D. M. KNOX.

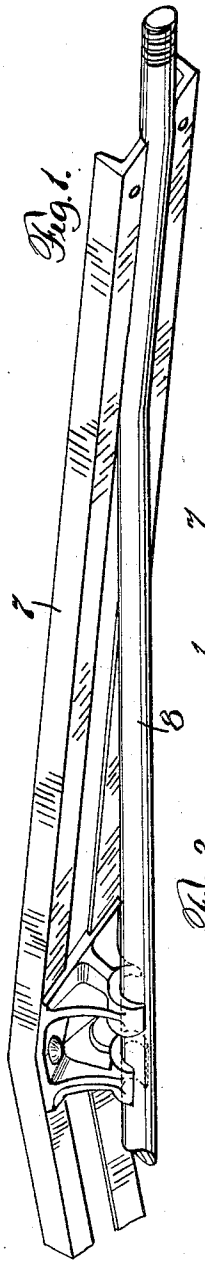
ROOF CARLINE.

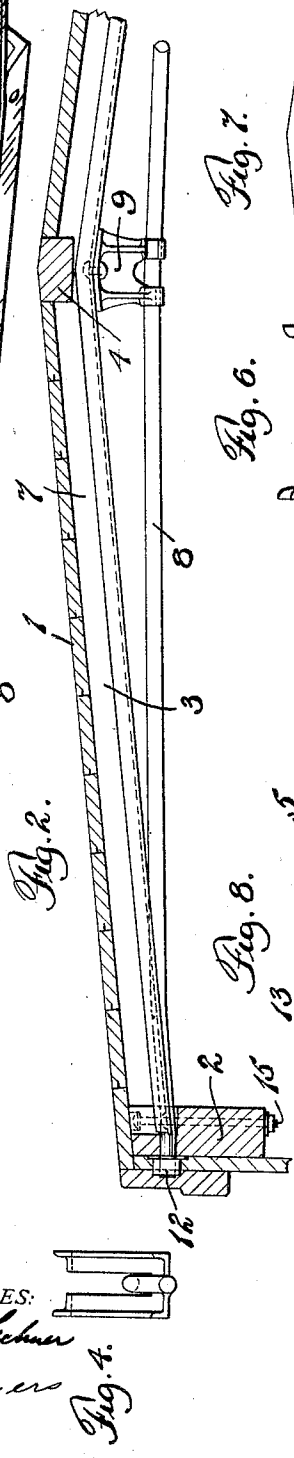
APPLICATION FILED DEC. 12, 1911.

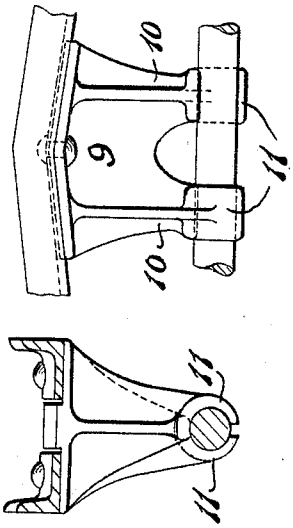
1,044,539.

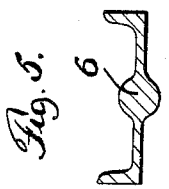
Patented Nov. 19, 1912.

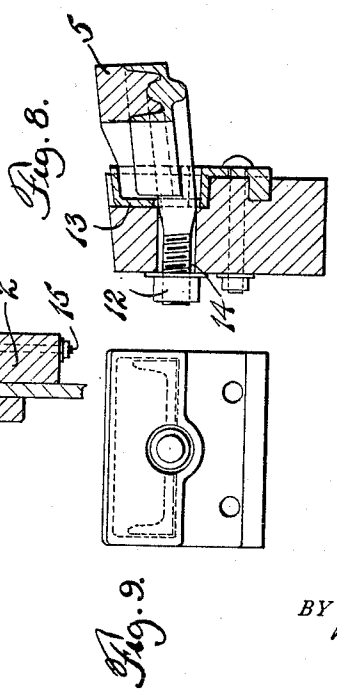
6 SHEETS—SHEET 1.

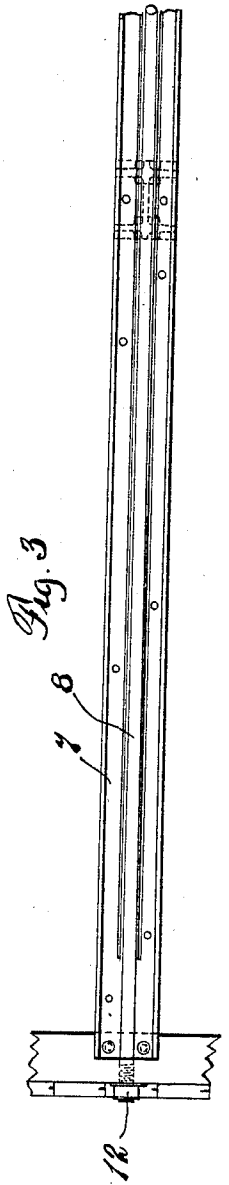












WITNESSES:

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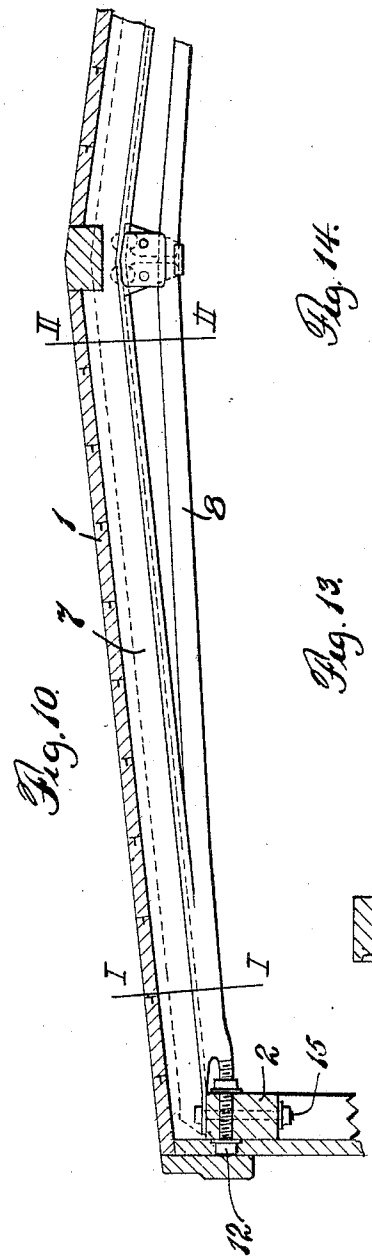

Fig. 10.

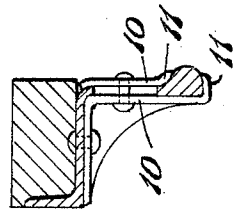

Fig. 14.

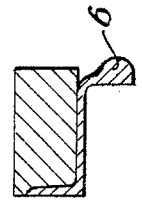

Fig. 13.

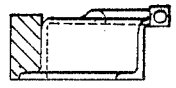

Fig. 12.

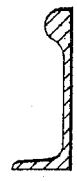

Fig. 15.

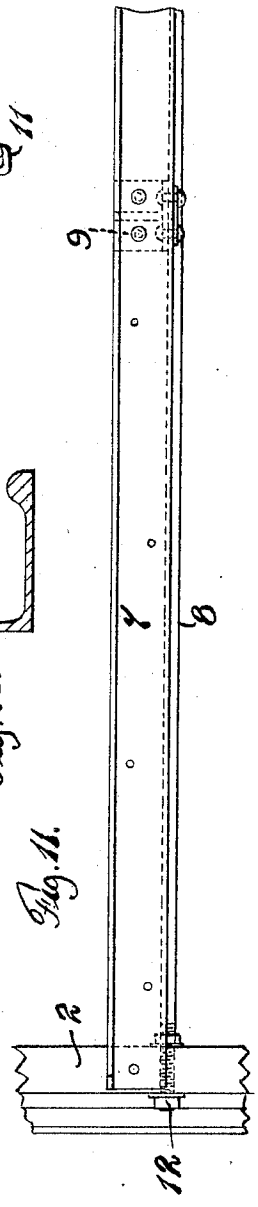

Fig. 11.

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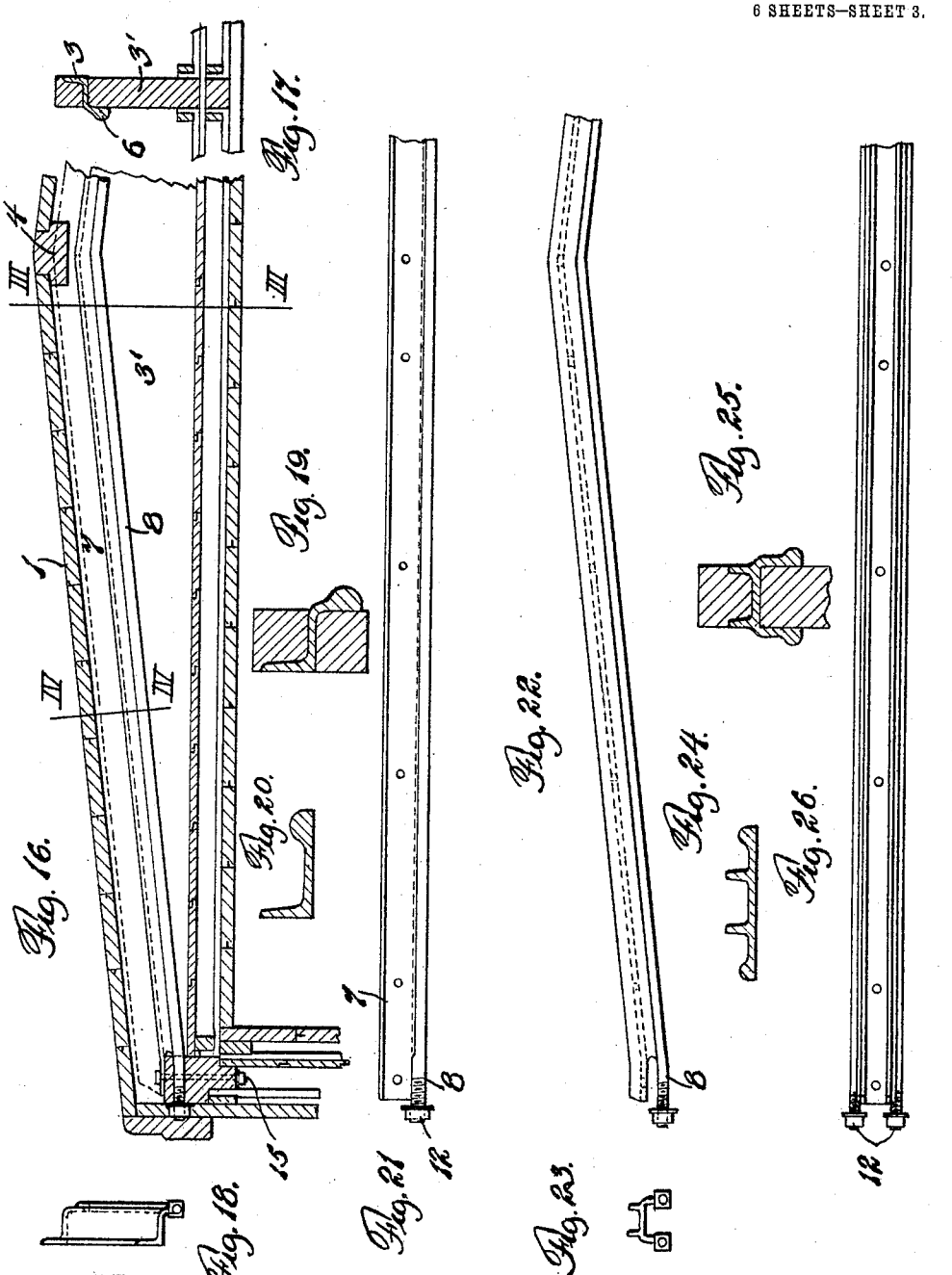
6 SHEETS—SHEET 3.



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6 SHEETS—SHEET 4.

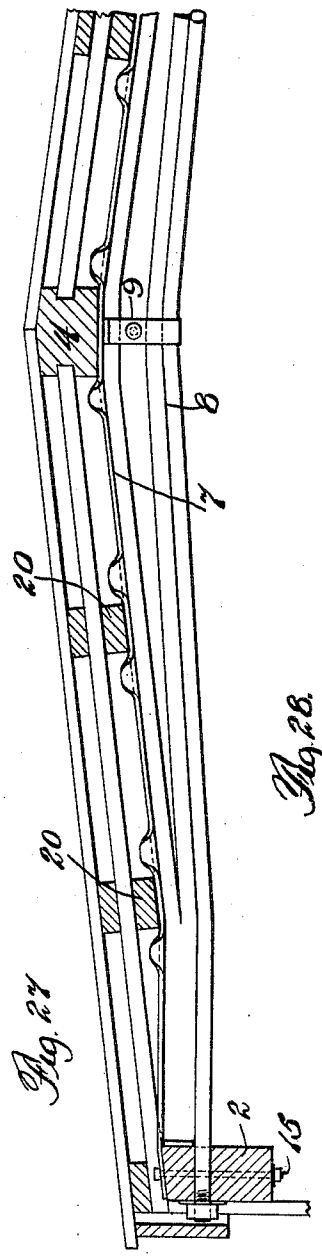

Fig. 27.

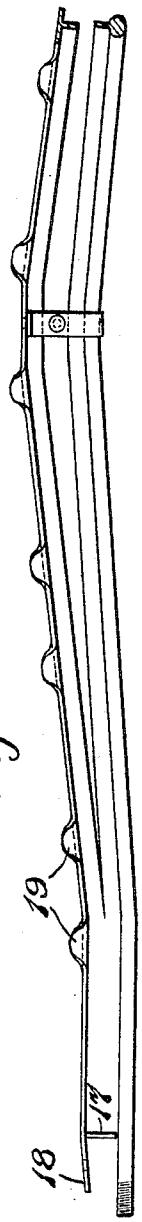

Fig. 28.

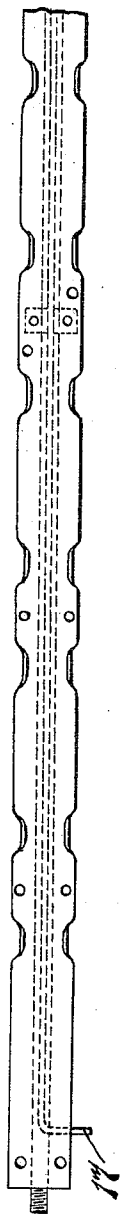

Fig. 29.

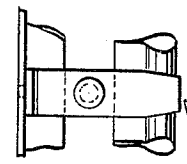

Fig. 34.

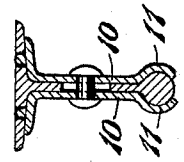

Fig. 33.

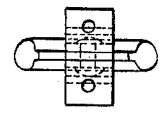

Fig. 32.

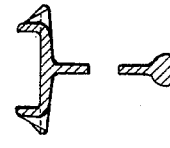

Fig. 31.

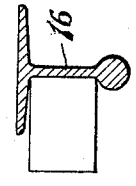

Fig. 30.

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6 SHEETS—SHEET 5.

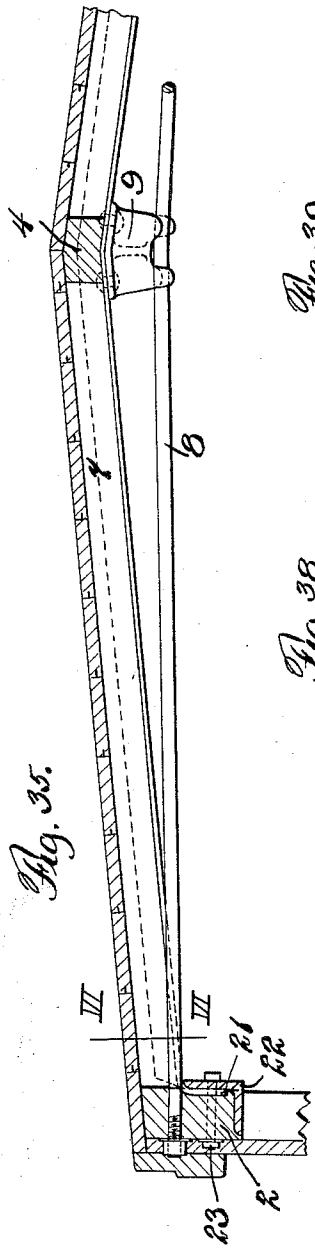

Fig. 35.

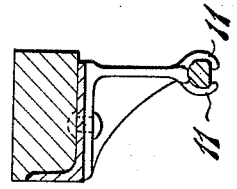

Fig. 39.

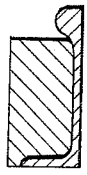

Fig. 38.

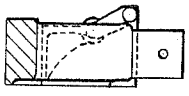

Fig. 37.

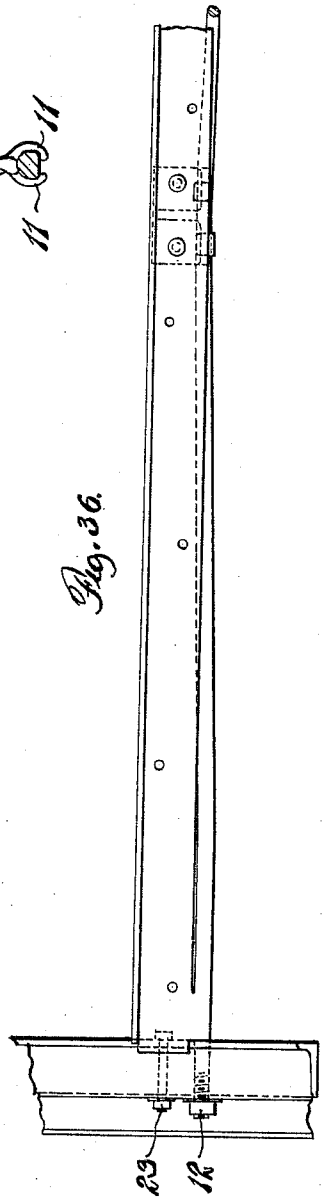

Fig. 36.

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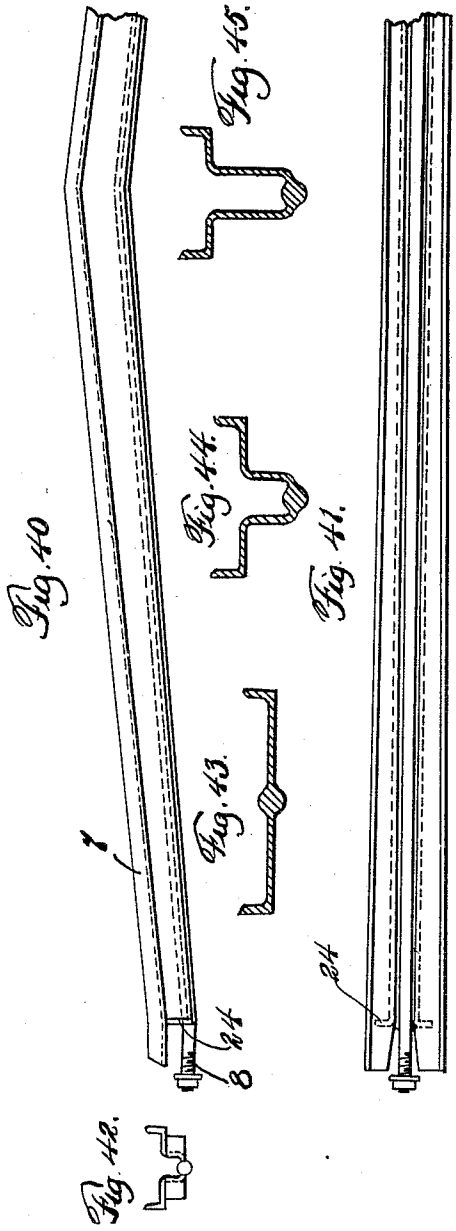
APPLICATION FILED DEC. 12, 1911.

1,044,539.

Patented Nov. 19, 1912.

6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

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ROOF-CARLINE.

1,044,539. Specification of Letters Patent. Patented Nov. 19, 1912.

Application filed December 12, 1911. Serial No. 665,286.

To all whom it may concern:

Be it known that I, DAVID M. KNOX, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Roof-Carlines, of which the following is a specification.

My invention relates in general to metal roof carlines, and particularly to metal carlines made from rolled sections. The invention is adapted for use in the construction of railway car roofs and I have illustrated it in this application. Among its chief objects are; the provision of an improved rolled section carline wherein the metal is so arranged and disposed as to give maximum strength per unit of weight; the provision of an integral carline divided into a compression member and tension member of improved construction; the provision of improved means for securing the carlines at the side plates or frames of the car; the provision in a divided carline of the character just described of an improved strut construction between the compression and the tension members; and in general, the provision of an improved arrangement of carline having a minimum weight and number of parts, and a maximum strength. These together with such other advantages as may hereinafter appear or are incidental to my invention, I attain by means of a construction illustrated in preferred form in the accompanying drawings, wherein various embodiments of my invention are illustrated. Of the drawings,

Figure 1 is a perspective view of a portion of a complete carline ready for application; Fig. 2 is a sectional view of a railway car roof showing the carline of Fig. 1 in position; Fig. 3 is a plan view of Fig. 1; Fig. 4 is an end view of the carline; Fig. 5 is a section through a bulb channel from which the channel is made; Fig. 6 is a section through the carline drawn to an enlarged scale, showing the center strut of the carline in end elevation; Fig. 7 is a side elevation of Fig. 6; Fig. 8 is a section through the means for mounting and securing the carline in the side plates of the car; Fig. 9 is a front view of said means; Figs. 10 to 15 inclusive illustrate a carline made from a bulb Z section. Fig. 10 is a half cross section of an ordinary house car roof showing this type of carline in position, Fig. 11 is a plan view of Fig. 10, Fig. 12 is an end view of the carline of Fig. 10, Fig. 13 is a section through the carline on the line I—I of Fig. 10, Fig. 14 is a section through the carline on the line II—II of Fig. 10, and Fig. 15 is a section through a Z bulb angle from which this carline is made. Figures 16 to 21 inclusive illustrate another embodiment of my invention; Fig. 16 is a half section through a refrigerator car roof showing the carline in position, Fig. 17 is a section through the carline on the line III—III of Fig. 16, Fig. 18 is an end view of the carline, Fig. 19 is a section on the line IV—IV of Fig. 16, Fig. 20 is a section through a Z bulb angle from which this form of carline is made, and Fig. 21 is a plan view of the carline. Figs. 22 to 26 inclusive illustrate a modification of the carline of Fig. 16; Fig. 22 is a side elevation of the carline, Fig. 23 is an end view of Fig. 22, Fig. 24 is a section through a double T bulb section from which the carline is made, Fig. 25 is a section through the carline, and Fig. 26 is a plan view thereof. Figs. 27 to 34 inclusive illustrate a carline made from a bulb T section applied to an ordinary house car roof of the inside metal roof type; Fig. 27 is a half section through the roof with the carline in position, Figs. 28 and 29 are respectively a side elevation and plan view of the carline, Figs. 30 and 31 are sections through the carline taken at different points, and Figs. 32, 33 and 34 are details of the center strut employed in this form of carline. Figs. 35 to 39 inclusive illustrate a carline made from a bulb angle and applied to an ordinary house car of the outside metal type; Fig. 35 is a section showing the carline in position, Fig. 36 is a plan view of the carline of Fig. 35, Fig. 37 is an end view of the carline, Fig. 38 is a section on the line VI—VI of Fig. 35, and Fig. 39 is a section showing the center strut. In Figs. 40 to 45 inclusive I have shown a carline made from a bulb channel by a pressing process and adapted for outside metal car construction; Figs. 40 and 41 are respectively a side elevation and plan view of the carline; Fig.

42 is an end view of Fig. 40, Fig. 43 is a section through the bulb channel stock from which the carline is made, and Figs. 44 and 45 are sections taken at different parts of the carline.

Referring now more particularly to Figs. 1 to 9 which illustrate a preferred construction of carline, it will be seen that the roof 1 is of usual construction for house cars with outside metal roofs. The side plate 2 forms the top member of the side frame of the car, and the carlines 3, which are several in number, are sprung from and supported by the side plates or frames, and in turn support the roof 1. A ridge pole 4 of usual construction forms the longitudinal frame member of the roof and the carlines carry wooden filler blocks or carlines 5 to which the roof boards are nailed. The carline is made from a channel provided with a longitudinally extending bulb 6 (see Fig. 5), which is split or sheared a portion of its length on either side of the center of the carline from body of the carline *per se*. The two sections thus formed are sprung apart, the top or compression member 7 being given the form of the roof, and the bottom or tension member 8 remaining substantially straight, see particularly Fig. 2. The compression member and the tension member are held apart by means of the center strut 9, which is provided with two arms or brackets 10—10 having oppositely disposed half-loops 11—11 which engage and partially embrace the tension member on opposite sides. When placed in position, the strut is rigidly secured to the compression member, preferably by rivets, so that the two members of the carline are held against relative movement with respect to each other. The ends of the bulb portion which constitutes the tension member of the carline, project beyond the compression portion of the carline and are screw-threaded to receive the nuts 12. The side plates are recessed to receive the cast metal brackets 13 which serve as a housing or mounting for the carlines and take the end thrust of the compression member due to roof load and the like. The ends of the tension members project through the recesses 14 in the side plates and the nuts 12 serve to fasten the carlines in place. It will be obvious that by this construction I have provided a carline arrangement comprised of but few parts and one having a maximum strength with a minimum amount of weight. The side walls of the cars are prevented from bulging or collapsing due to such causes as excessive roof load, wrecks and the like.

The carline illustrated in Figs. 10 to 15 inclusive, is substantially of the same construction and performs the same functions as the carline just described. In this case, however, the bulb portion 6 is sheared or split from the body of the carline both at the center and at the ends, the ends of the tension member being undercut so that the compression member 7 may have a bearing on the side plates 2. The bolts 15 serve as additional means for securing the carline to the side plates.

Another modification of my invention is shown in Figs. 16 to 21, the tension member 8 in this type being sheared or undercut only at its end portions. This form of carline is particularly adapted for use on refrigerator cars, as is the type illustrated in Figs. 22 to 26, which latter differs only in the sections from which it is made. This carline is used in connection with a wooden carline 3′.

In Figs. 27 to 34 inclusive is illustrated a carline for house cars, which is composed of a bulb beam 16, which is sheared in its web portion to form a tension member as previously described. The ends of the tension member project through the side plates, and the web at the ends of the carline is sheared a short distance and bent at right angles, as at 17, leaving the base of the section projecting in the form of a lip 18 which is adapted to rest on the top of the side plate 2, the portion 17 abutting the side thereof. The edges of the base portion of the section are bent up at intervals to form lugs 19 adapted to position the purlins 20.

The carline of Figs. 35 and 36 is of the same general construction as those heretofore described, save that the end portions of the base of the section of which it is made, are bent down in the form of lips 21 which abut the sides of the side plates 2 and are secured thereto by means of angles 22 bolted to the side plates by bolts 23.

In Figures 40 to 45 still another modification of my invention is illustrated. This form is made from a bulb channel section pressed in the shape of a trough deeper in the middle than at the ends. The bulb portion projects beyond the ends of the body of the carline and constitutes the tension member thereof. The ends of the web portion are also bent to form abutments 24 adapted to bear against the side plates 2.

It will be noted that the various types of center struts shown have the same general characteristics, and that all of the types of carlines shown and described have the common advantages of lightness, strength and simplicity. The construction also gives a maximum clear height inside the car. In the carline of Figure 1, the cast metal brackets 13 may be omitted and the end of the carline secured by bolts 15, as indicated in Figure 2.

Other advantages incident to my invention will be readily apparent to those skilled in the art.

Having thus described my invention and

illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:—

1. In a car structure, an integral metal roof carline comprising a commercial rolled member having a vertical section and a horizontal section, a portion of which latter section intermediate the ends of the carline is split from the rest of the member to form the carline into a compression member and a tension member, the ends of the horizontal section projecting beyond the body of the member.

2. In a roof structure, the combination with a metal roof carline comprising an integral body portion provided with a longitudinally extending bulb, a portion of which is split from the body portion to form a tension member, of a strut between the body portion and the tension member provided with a pair of arms, one end of each of which partially surrounds the tension member on opposite sides.

3. In a roof structure, the combination of a roof carline comprising a compression member and a tension member, and a strut between the two members, the said strut being provided with a pair of arms, one end of each of which partially surrounds the tension member on opposite sides, the said compression and tension members being in one integral piece.

4. In car structure, an integral metal roof carline comprising a rolled section provided with a longitudinally extending bulb portion in the web thereof a portion of which intermediate the ends of the carline is split from the web to form the carline into a compression member and a tension member, the ends of the bulb portion projecting beyond the body of the section.

5. In car structure, an integral metal roof carline comprising a rolled section provided with a longitudinally extending bulb portion in the web thereof a portion of which intermediate the ends of the carline is split from the web to form the carline into a compression member and a tension member, the ends of the bulb portion projecting beyond the body of the section and being provided with fastening means.

6. In car structure, an integral metal roof carline comprising a rolled section provided with a longitudinally extending bulb portion in the web thereof a portion of which intermediate the ends of the carline is split from the web to form the carline into a compression member and a tension member, the ends of the bulb portion extending beyond the body of the section and being provided with threads to receive fastening nuts, the said ends being adapted to project through the side framing of the car.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

DAVID M. KNOX.

Witnesses:
DAVID M. LIGHT,
WM. J. HEARD.