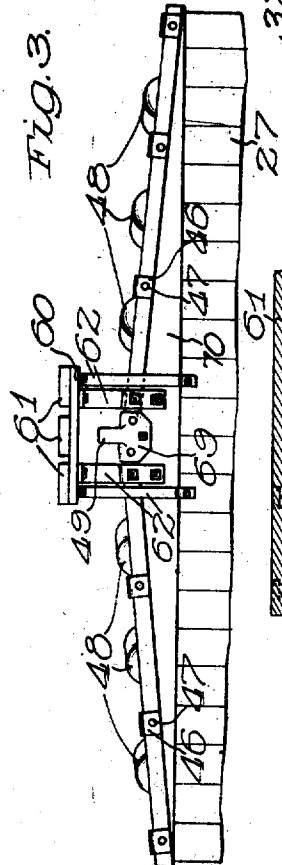


FIG. 5.

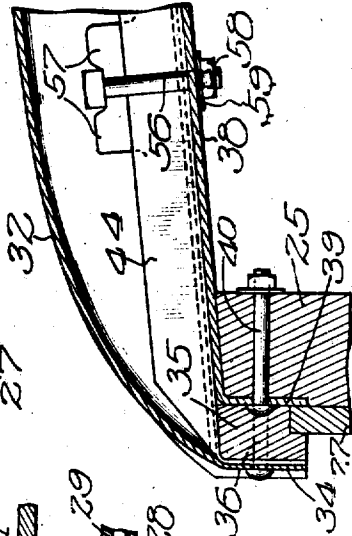
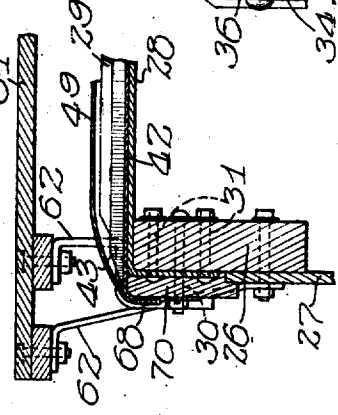


FIG. 4.



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6 SHEETS—SHEET 3.

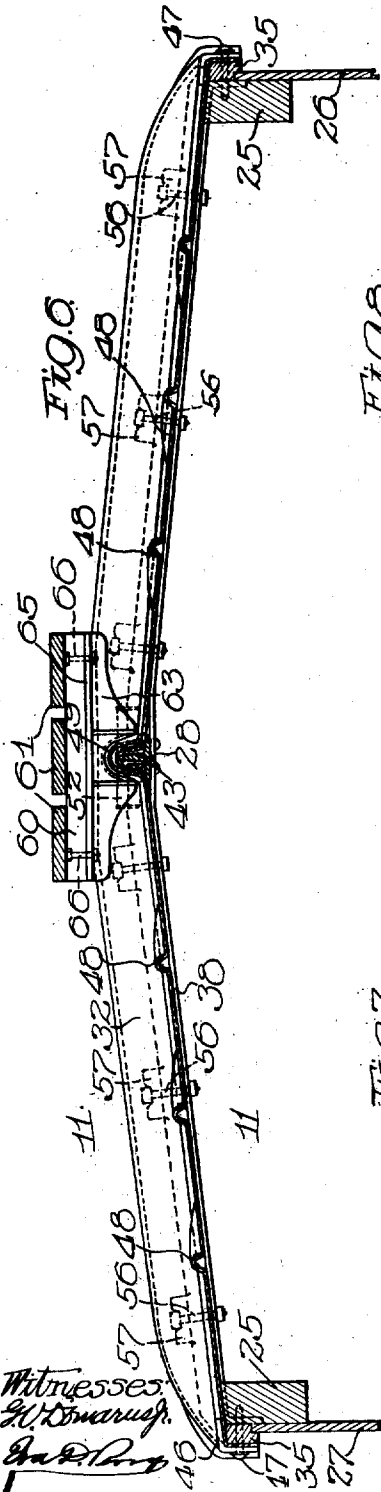
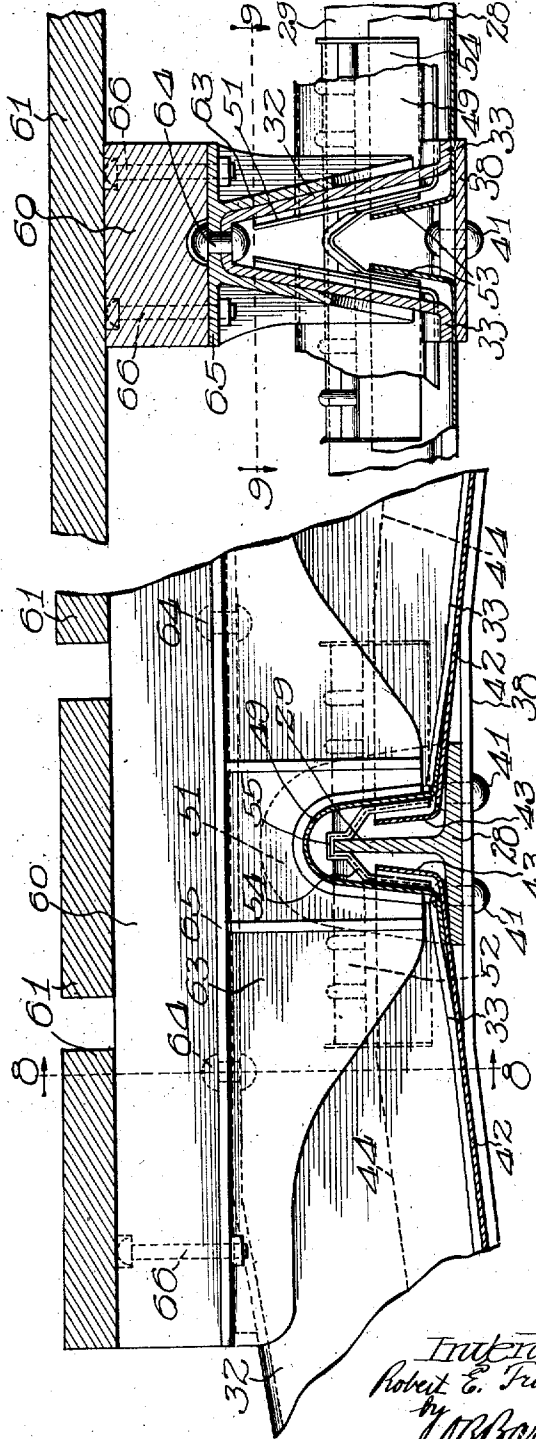


FIG. 6.

FIG. 7.



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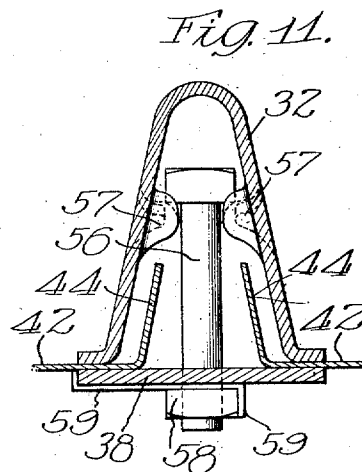
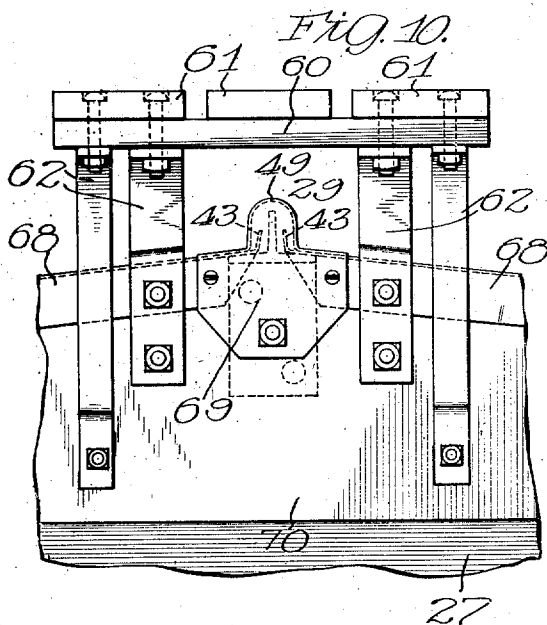
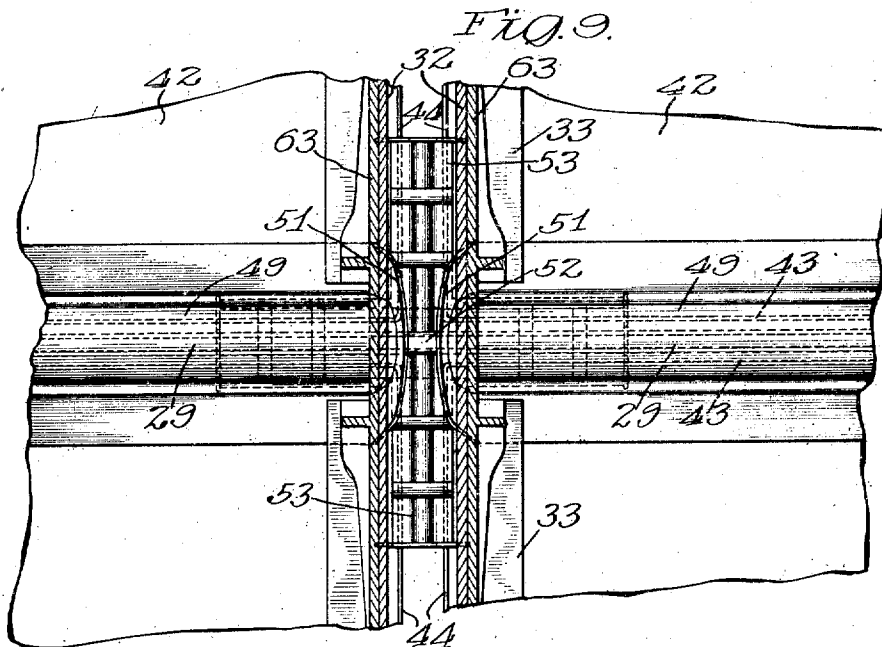
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6 SHEETS—SHEET 4.

1,037,230.



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6 SHEETS—SHEET 5.

Fig. 12.

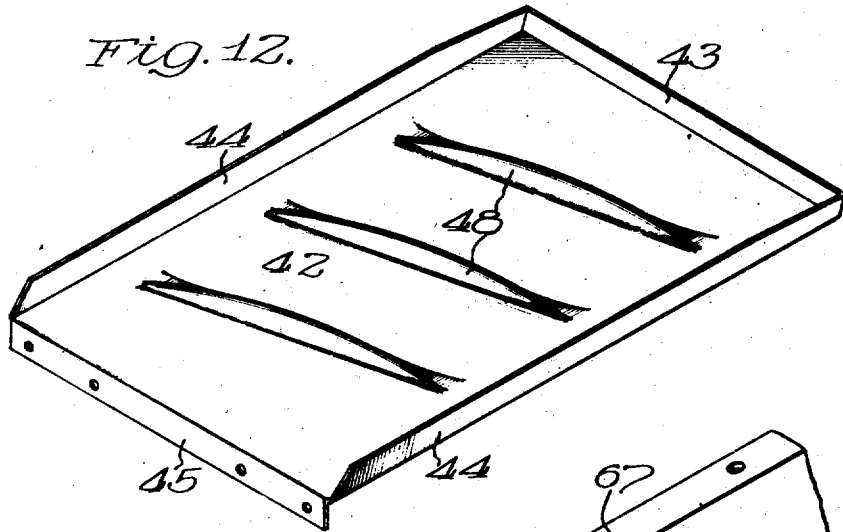


Fig. 13.

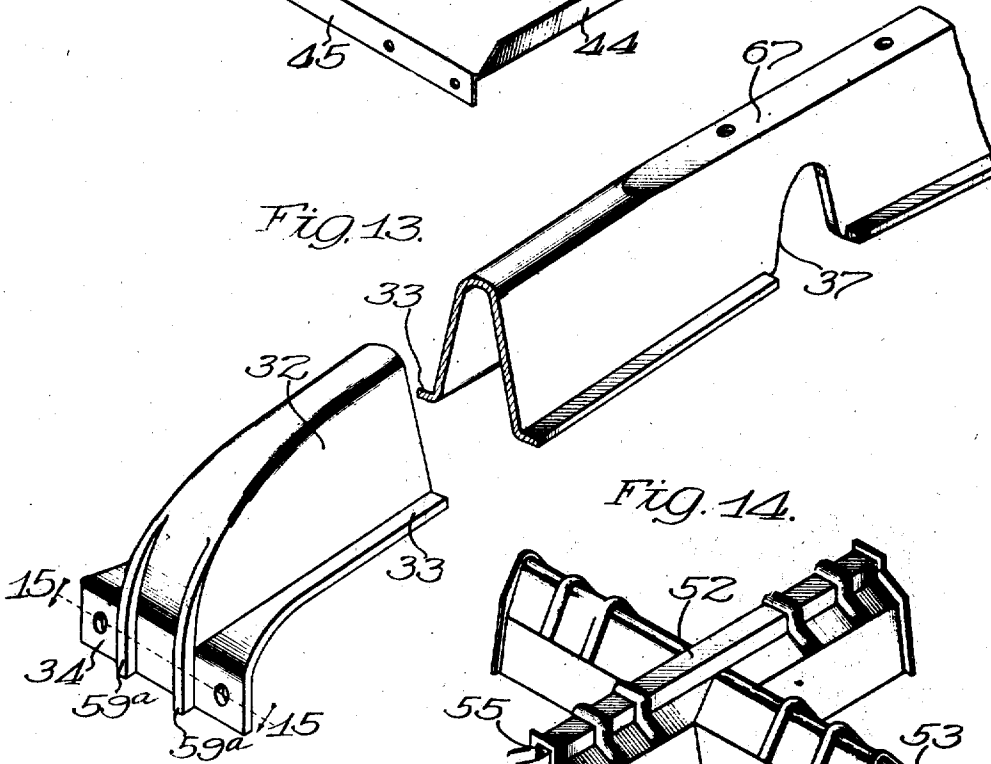


Fig. 14.

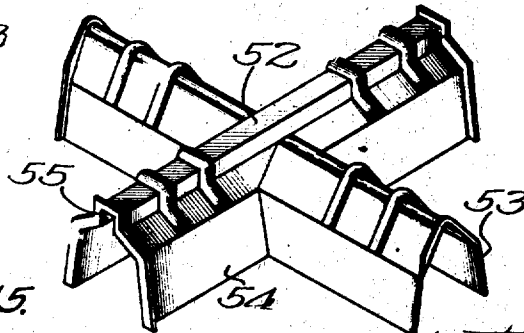
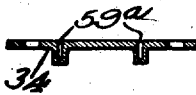


Fig. 15.



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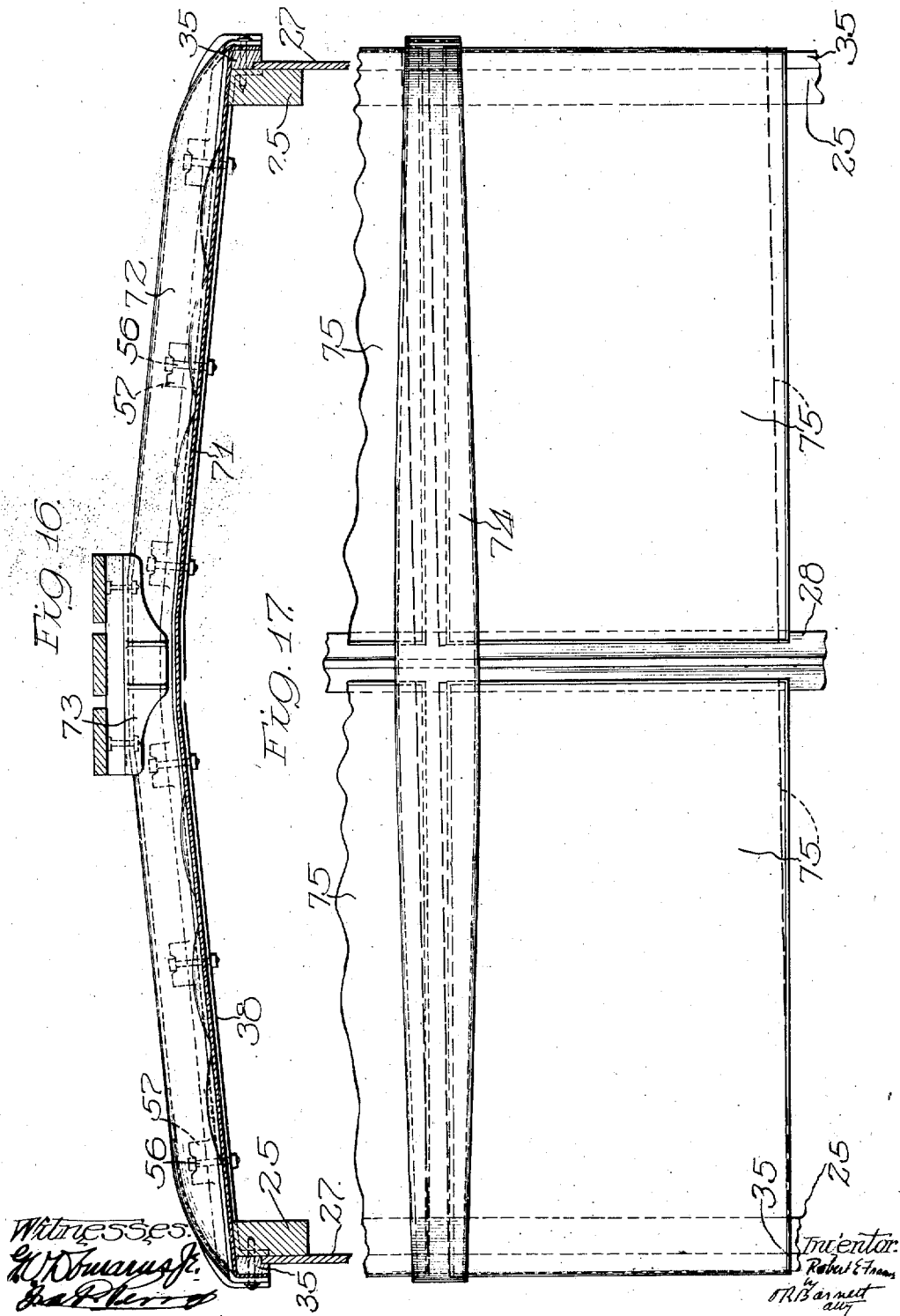
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6 SHEETS—SHEET 8.

1,037,230.



UNITED STATES PATENT OFFICE.

ROBERT E. FRAME, OF CHICAGO, ILLINOIS.

CAR-ROOF

1,037,230.

Specification of Letters Patent.

Patented Sept. 3, 1912.

Application filed August 7, 1911. Serial No. 642,645.

To all whom it may concern:

Be it known that I, ROBERT E. FRAME, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car-Roofs, of which the following is a specification.

My invention relates to a car roof, and has for its object to provide the several novel and improved constructions and arrangements in metal roofs suitable for freight cars which will be hereinafter described and claimed.

One of the special objects of the invention is to provide a metal roof construction for freight cars in which the roof elements or roof sheets are arranged beneath and suspended from the supporting or load carrying members instead of being superposed thereon in the usual manner; or in other words, to provide an arrangement in which the supporting members, the carlines and ridge pole when the latter is employed instead of being within the car, are outside and on the top of the car. This arrangement increases the effective inside height of the car without proportionally increasing the amount of material going into its construction.

A further object is to provide a metal roof structure in which the carlines, by being placed above the roof sheets and by being suitably formed, serve to cap or cover the adjacent edges of the roof sheets, thus eliminating the additional roof sheet caps ordinarily used for this purpose.

A further object of the invention is to provide a roof structure which shall be light, strong and waterproof and which will have a certain flexibility giving it the capacity to absorb the shocks and strains incident to use, and particularly to adapt itself to and resist the strains due to the "weaving" of the car.

Further objects of the invention will appear from the following description of the invention as embodied in the preferred construction shown.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a fragmentary plan view of the roof, certain parts being removed in order to better illustrate the construction

employed. Fig. 2 is a side view. Fig. 3 an end view. Figs. 4, 5, 6 and 7 are sectional views taken on lines 4—4, 5—5, 6—6, 7—7, respectively, of Fig. 1, looking in the direction indicated, in each case, by the arrows. Fig. 8 is a sectional view taken on line 8—8 of Fig. 7, looking in the direction of the arrows. Fig. 9 is a sectional plan taken on line 9—9 of Fig. 8. Fig. 10 is a fragmentary end view illustrating certain features of the ridge pole and running board construction. Fig. 11 is a sectional view taken on line 11—11 of Fig. 6, looking in the direction of the arrows. Fig. 12 is a view, in perspective, of one of the roof sheets. Fig. 13 is a fragmentary view, in perspective, of one of the carlines. Fig. 14 is a view, in perspective, of one of the roof sheet caps. Fig. 15 is a sectional view taken on line 15—15 of Fig. 13. Fig. 16 is a cross sectional view illustrating a modification; and Fig. 17 a fragmentary diagrammatic plan view illustrating another modification.

Like characters of reference indicate like parts in the several figures of the drawings. 25 designates the side frame members of the car, 26 the end frame members, and 27 the sheathing of the car. It will be understood that these parts are shown merely for the purpose of illustrating the application of my roof structure to a car of common form. The invention might be employed upon cars differently constructed.

The supporting or load carrying structure of the roof comprises a ridge pole 28 which is preferably a T-section girder, the vertical flange 29 of which is tapered off at each end and the base flange of which is given an angular bend beyond the places where the vertical flange terminates so as to form a flange 30 at each end of the ridge pole overlapping the end frame member 26 and which may be secured thereto by the bolts 31 (Fig. 4). The supporting structure of the roof also comprises a number of carlines 32 consisting of channeled or inverted U section members formed with the flanges 33 along opposite edges and with the angular end flanges 34 (Fig. 13), which latter flanges overlap spacing strips 35 secured to the side frame members 25 of the car and which are secured thereto by the bolts 36 (Fig. 5). The

carlines are formed with the openings 37 through which extends the ridge pole 28. To secure the roof sheets to the carlines, I preferably provide roof sheet supports, preferably in the form of strips, 38, the angularly bent ends 39 of which are secured to the side frame member 25 by bolts 40 (Fig. 5). The supports are by preference secured to the ridge pole by the rivets 41.

The roofing elements consist of the roof sheets 42 (Fig. 12) and certain capping elements to be hereafter described. The roof sheets are formed of sheet metal and provided with upstanding flanges 43 at the inner edges, upstanding flanges 44 at the sides, and with downturned flanges 45 at their outer edges. The latter flanges overlap the side of the car, for example the spacing strip 35 (Fig. 5), and are secured thereto in any preferred manner as for example by means of the clips 46 and nails 47 (Figs. 1 and 6). Preferably the roof sheets are formed with the corrugations 48 obliquely arranged so as to shed water. This is to give strength to the sheets and to roughen the surface of the roof so as to make it less slippery for the trainmen.

The roof sheets are laid upon the base flange of the T-section ridge pole, and upon the supports 38. The inner edges of the roof sheets are protected by what may be termed the ridge pole cap, preferably made in sections which severally extend from car line to carline covering the ridge pole and overlapping the roof sheets. These ridge pole cap piece sections are designated 49 and are preferably formed on opposite sides with the flanges 50 and at the ends with the semi-circular flanges 51. The flanged ends of the ridge pole cap piece sections extend into the openings 37 in the carlines, the cap piece sections preferably making a close fit with the carlines at these places. The edges of the roof sheets at the sides are covered by the carlines which serve the double purpose of supporting the roof sheets and capping them, thus doing away with the separate devices ordinarily used for making a waterproof joint between the successive roof sheets. The flanged construction of the roof sheets prevents water from entering the car by working in under the carlines and ridge pole caps.

In addition to the above described means for capping the roof sheets I preferably provide the devices 52 (Fig. 14) which may be termed roof sheet corner caps and which, as shown, consist, in each case, of two intersecting channel members 53 and 54, preferably made of sheet metal and formed integrally, the member 54 being made by preference with a narrow channel 55 which fits closely upon the vertical flange of the ridge pole 28. A corner cap of this sort fits over the flanges

at the corners of the four roof sheets which come together at the intersection of each of the carlines with the ridge pole.

The transverse supports 38 on which the sides of the roof plates 42 rest are arranged directly under the carlines and are supported therefrom by means of the bolts 56. In order to avoid perforating the carlines for the bolts 56, seats are formed within the carlines for the heads of such bolts. Preferably the seat, in each case, consists of projections 57, made by indenting the sides of the carline, the projections being so formed as to engage the bolt head and prevent the bolt from turning when its nut 58 is screwed up (Fig. 11). The nut 58 is preferably provided with a nut lock 59 and, if it is deemed advisable, the connection between the carline and the roof sheet support may be left a little loose so that the roof sheets will have some play; this arrangement giving added flexibility to the roof structure desirable when the car "weaves."

The carlines are preferably formed at their overlapping ends with the channels 59^a (Figs. 13 and 15) so that if water should by any chance work in between the carlines and the roof sheet means for its escape may be provided.

The running board, shown as consisting of the usual cross pieces 60 and stringers 61 and supported at the ends on the customary brackets 62, is preferably supported intermediate the ends on saddle castings 63 which seat upon the carlines and straddle the ridge pole cap. The saddle casting, in each case, is secured to the carline by a rivet 64 (Fig. 8) and is formed with the projecting base 65 to which a cross piece 60 may be secured by means of the bolts 66. The portions of the carlines on which the saddle castings rest are flattened as indicated at 67 in Figs. 8 and 13. The carlines are, of course, weakened by the openings 37, but saddle castings reinforce the carlines at these weakened places. It will be understood that the roof sheets at the extreme ends of the car have their side flanges adjacent the ends of the car formed so as to project downwardly instead of upwardly, so that they overlap the end of the car in the manner indicated at 68 (Fig. 10). Similarly the end ridge pole cap sections are bent over at their outer extremities and formed with the flanges 69 which are secured to the ends of the car, for example to the spacing blocks 70.

In Fig. 16 I show a construction which dispenses with the ridge pole. The roof sheets 71 extend across the car from side to side. They are secured to the side of car and suspended from the carlines designated 72 in the same way as shown in the previous figures. As the ridge pole is not used, the ridge pole cap is dispensed with and the

saddle castings 73 for the running board simply straddle the carlines.

In Fig. 17 I have shown a modified form of carline designated 74, the difference being that instead of being formed on straight lines, the width of the carline is gradually increased toward the center. The purpose of this is to allow the inner ends of the roof plates designated 75, to shift, when the car weaves, without the danger of binding. This prevents the breaking or distortion of the parts of the roof. The roof plates 75 are secured at their outer edges to the frame work 25 of the car. The weaving of the car shifts the plates to the position indicated by the dotted lines.

While I have shown my invention as embodied in certain preferred forms, it will be understood that modifications might be employed without departure from the invention. Therefore, I do not limit myself to the particulars described and claimed except so far as the same are made specifically limitations on certain of the claims herein. In carrying out my invention I prefer to use all of the devices and improvements above described and in substantially the arrangement described. Nevertheless it might be possible to obtain some of the advantage of my improvements even if they were not all used conjointly.

By the term "U section" as applied to the carlines I do not intend to limit the claims to the precise cross sectional configuration shown. The term "V section" would perhaps equally well describe the preferred form of carline shown and the invention contemplates making the carlines either more or less tapered from the bottom to the top than is shown, as circumstances may require.

I claim:—

1. A metal roof for cars comprising imperforate, inverted, U-section carlines, a plurality of roof sheets arranged below the carlines with their respectively adjacent edges lying under and capped by said carlines, and means located within and below the carlines, sustained therefrom and extending along under said edges of the roof sheets for binding said edges to the under sides of said carlines.

2. A metal roof for cars comprising imperforate, inverted, U-section carlines formed with outwardly projecting flanges at their lower edges, a plurality of roof sheets arranged below the carlines with their respectively adjacent edges lying under and capped by said carlines, and means located within and below the carlines suspended therefrom and extending along under said edges of the roof sheets for binding said edges to the under sides of the flanges of said carlines.

3. A metal roof for cars comprising imperforate, inverted, U-section carlines, a plurality of roof sheets formed with flanges at their respectively adjacent edges which extend up into the channels of the carlines, and means located within and below the carlines, suspended therefrom and extending along under said edges of the roof sheets for binding said edges to the under sides of said carlines but so as to allow the roof sheets to shift when the car weaves.

4. A metal roof for cars comprising channeled carlines, roof sheets arranged below and between the carlines, roof sheet supports, bolts for suspending the supports from the carlines, and seats for the heads of said bolts formed within the channels of the carlines.

5. A metal roof for cars comprising channeled carlines, roof sheets arranged below and between the carlines, roof sheet supports, and bolts for sustaining the supports from the carlines; the carlines being formed with projections within the channels providing seats for the heads of the bolts.

6. A metal roof for cars comprising inverted U-section carlines formed with flanges along their edges, roof sheets formed with flanges which extend up into the channels of the carlines, roof sheet supports which hold the roof sheets against the flanges of the carlines, bolts securing the supports to the carlines, and seats formed within the channels of the carlines for the heads of the bolts.

7. A metal roof for cars comprising carlines, consisting of inverted U-section members, roof sheets secured to the under side of the carlines, the lower edges of the carlines being formed at the middle with recesses, a ridge pole extending through said recesses, and a ridge pole cap fitted into said recesses.

8. A metal roof for cars comprising carlines, consisting of inverted U-section members, roof sheets secured to the under side of the carlines, the lower edges of the carlines being formed at the middle with recesses, a ridge pole extending through said recesses, and ridge pole cap sections having flanged ends which are fitted into the recesses in the carlines.

9. A metal roof for cars comprising a ridge pole, a ridge pole cap, inverted U-section carlines, roof sheets suspended from the carline and formed on their edges with flanges which extend up within the channels of the carlines and the ridge pole cap, and transverse strips under the edges of adjacent roof sheets secured to opposite sides of the car and supported from the carlines.

10. A metal roof for cars comprising a ridge pole, a ridge pole cap, channeled carlines, roof sheets formed with flanges which extend up within the carlines and ridge

pole cap, and corner caps extending over the ridge pole and the flanges at the corners of the roof sheets.

11. A metal roof for cars comprising carlines extending from one side of the car to the other, a ridge pole extending from end to end of the car through the carlines, roof sheets sustained from and arranged with their transverse edges under said carlines so as to be capped thereby, and ridge pole cap sections between the carlines and covering the inner edges of said roof sheets.

12. A metal roof for cars comprising a T-section ridge pole, channeled carlines, roof sheet supports, ridge pole cap sections formed with flanged ends which fit into the carlines, roof sheets supported on the base flange of the ridge pole and upon said supports and formed with flanges extending up into the carlines and ridge pole cap sections, means for securing said supports to the carlines, and corner caps which overlap the flanges on the roof sheets which come together at the intersections of the ridge pole with the carlines.

13. A metal roof for cars comprising a T-section ridge pole, channeled carlines, roof sheet supports, ridge pole cap sections formed with flanged ends which fit into the carlines, roof sheets supported on the base flanges of the ridge pole and upon said supports and formed with flanges extending up into the carlines and ridge pole cap sections, means for securing said supports to the carlines, corner caps which overlap the flanges on the roof sheets which come together at the intersections of the ridge pole with the carlines, and running board saddle castings which straddle the carlines and ridge pole cap sections.

14. A metal roof for cars comprising a ridge pole, channeled carlines, roof sheet supports, ridge pole cap sections formed with flanged ends which fit into the carlines, roof sheets supported on the base flange of the ridge pole and upon said supports and formed with flanges extending up into the carlines and ridge pole cap sections, means for securing said supports to the carlines, and corner caps which overlap the flanges on the roof sheets which come together at the intersections of the ridge pole with the carlines.

15. A carline for a metal car roof consisting of an inverted U-section member formed with flanges along its opposite edges, and with recesses in said edges at the middle through which the ridge pole may pass.

16. A carline for a metal car roof consisting of an inverted U section member formed with flanges along its opposite edges, and with recesses in said edges at the middle through which the ridge pole may pass, and with flanges at its ends adapted to be secured to the sides of the car.

17. A carline for a metal car roof consisting of a channeled member formed with indentations providing interiorly a seat for a bolt head.

18. A metal roof for cars comprising a ridge pole, channeled carlines, roof sheet supports, ridge pole cap sections formed with flanged ends which fit into the carlines, roof sheets supported on the base flanges of the ridge pole and upon said supports and formed with flanges extending up into the carlines and ridge pole cap sections, means for securing said supports to the carlines, corner caps which overlap the flanges on the roof sheets which come together at the intersections of the ridge pole with the carlines, and running board saddle castings which straddle the carlines and ridge pole cap sections.

19. A metal roof for cars comprising inverted U section carlines extending from one side of the car to the other, a ridge pole extending from end to end of the car through the carlines, roof sheets sustained from the carlines with their transverse edges lying under so as to be capped by the carlines, ridge pole cap sections between the carlines and covering the inner edges of the roof sheets, and corner caps in the form of crosses which lie under the carlines and ridge pole cap sections.

20. A metal roof for cars comprising inverted U section carlines extending from one side of the car to the other, a T section ridge pole extending from end to end of the car through the carlines, roof sheets sustained from the carlines with their transverse edges lying under so as to be capped by the carlines and their inner edges supported on the ridge pole, ridge pole cap sections between the carlines and covering the inner edges of the roof sheets, and corner caps in the form of crosses which are formed with grooves to fit the upright flange of the ridge pole and lie under the carlines and ridge pole cap sections.

21. A metal roof for cars comprising carlines having openings at the middle, a ridge pole extending through said openings, a ridge pole cap fitted into the openings in the carlines, and roof sheets secured to and held in place under said carlines.

22. A metal roof for cars comprising inverted U section carlines having openings at the middle, a ridge pole extending through said openings, a ridge pole cap fitted into the openings and formed within the carlines with upstanding flanges, and roof sheets secured to and held in place under said carlines.

23. A metal roof for cars comprising carlines, a ridge pole, roof sheets with their transverse edges arranged under the carlines, and supporting strips for the roof sheets secured at opposite ends to the sides

of the car and supported midway from said carlines.

24. A metal car roof comprising two sets of rectangular roof sheets secured to opposite sides of a car and formed with up-
standing flanges on their transverse edges, and inverted U-section carlines which overlap the transverse edges of the roof sheets,

said carlines being widened toward the middle of the car so as to allow play to inner ends of the roof sheets when the car weaves.

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Witnesses:

P. H. TRUMAN,

L. A. FALKENBERG.

Correction in Letters Patent No. 1,037,230.

It is hereby certified that in Letters Patent No. 1,037,230, granted September 3, 1912, upon the application of Robert E. Frame, of Chicago, Illinois, for an improvement in "Car-Roofs," an error appears in the printed specification requiring correction as follows: Page 3, line 119, for the word "carline" read *carlines*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of October, A. D., 1912.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

of the car and supported midway from said carlines.

24. A metal car roof comprising two sets of rectangular roof sheets secured to opposite sides of a car and formed with up-
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