Aug. 30, 1938. E. R. SWANSON 2,128,624

CAR ROOF

Filed Nov. 4, 1935 6 Sheets-Sheet 1

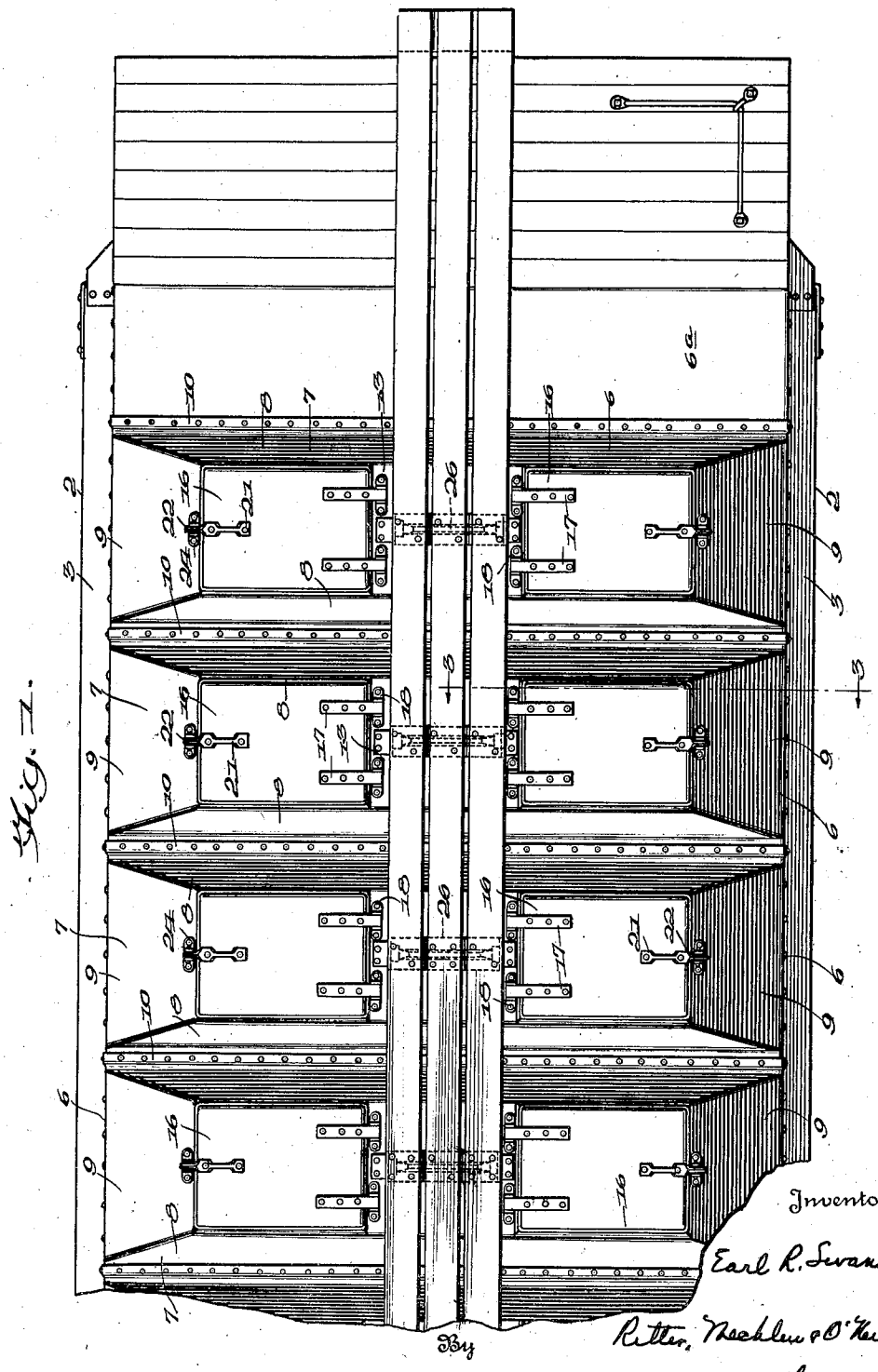


Fig. 1.

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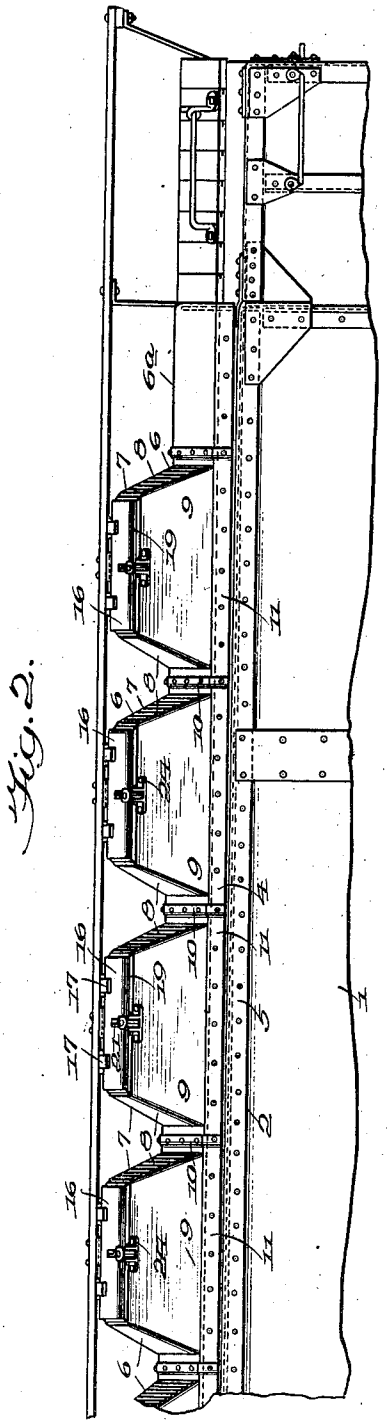


Fig. 2.

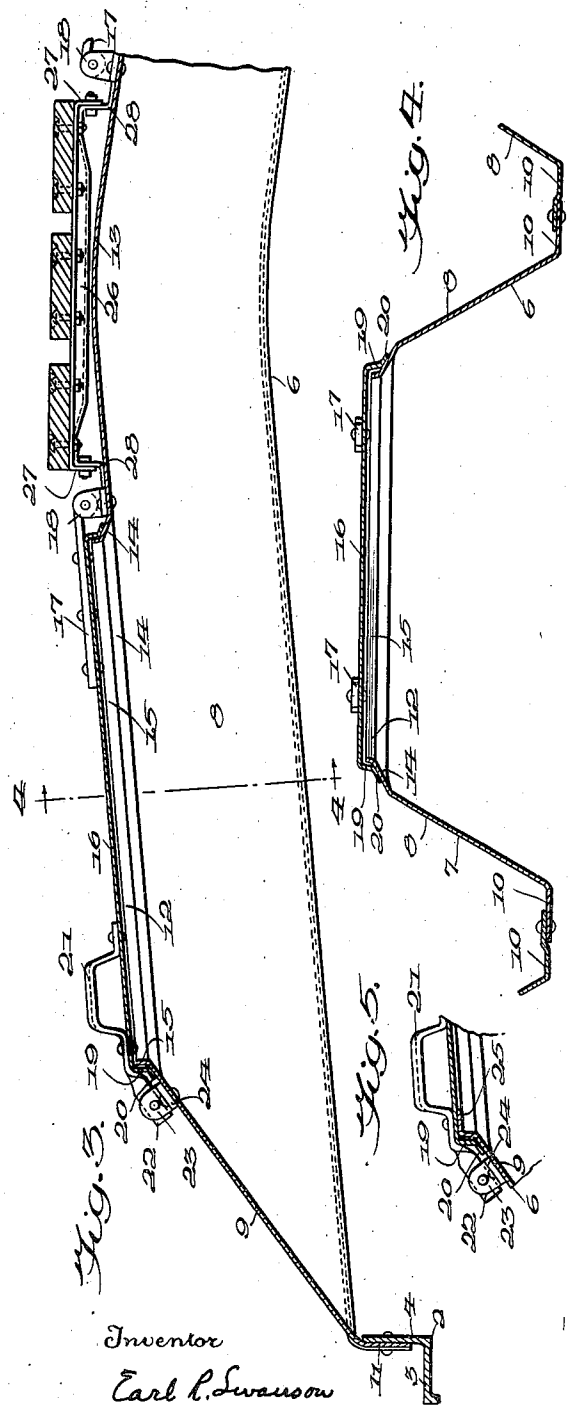


Fig. 3.

Fig. 4.

Fig. 5.

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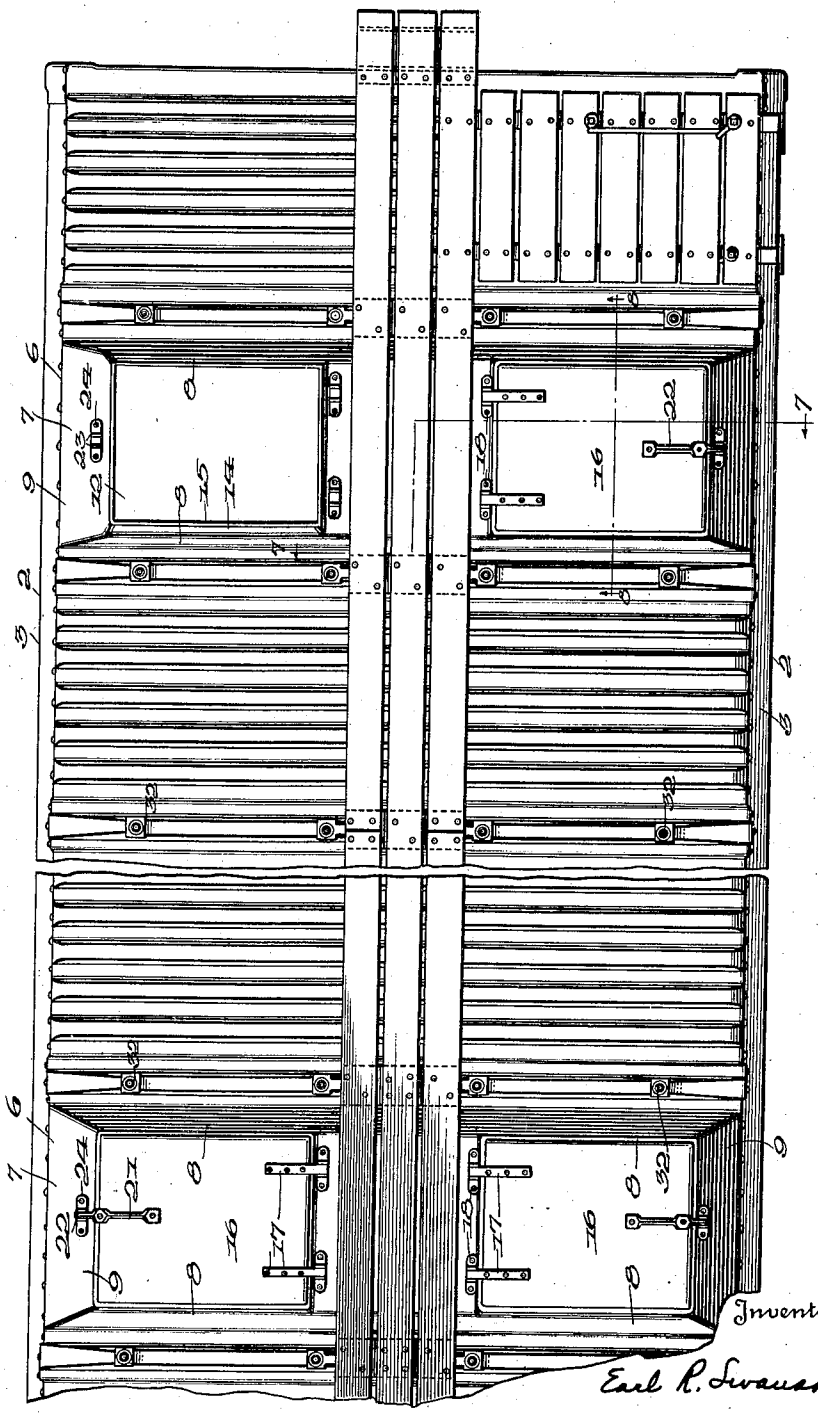


Fig. 6.

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Fig. 7

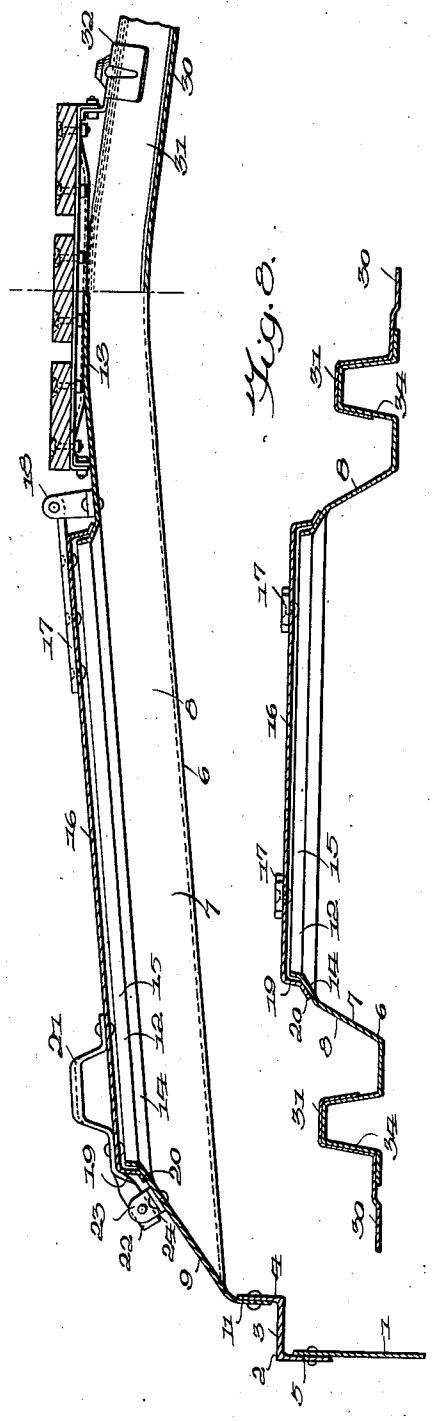


Fig. 8.

Fig. 11.

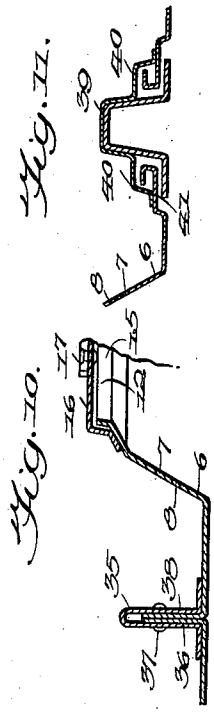


Fig. 10.

Fig. 12.

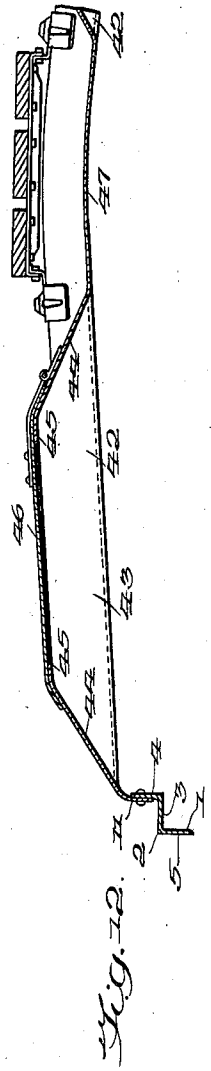
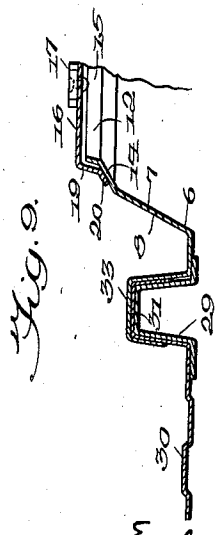


Fig. 9.



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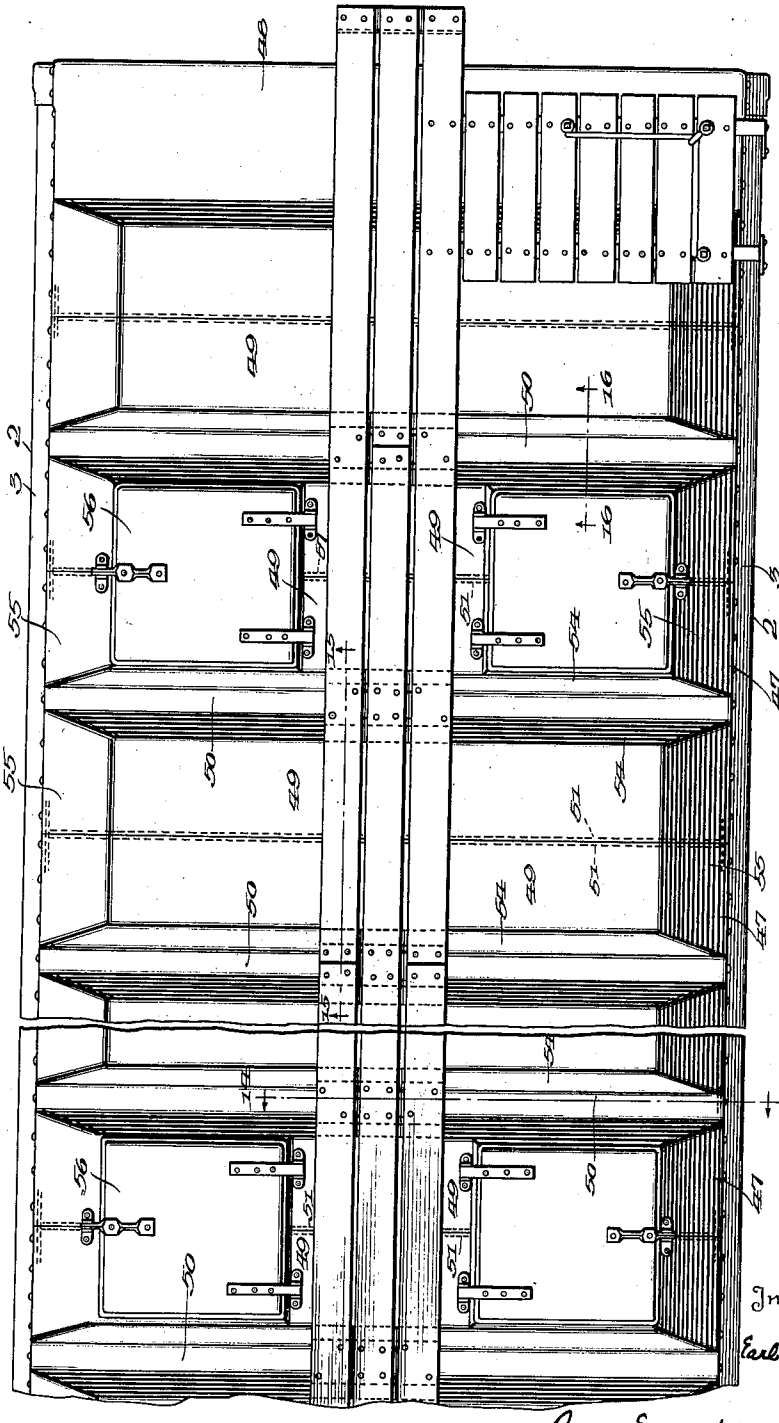
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Fig. 13.



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CAR ROOF

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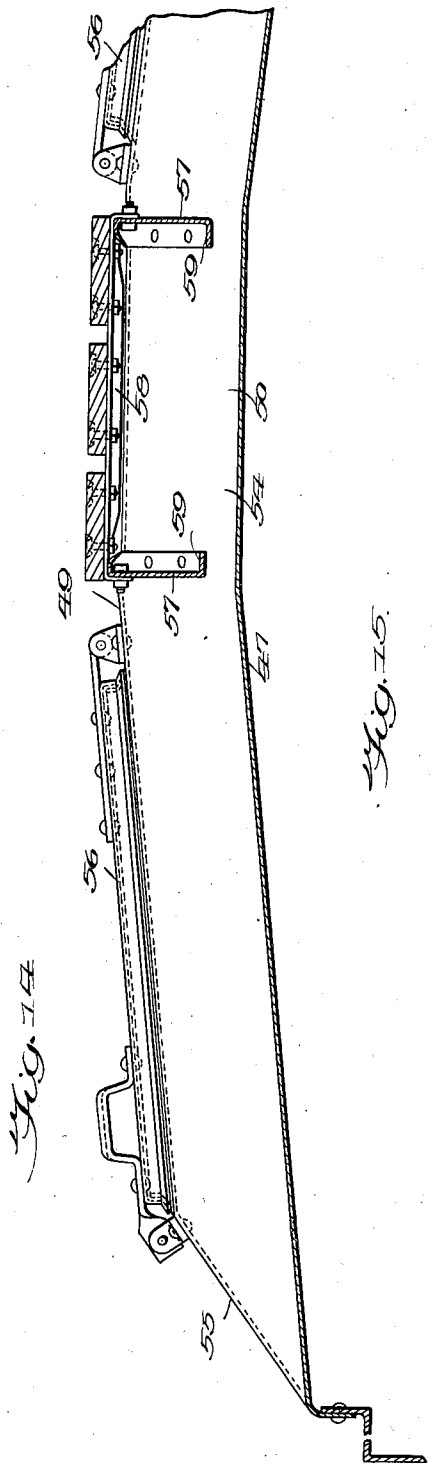


Fig. 14.

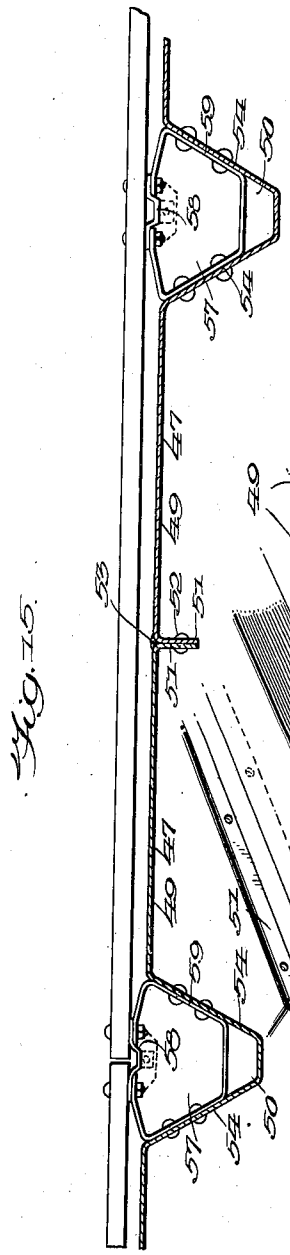


Fig. 15.

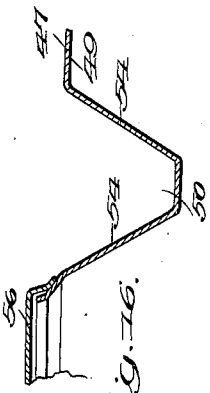


Fig. 16.

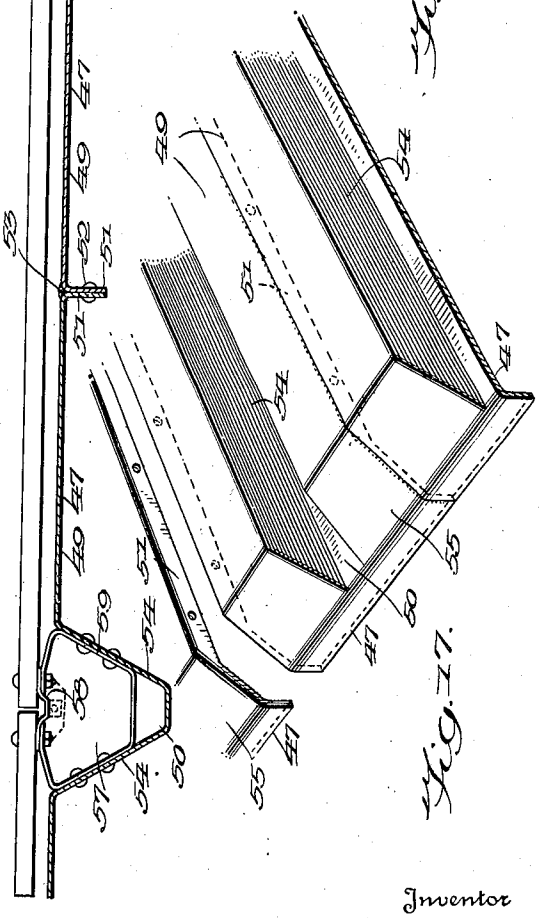


Fig. 17.

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Patented Aug. 30, 1938 2,128,624

UNITED STATES PATENT OFFICE

2,128,624

CAR ROOF

Earl R. Swanson, Chicago, Ill., assignor to Chicago-Hutchins Corporation, a corporation of Delaware

Application November 4, 1935, Serial No. 48,254

10 Claims. (Cl. 108—5.4)

My invention relates to roofs for railway cars and more particularly to roofs of the character having openings or hatches through which bulk commodities, such as grain, cement and the like, may be loaded in the car.

The principal object of the invention is to provide lading receiving openings in elevated or raised portions formed in the metal roof sheets, so that bulk material loaded into the car may pyramid into the raised or elevated portions and thus enable the car to be loaded to full capacity without the necessity of pushing the load into remote areas of the car.

Another object of the invention is to so form the elevated or raised portions that the roof sheets will possess sufficient inherent rigidity as to make unnecessary the use of the usual roof carlines.

A primary feature of the invention consists in providing the raised portions of the roof sheets with upwardly converging side walls extending transversely of the roof and with at least one end wall extending upwardly and inwardly from adjacent the eaves of the roof at an angle to the plane of the lading receiving opening which is formed in the top of the raised portion.

Another feature of the invention consists in providing the car roof with one or more metal sheets pressed into relatively deep inverted pan-shaped sections having a lading receiving opening in the top thereof.

A further feature of the invention consists in providing one or more of the sheets of the roof with similarly disposed plate portions spaced longitudinally of the roof and an intervening depressed portion defining a reinforcing trough.

Other and more specific features of the invention, residing in advantageous forms, combinations and relations of parts, will hereinafter appear and be pointed out in the claims.

In the drawings:

Figure 1 is a plan view of a roof embodying my invention applied to a railway hopper car.

Figure 2 is a fragmentary side elevation of the upper portion of the car illustrated in Figure 1.

Figure 3 is an enlarged vertical sectional view taken on line 3—3 of Figure 1.

Figure 4 is a sectional view taken on line 4—4 of Figure 3.

Figure 5 is a fragmentary view of the upper portion of one of the raised portions of the roof illustrating a slightly modified form of the invention.

Figure 6 is a plan view of a railway box car in which some of the roof sheets of conventional form have been replaced by roof sheets of the type illustrated in Figures 1 to 5, inclusive.

Figure 7 is an enlarged vertical sectional view taken on line 7—7 of Figure 6.

Figure 8 is an enlarged sectional view taken on line 8—8 of Figure 6.

Figures 9, 10 and 11 are fragmentary sectional views illustrating the adaptability of the roof sheets having the raised portions to different types and styles of car roofs.

Figure 12 is a view similar to Figure 7, on a reduced scale, illustrating a modified form of the invention.

Figure 13 is a plan view illustrating still another modification of the invention.

Figure 14 is an enlarged vertical sectional view taken on line 14—14 of Figure 13.

Figure 15 is a vertical sectional view taken on line 15—15 of Figure 13.

Figure 16 is a sectional view taken on line 16—16 of Figure 13.

Figure 17 is a perspective view of portions of the roof sheets, shown in Figure 13, adjacent the eaves of the roof, two of the roof sheets being shown connected and a third roof sheet being shown as disconnected from the others.

Referring more particularly to the drawings and specifically to Figures 1 to 5, inclusive, 1 designates the sides of the car and 2 the side plates, each of which may advantageously be in the form of a Z having a horizontal web 3, a flange 4 projecting upwardly from the inner edge of the web and a flange 5 projecting downwardly from the outer edge of the web and secured to the upper ends of the side sheets of the car.

The roof sheets 6 preferably extend continuously from one side of the car to the other and all of them, with the exception of the end roof sheet, one of which is indicated at 6a, may be formed so as to provide the roof with a plurality of longitudinally spaced raised portions 7. In the form of the invention illustrated in Figures 1 to 5, inclusive, these raised portions are provided by forming the sheets into relatively deep inverted pan-shaped sections having upwardly converging side walls 8 extending transversely of the car and end walls 9 which converge upwardly from adjacent the eaves of the roof and extend longitudinally of the car. The end walls extend upwardly at a rather substantial angle to the general plane of the roof and respectively terminate at points above lines connecting the ridge and eaves of the roof.

The lower portions of the side walls 8 terminate in laterally extending flanges 10 which are

overlappingly secured, as by rivets, to the corresponding flanges of adjacent roof sheets. The lower portions of the end walls 9, together with the outer ends of flanges 10, terminate in downwardly extending vertically disposed flanges 11 which are overlappingly secured to the outer faces of the upwardly extending flanges 4 of the Z-bar side plates. Each of the raised portions of the roof sheets is preferably provided with two lading receiving openings 12 which are respectively disposed on opposite sides of the ridge of the roof and intermediate the openings the raised portion is provided with a top wall 13. The openings 12 may be conveniently of substantially the same width as the upper part of the raised portions and each opening is bounded by an inclined portion 14 which terminates in a substantially vertically disposed flange 15.

Movably mounted on the roof are a plurality of doors 16 for respectively closing the lading receiving openings. Each of the doors may be conveniently provided with a plurality of straps 17 whereby it may be hingedly connected to brackets 18 secured to the top wall 13 of the adjacent raised portion. To prevent dirt, moisture, rain and the like from entering the lading receiving openings, the doors are each formed with marginal flanges 19 which incline outwardly, as indicated at 20, for engaging the correspondingly inclined portions 14 of the roof sheets. Adjacent their free edges, each of the doors is preferably provided with a U-shaped bracket 21 affording a hand grip whereby the door may be conveniently raised and lowered and, to secure the door in closed position, the bracket may be integrally formed with a plate-like extension 22 which is adapted to be received between two laterally spaced legs 23 of a member 24 secured to the upper portion of the adjacent end wall 9 of the raised portion. The extension 22 and lugs 23 are provided with registrable apertures for receiving any suitable means (not shown) for restraining upward movement of the extension.

Moisture and the like may be more effectively excluded from the car and the portions of the roof sheets defining the lading receiving openings may be additionally rigidified by forming those portions with an inturned flange, as indicated at 25 in Figure 5. This flange is preferably disposed as to engage the under side of the door when the inclined portion 20 of the flange 19 of the door engages the cooperating portions of the roof sheet.

The top walls 13 of the raised portions afford convenient means to which running board saddles 26 may be secured. The saddles 26, which are of conventional form, are provided at their ends with down-turned flanges 27 which may be bolted or secured by any other suitable means to brackets 28 rigidly secured to the top wall 13, preferably between the hinged brackets 28.

It will be observed that the adjacent side walls 8 of the raised portions of adjoining roof sheets define valleys or troughs which extend transversely of the roof and that the raised portions impart sufficient rigidity to the roof sheets that they are self-supporting and thus render the use of carlines unnecessary.

Figures 6 to 11, inclusive, of the drawings illustrate various means of adapting roof sheets 6 having raised portions of the character illustrated in Figures 1 to 5, inclusive, to different types of roofs. The roof illustrated in Figures 6 to 9, inclusive, is of a well known type embodying inverted channel-shaped carlines, such as shown at 29 in Figure 9. In this type of roof, the side edges of the conventional roof sheets 30 are formed with U-shaped portions 31 which are arranged in nested embracing relation on the carlines, being connected thereto by U-shaped clamps 32. In adapting roof sheets 6 to this type of roof, the side edges of the sheets may be integrally formed with U-shaped portions 33 (see Figure 9) for cooperating with the carlines 29 in the same manner as other roof sheets, or, as shown in Figure 8, roof sheets 6 may be made from heavier gauge metal and their side edges integrally formed with portions 34 of the same cross sectional shape as the carlines, thereby dispensing with the carlines which would otherwise cooperate with the sheet. Although only two of the usual roof sheets 30 have been shown as being replaced with the roof sheet 6, it will be appreciated that any desired number of the roof sheets may be likewise replaced.

Figure 10 illustrates a convenient means by which roof sheets 6 may be applied to a roof of the type embodying outside carlines 35. In this type of roof, the sheets are customarily associated with such carlines by being provided with flanges 36 which extend upwardly between the legs of the carline, being secured thereto by rivets 37. It will be appreciated that roof sheet 6 may also be conveniently formed with an upwardly extending flange 38, which may be connected to the carline in the same manner as the flanges 36.

Figure 11 illustrates the manner in which roof sheets 6 may be applied to a flexible car roof. In this type of roof, the roof sheets are not rigidly connected to the carlines but instead are movably associated therewith by a cap 39 embracing the carline and having portions 40 projecting laterally therefrom to overlappingly engage adjacent portions of the roof sheets. The roof sheet 6 illustrated in Figure 11 is shown as being provided at one side thereof with a portion 41 for cooperating with the cap 39.

Instead of providing roof sheets 6 with continuously extending raised portions 7, they may be provided with a pair of raised portions 42, as illustrated in Figure 12. The roof sheet illustrated in this figure is of the type having integrally formed carlines, such as shown in Figure 8.

Each of the raised portions 42 is of substantially the same shape as the raised portion 7 of sheet 6, having upwardly converging side walls 43 and similarly converging end walls 44. The upper ends of these walls are bent inwardly, as indicated at 45, to engage the under side of the door 46 in the plane of the lading receiving opening. The two inner end walls of the pair of raised portions merge at their lower portions with a plate portion 47 of the roof sheet which is disposed in the general plane of the roof.

In the modification of the invention illustrated in Figures 13 to 17, inclusive, each of the raised portions of the roof is formed by two sheets instead of one. In this form of the invention, each of the roof sheets 47, with the exception of the end roof sheets 48, is provided with two similarly disposed plate portions 49 spaced longitudinally of the roof and an intervening depressed portion 50 defining a reinforcing valley or trough which extends transversely of the car.

The outer side edges of the plate portions 49 are formed with downwardly extending flanges or the like 51 which are adapted to be disposed in abutting relation and rigidly secured together by rivets 52 or by spot welding. The meeting edges

of the sheets may be effectively sealed to exclude moisture and the like by welding contiguous portions of the sheets, as indicated at **53**. Although the raised portions of the roof are each formed by two roof sheets instead of one, they are substantially of the same shape as the raised portions **7** of sheet **6**, having upwardly converging side walls **54** extending transversely of the car and upwardly converging end walls **55** extending longitudinally of the car.

Openings through which lading may be loaded into the car are formed in the roof by notching or cutting away corresponding portions of adjacent roof sheets. These openings may be flanged in the same manner as the openings of sheet **6** for cooperating with doors **56** to prevent moisture and the like from entering the car through the door opening.

Disposed in each depressed portion **50** of the roof on opposite sides of the ridge are diaphragm members or the like **57**, which serve to rigidify the troughs and afford supports for the running board saddles **58**. Each of the diaphragms may be conveniently formed as a pressing having a main plate portion and a marginal flange **59**, portions of which conform to the contour of the trough so as to be rigidly secured as by rivets to the side walls **54**.

By providing the roof sheets intermediate their side edges with reinforcing troughs, it will be evident that they possess sufficient rigidity to be self-supporting. Moreover, the formation of the sheets is such and they are adapted to be secured together in such manner that they may be completely assembled before being applied to the car.

While the roof illustrated in Figure 1 is shown as having openings in each of the roof sheets provided with raised portions and only a few of the sheets having raised portions illustrated in Figure 13 have openings, it will be appreciated that any number of openings may be provided and that they may be arranged in any suitable manner, such, for example, the openings on one side of the ridge of the roof may be staggered with respect to the openings on the opposite side.

What I claim is:

1. A railway car roof having a plurality of pressed metal roof sheets, said sheets being upwardly offset to form a plurality of raised portions, each of said raised portions having a lading receiving opening in the upper portion thereof and being provided with upwardly converging side walls extending transversely of the roof and with one or more end walls extending upwardly and inwardly from adjacent the eaves of the roof at an acute angle to the plane of the lading receiving opening, said raised portions forming inverted pockets permitting substantial quantities of lading received through said openings to pyramid therein and the opening in each raised portion being of a width substantially equal to the distance between the upper portions of said side walls and terminating substantially at the upper edge of the said end wall adjacent the eaves, and doors movably mounted on the roof for respectively closing said openings.

2. A railway car roof having a plurality of pressed metal roof sheets, each of said sheets having a raised portion intermediate its side edges and portions projecting laterally from the base of the raised portion for a distance less than the height of the latter, said raised portions respectively having lading receiving openings in the top thereof and being provided with upwardly converging side walls extending transversely of the roof and at least one inclined end wall extending upwardly and inwardly from adjacent an eaves of the roof and terminating above a line connecting said eaves and the ridge of the roof, said raised portions forming inverted pockets permitting substantial quantities of lading received through the openings to pyramid therein, and doors movably mounted on the roof for respectively closing said openings.

3. A railway car roof having a plurality of pressed metal roof sheets, said roof sheets having upwardly offset portions forming a plurality of raised portions, each of said raised portions having an opening in the top thereof and being provided with inclined side walls extending transversely of the roof and with one or more inclined end walls extending upwardly and inwardly from adjacent the eaves of the roof in a plane intersecting above the roof a vertical plane passing through the longitudinal axis of the car, said raised portions forming inverted pockets permitting substantial quantities of lading received through the openings to pyramid therein and the upper portions of said inclined walls of each raised portion terminating in angularly disposed upstanding flanges bounding the lading receiving opening, and doors movably mounted on the roof for respectively closing said opening.

4. A railway car roof having a plurality of pressed metal roof sheets, said sheets being offset upwardly to form a plurality of raised portions extending continuously from adjacent one side of the car to adjacent the other, each of said raised portions including a top wall having a plurality of lading receiving openings respectively disposed on opposite sides of the ridge of the roof, upwardly converging side walls, and end walls respectively extending upwardly and inwardly from adjacent the eaves of the roof at acute angles to the planes of the respectively adjacent lading receiving openings, said raised portions forming inverted pockets permitting substantial quantities of lading received through said opening to pyramid therein and the openings in each raised portion respectively being of a width substantially equal to the distance between the upper portions of said side walls and terminating substantially at the upper edges of the end walls, and doors movably mounted on the roof for respectively closing said openings.

5. A railway car roof having a plurality of pressed metal roof sheets, said sheets being offset upwardly to form a plurality of pairs of raised portions respectively provided with lading receiving openings in the upper portions thereof, the raised portions of each pair being disposed on opposite sides of the ridge of the roof and each of said raised portions including upwardly converging side walls extending transversely of the roof and upwardly converging end walls one of which extends upwardly and inwardly from adjacent an eaves of the roof and terminates above a line connecting the eaves and the ridge of the roof, said raised portions forming inverted pockets permitting substantial quantities of lading received through the openings to pyramid therein and the upper portions of said inclined walls of each raised portion terminating in angularly disposed upstanding flanges bounding the lading receiving openings, and doors movably mounted on the roof for respectively closing said openings.

6. A railway car roof having a plurality of pressed metal roof sheets extending from side to side of the car, adjoining ones of said roof sheets being respectively provided intermediate their

side edges with raised portions each having downwardly diverging side walls respectively terminating in laterally extending portions adapted to be joined with corresponding portions of the adjoining roof sheets, the adjacent side walls of the raised portions of adjoining sheets defining a reinforcing valley having inclined sides extending transversely of the roof, said raised portions being of substantially greater width than the valleys and being of greater height than the width of the lower portions of the valleys, one or more of said raised portions being provided with lading receiving openings and forming inverted pockets permitting substantial quantities of lading to pyramid therein, and doors movably mounted on the roof for closing the openings.

7. A railway car roof having a plurality of pressed metal roof sheets extending from side to side of the car, each of said roof sheets being provided with similarly disposed plate portions spaced longitudinally of the roof and an intervening depressed portion having inclined sides defining a reinforcing trough, said plate portions respectively being of greater width than the troughs and the outer side edges of the plate portions of each of said sheets having down-turned portions rigidly secured to corresponding portions of adjoining roof sheets.

8. A railway car having a plurality of metal roof sheets, each of said sheets having similarly disposed plate portions spaced longitudinally of the roof and an intervening depressed portion defining a reinforcing trough, the adjacent plate portions of at least two adjoining sheets being notched to provide a single lading receiving opening, and a door movably mounted on the roof for closing said opening.

9. A railway car roof having a plurality of metal roof sheets extending from side to side of the car, each of said roof sheets having plate portions spaced longitudinally of the roof and an intervening depressed portion defining a reinforcing trough, the outer side edges of the plate portions of each sheet having downwardly extending portions respectively secured to corresponding portions of adjoining roof sheets, the adjacent plate portions of at least two adjoining sheets being notched to provide a single lading receiving opening, and a door movably mounted on the roof for closing said opening.

10. A railway car roof having a plurality of pressed metal roof sheets, each of said sheets having plate portions spaced longitudinally of the roof and an intervening depressed portion having inclined sides defining a reinforcing trough, a bracket disposed within the trough and secured to the inclined sides thereof for rigidifying the latter and serving as a support for a running board saddle.

EARL R. SWANSON.