

July 28, 1942.

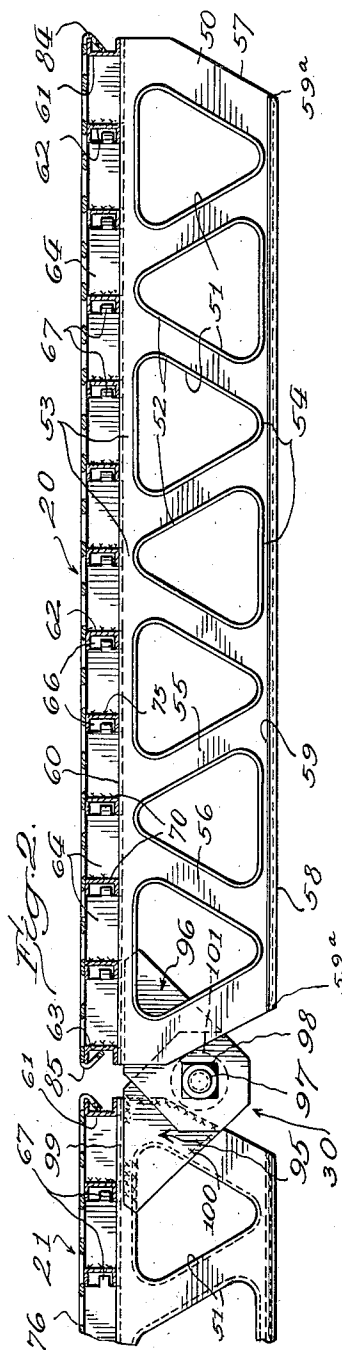
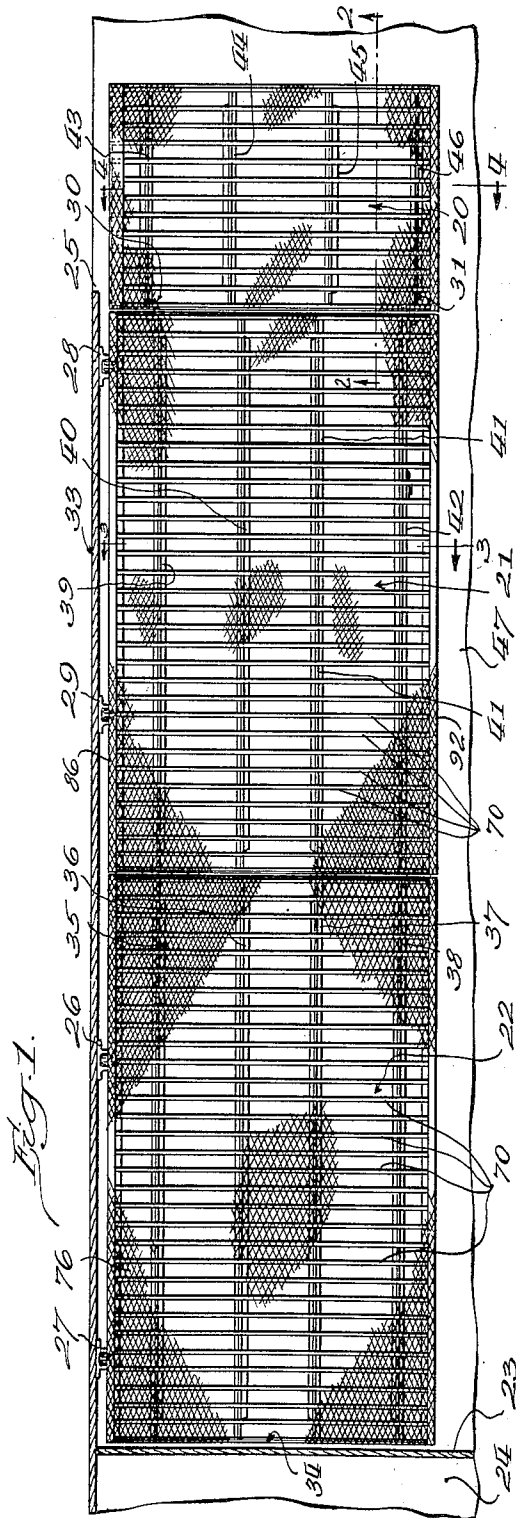
C. S. JOHNSTON

2,291,472

FLOOR RACK FOR REFRIGERATOR CARS

Filed April 23, 1941

5 Sheets-Sheet 1



Inventor:
Charles S. Johnston
By McCaleb, Herndt & Dickinson
Attys.

July 28, 1942.

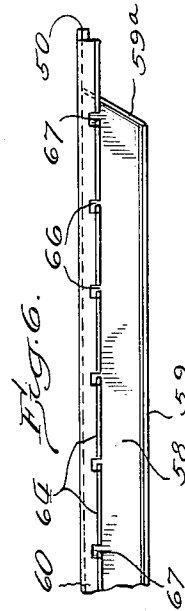
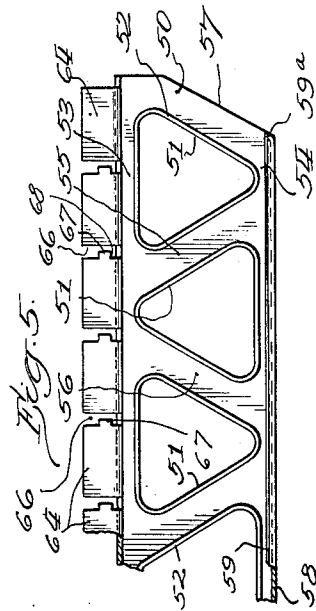
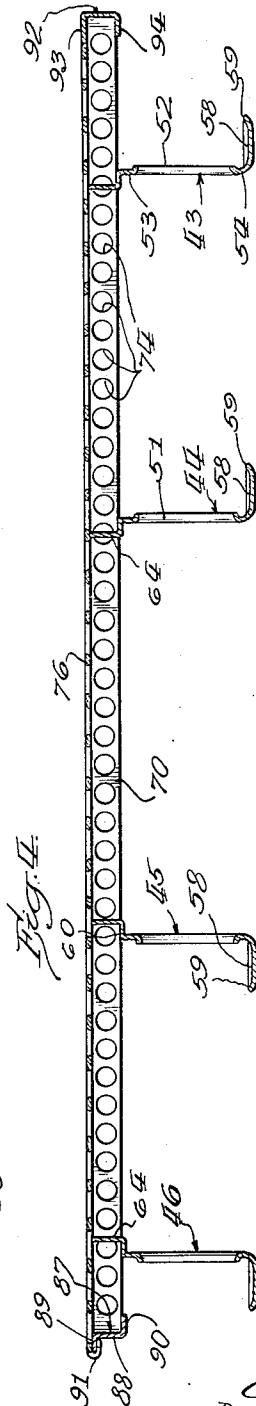
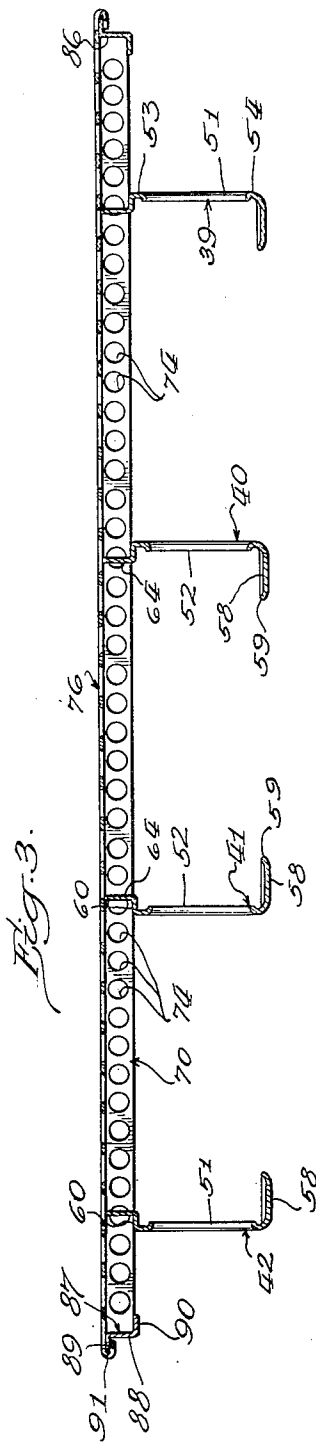
C. S. JOHNSTON

2,291,472

FLOOR RACK FOR REFRIGERATOR CARS

Filed April 23, 1941

5 Sheets-Sheet 2



Inventor:
Charles S. Johnston
By
McCauley, Hunt & Dickinson
Attys.

July 28, 1942.

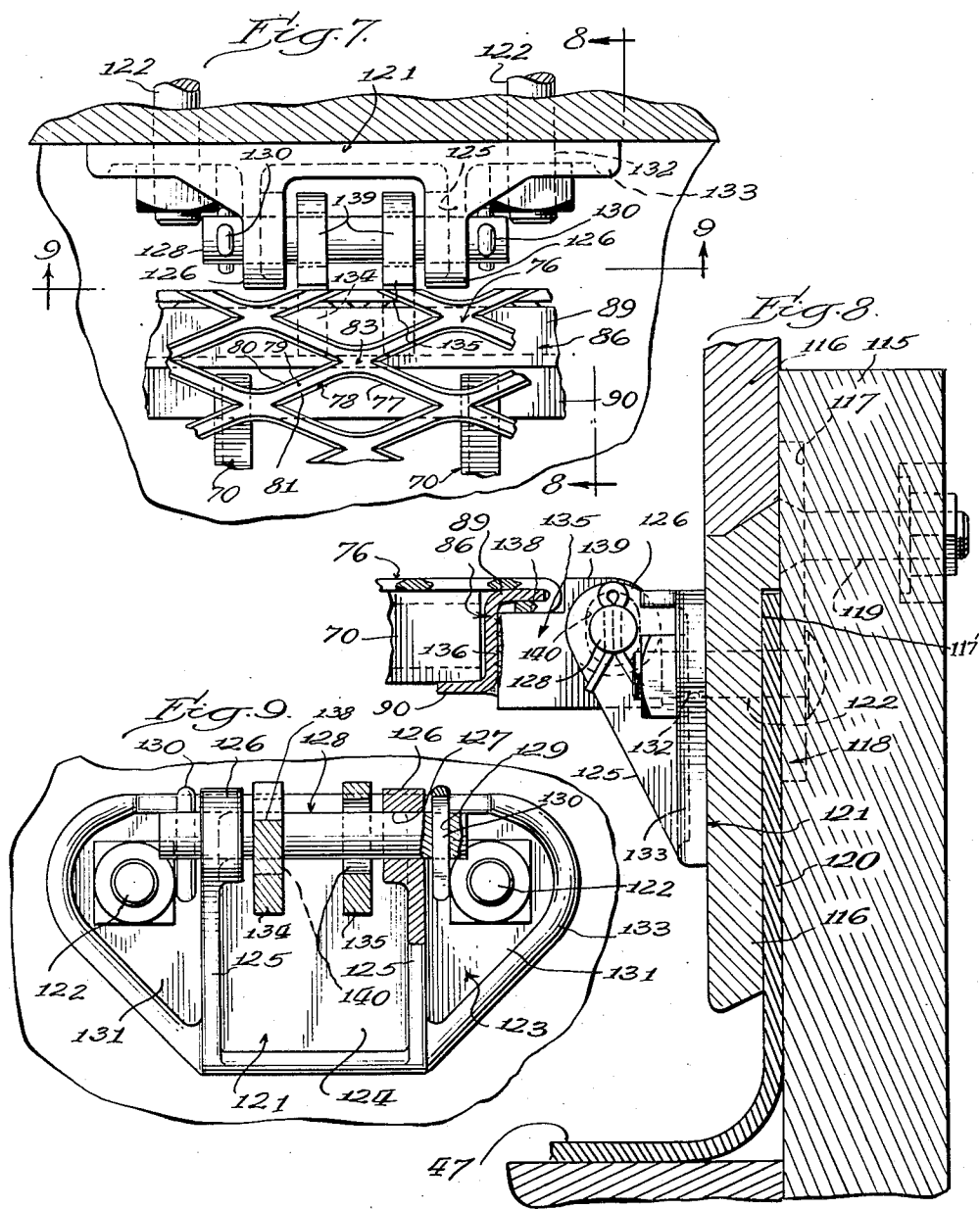
C. S. JOHNSTON

2,291,472

FLOOR RACK FOR REFRIGERATOR CARS

Filed April 23, 1941

5 Sheets-Sheet 3



Inventor:
Charles S Johnston
By
m^c Caleb, Kendall & Dickinson
Attys.

July 28, 1942.

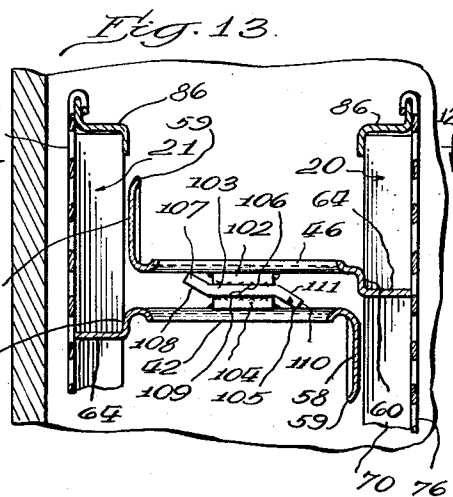
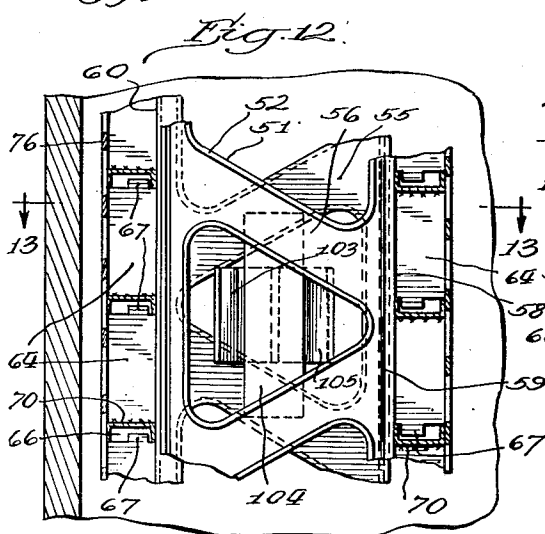
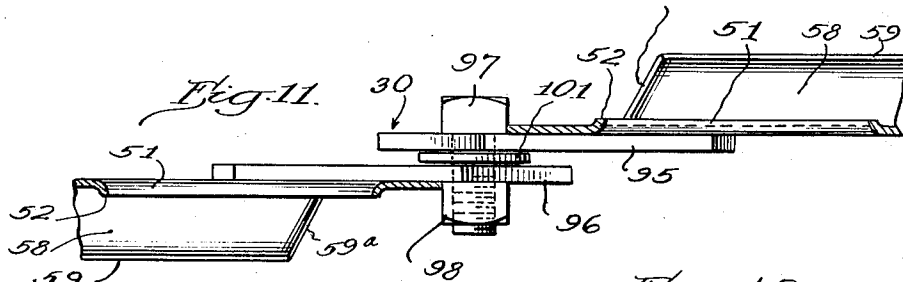
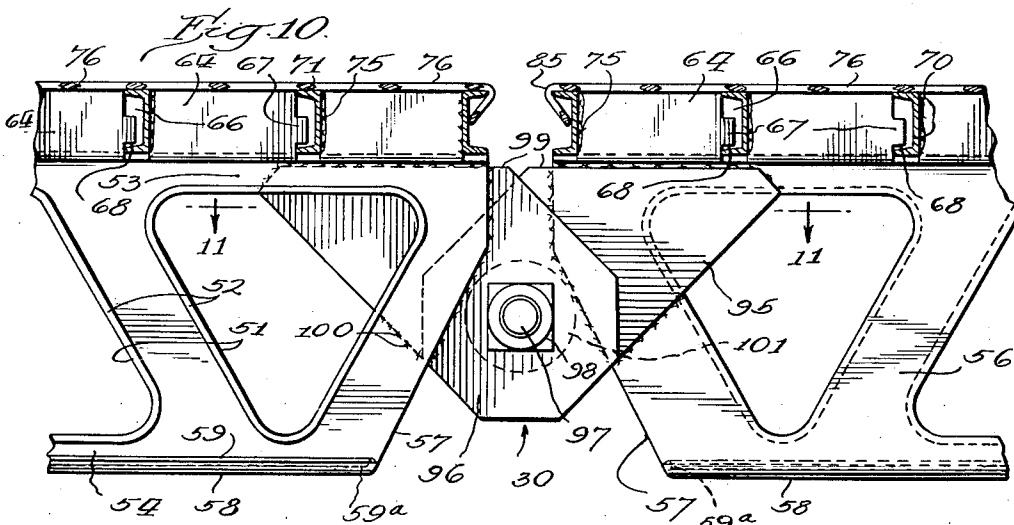
C. S. JOHNSTON

2,291,472

FLOOR RACK FOR REFRIGERATOR CARS

Filed April 23, 1941

5 Sheets-Sheet 4



Inventor:
 Charles S. Johnston
 By
 McCall, Kuntz & Dickinson
 Attys.

UNITED STATES PATENT OFFICE

2,291,472

FLOOR RACK FOR REFRIGERATOR CARS

Charles S. Johnston, Glencoe, Ill., assignor to
Transportation Specialties Company, Chicago,
Ill., a corporation of Illinois

Application April 23, 1941, Serial No. 389,848

17 Claims. (Cl. 105—375)

The present invention relates to floor racks for refrigerator cars, and is particularly concerned with the provision of improved and simplified metallic floor racks which are adapted to support the lading in such manner that it is accessible for ventilation or circulation of cooling air from the ice bunkers of the refrigerator car.

One of the objects of the invention is the provision of an improved floor rack which is adapted to provide a maximum strength with a minimum amount of weight and which is adapted to be used for a long period of time without necessity for repair or replacement. The floor racks usually cover substantially the whole floor of the refrigerator car, and they support the load in the car and receive the brunt of the wear, which occurs when the merchandise is moved about by trucks or by sliding, rolling, or other forms of handling.

Another object of the invention is the provision of an improved floor rack structure including a simplified mode of supporting the floor racks in elevated position against the walls of the car and an improved structure for mounting the necessary fittings by means of which conduction of heat through the fastening devices is eliminated.

Another object of the invention is the provision of an improved metal floor rack provided with a novel covering of such a structure that it is adapted to permit the sliding of boxes, barrels, sacks, etc. over the floor rack without tearing or breaking or catching of nails in the ventilation apertures of the floor rack covering.

Another object of the invention is the provision of an improved metal floor rack having means for locking the cross frame members to the stringers during the manufacture of the device, so that the cross frame members and stringers can be held in predetermined position for welding, without the necessity of jigs or other securing devices between these members.

Another object of the invention is the provision of an improved metal floor rack having its sections arranged to be folded up against the side wall and having the door sections arranged to fold against the adjacent rack sections and provided with an improved type of latching device for holding the door sections in elevated and folded position.

Another object of the invention is the provision of an improved metal floor rack structure which permits the cross circulation of air under the top of the floor rack, as well as the circula-

tion of air longitudinally of the car between the stringers of the floor racks.

Another object of the invention is the provision of an improved stringer structure for metal floor racks, by means of which a maximum amount of strength is provided for supporting the load in the car in spaced relation to the flooring and a maximum cross ventilation may be secured.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawings, of which there are five sheets,

Fig. 1 is a fragmentary diagrammatic top plan view, showing the arrangement of the floor racks in one-fourth of the area of a refrigerator car floor;

Fig. 2 is a fragmentary sectional view, taken on the plane of the line 2—2 of Fig. 1, looking in the direction of the arrows, showing the stringers in elevation, and the cross channels in section;

Fig. 3 is a vertical sectional view, taken through a floor rack, on the plane of the line 3—3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a view similar to Fig. 3, taken on the plane of the line 4—4 of Fig. 1, looking in the direction of the arrows;

Fig. 5 is a fragmentary side elevational view of one of the stringers;

Fig. 6 is a fragmentary top plan view of one of the stringers;

Fig. 7 is a fragmentary plan view of the hinge fittings for hingedly securing the floor racks to the wall, with the wall shown in section;

Fig. 8 is a fragmentary vertical sectional view, taken on the plane of the line 8—8 of Fig. 7;

Fig. 9 is a fragmentary vertical sectional view, taken on the plane of the line 9—9 of Fig. 7, looking in the direction of the arrows;

Fig. 10 is a fragmentary vertical sectional view, taken on a plane extending at right angles to the cross channel members, showing the details of structure of the hinges between the main floor racks and the door sections of the floor racks;

Fig. 11 is a fragmentary horizontal sectional view, taken on the plane of the line 11—11 of Fig. 10;

Fig. 12 is a fragmentary horizontal sectional view, taken on the plane of the line 12—12 of Fig. 13, looking in the direction of the arrows, showing the latching means between the main

rack section and the door section of the floor racks;

Fig. 13 is a fragmentary vertical sectional view, taken on the plane of the line 13—13 of Fig. 12;

Fig. 14 is a fragmentary horizontal sectional view, taken on the plane of the line 14—14 of Fig. 15, looking in the direction of the arrows, showing the latching means for holding the floor racks in elevated position, and its mode of securement to the car wall;

Fig. 15 is a fragmentary vertical sectional view, taken on the plane of the line 15—15 of Fig. 14;

Fig. 16 is a fragmentary elevational view of the latching device, as seen from the interior of the car;

Fig. 17 is a vertical sectional view, taken on the plane of the line 17—17 of Fig. 15, showing the mode of securement of certain bolts which fasten the latching device to the framework;

Fig. 18 is a fragmentary elevational view, showing the structure of the cross channel members for supporting the foraminated floor covering.

Referring to Fig. 1, the floor racks embodying my invention are preferably made in a plurality of sections, such as, for example, the door section 20 and the two main sections 21 and 22.

The two sections 21 and 22 usually extend from the bulkhead 23, immediately adjacent the ice bunker 24, to a point adjacent the doorway opening 25. The door section 20 extends from a point adjacent the side of the door opening to a point midway between the side walls of the door frame so that the floor racks illustrated in Fig. 1 cover substantially one-fourth of that part of the refrigerator car in which the freight is placed.

The width of these floor racks is preferably such that they extend to substantially the middle of the car floor, a similar assembly of floor racks being used on the other side of the car.

Thus, each floor rack 22 may be provided with a pair of hinges 26, 27 and the rack 21 with a pair of hinges 28, 29, pivotally securing the adjacent edge of the racks to the car wall so that they may be swung upward and secured in vertical position against the wall, when it is not desired to have floor racks on the floor.

The door section 20 is secured to the adjacent edge of the floor rack section 21 by means of the hinges 30, 31 so that it will be adapted to swing around against the floor rack section 21, after the rack sections 21, 20 have both been swung to a vertical position.

This moves the door section 20 out of the doorway into position against the rack 21, which is located vertically against the side wall 33.

In some embodiments of the invention the rack section 22 may be made shorter, its end 34 being spaced from the bulkhead 23 by an amount sufficient to permit the insertion of a centrifugal fan housing, which has its discharge extending tangentially of the housing into the space under the floor racks, and which is provided with a centrifugal impeller and inlet conduits leading to the space in the ice bunker 24 at its lower part.

The various floor rack sections are substantially similar in their structure, except for various adaptations that are made for the purpose of permitting the folding of the door section 20 against the section 21. Thus, except for the length of the sections 21, 22, they may be identical.

Each of the floor rack sections is preferably constructed of a plurality of longitudinally extending metal stringers 35—46, which perform

the function of supporting the top of the floor rack in spaced relation to the floor 47 of the car, and thus permit the circulation of air longitudinally of the car under the floor rack, between the stringers.

Thus, rack section 22 includes stringers 35 to 38, rack section 21 includes stringers 39—42, and rack section 20 includes stringers 43—46.

Referring to Figs. 3 to 6, the structure of these stringers is there shown in cross section. Each stringer (Fig. 5) is preferably formed with its main vertically extending body or web 50 having a multiplicity of triangular apertures 51 punched out of the body and provided with the transversely extending reinforcing flange 52 surrounding each triangular aperture.

The triangular apertures 51 have such dimensions that they leave a narrow portion 53 of the body 50 at the top and a similar narrow portion of the body at 54, at the bottom of the stringer. The triangular apertures are alternately disposed with the base of the triangle upward and the base of the triangle downward, so that there is left of the body or web 50 a plurality of diagonally extending frame portions 55, 56. For example, the frame portions 55, 56 take the form of integral parts of a truss, as they join the upper and lower portions 53, 54 of the web of the stringer, and they extend diagonally and transversely to each other. Thus the main body 50 of the stringer is so apertured that a minimum amount of metal remains, consistent with the strength required, and a maximum circulation of air transversely of the stringers is permitted.

The structure is adapted to be stiff and strong for its weight, and adapted to support the load in the car on the racks without possibility of the bending of the floor racks or any part thereof. At their ends the stringers are preferably provided with the lower beveled edge 57, thus eliminating the sharp corner that would otherwise stick out when the rack is folded against the car wall.

Each stringer is preferably formed with a relatively wide bearing flange or foot flange 58, at the bottom of the web 50, and extending at substantially right angles to the web 50.

The bearing flange 58 is preferably turned slightly upward at 59, adjacent its edge, so that there is less possibility of damage to freight in the car by engagement with these foot flanges when the racks are folded up against the car wall. This also prevents damage to the waterproof floor covering which is in the nature of impregnated felt or roofing, and which the racks are intended to protect. For this reason both edges of the floor bearing flanges are rounded and the end corners are turned up as at 59a. Thus if the rack shifts on the floor it does so without cutting the waterproof layer.

The foot flange 58 engages the flooring 47 of the car, and by its extended area and frictional engagement tends to prevent the shifting of the floor racks, due to the inertia of the load carried thereby, when the car is suddenly stopped or started or when it passes around corners, subjecting the load to centrifugal force. This shifting is, of course, also resisted by the hinges and fastenings, but such hinges have a slight amount of play, and would not wholly prevent movement of the racks on the floor.

Each stringer is preferably formed at the top of its web 50 with a transversely extending bearing flange 60, which is also at right angles to the

web 50, but is narrower than the floor bearing flange 58.

This bearing flange 60 is adapted to engage the lower side of a plurality of transversely extending channel members such as the channel members 61, 62, or 63 (Fig. 2).

The channel bearing flange 60 supports a vertically extending web 64 (Fig. 5), which is provided with a plurality of regularly spaced slots 66 for receiving the cross channels 61-63. The slots 66 are provided with a horizontal integral tongue 67, the slots being otherwise substantially rectangular in cross section in the vertical web 64, and the slots 66 extend horizontally into the channel bearing flange 60, as shown in Fig. 6.

The inwardly extending tongues 67 have their lower horizontal edge 68 located at such a point that when the channels are in the slots 66 and the stringers extend vertically at right angles to the longest dimension of the channels, the lower flange of each channel is clamped between the channel bearing flange 60 and the edge 68 of tongues 67.

Referring to Figs. 3 and 4, it will be seen that in Fig. 3 the floor bearing flanges 58 all extend inwardly from the outer edge of the rack toward the center. This is a section taken through the main rack, such as the rack 21 or 22.

In Fig. 4 the structure of the stringers is similar, except that the floor bearing flanges 58 are all turned outwardly from the middle of the rack toward the edges of the rack. This is not merely a matter of turning the stringers around, but two types of stringers are employed, as it will be observed that the stringers in Fig. 4 have their floor flanges extending oppositely to the channel bearing flanges 60, while in Fig. 3 the floor bearing flanges extend in the same direction from the web 50, as the channel bearing flanges 60.

The result of this arrangement and the suitable location of the webs of the stringers is that when the section 21 is folded up against the wall and the section 20 is swung around on its hinges 30 and 31 against the section 21, the webs of the stringers of the section of Fig. 3 have their flat sides located to slide over the flat sides of the webs of the stringers of Fig. 4. Interference between the foot flanges of adjacent stringers on different sections 20, 21 extend in the opposite direction so that these two sections may be nested closely together.

The nesting of the stringers is illustrated in Figs. 12 and 13, where the means for latching the sections 20, 21 together is also shown. The mode of assembly of the channeled cross members and the stringers is as follows:

The stringers required for a floor rack are laid upon a support, such as the floor or a table, and supported in a tilted position, that is, they tilt toward the left in Fig. 4 in such manner that part of the slot 66 below the tongue 67 in the vertical web 64 and the bearing flange 60 serve to provide ample clearance for the insertion of the lower flange of the cross channels.

The vertical depth of the tongue 67 is less than the space between the cross channel flanges, and the tongue 67 is shorter than the width of the channel flanges. Thus, it is possible to rotate all of the cross channels into the slots 66 of the stringers simultaneously until all of the cross channels are in proper position in the slots 66. Then the stringers of the section are moved to a position at right angles to the channels, as shown in Fig. 4, and the lower edge 68 of each

tongue binds against the lower flange of each channel and holds it in predetermined position.

Referring to Fig. 18, this is an elevational view of one of the channels. Each channel has a vertically extending web 70 and a pair of horizontal flanges 71, 72 extending at right angles to the web 70. The horizontal flanges 71, 72 taper toward their outer edges and thus have a thicker section at the base, as indicated by the line 73 inside the channel.

In some embodiments of the invention these channels may have the web 70 provided with a multiplicity of punched apertures 74 which reduce the weight of the cross channels and permit further circulation of air through these channels longitudinally of the car.

In other embodiments the apertures 74 may be omitted, as ample ventilation may be provided by the space between the stringers, below the cross channels.

Each of the cross channels is then welded to the stringers, the line of weld being indicated by the X marks at 75 in Fig. 10, and each channel being thus welded at each intersection, with a stringer, a very strong framework is provided.

The upper surface of the top flange 71 of each channel is flush with the upper edge of the vertical web 64 of each stringer, thus providing a plane top surface for the frame, which is adapted to support the foraminated upper covering 76.

This foraminated upper covering 76 preferably comprises a metal sheet, which has been provided with suitable apertures, and the preferred form of the invention comprises a form of expanded metal made by producing slits in the metal and spreading the adjacent parts of the metal, the slits being staggered, as shown in Fig. 7.

Here the metal rack covering 76 is shown in detail, and it is provided with a plurality of diamond shaped apertures 77 bordered by the diagonally extending sheet metal frame members 78. This expanded metal is not to be confused with the ordinary expanded metal lath, as it is preferably of a much greater thickness and of a particular structure, as follows.

Each of the integral frame member portions of the expanded metal covering 76 comprises a flat upper surface 79 (Fig. 7) and a downwardly beveled edge portion 80, 81 on each side of the flat upper portion 79.

The beveled parts 80, 81 all extend downward from the flat upper surface portions 79, and the flat upper surface portions 79 are all in the same plane and provide the upper load bearing surface of the racks. The beveled parts 80, 81 on the upper surface of the rack covering serve to cause boxes or other containers to slide over the rack covering more easily, as any outwardly projecting parts of a box would engage the bevel at 80 or 81 and be cammed upward to the flat surface 79.

No sharp upper edges are presented to engage and tear the containers, such as sacks or bales, and the metal covering 76 is adapted to permit the rolling of trucks with a minimum amount of bumping.

Referring to Fig. 2, it will be observed that 62 indicates the cross channels located between the ends of the stringers, while 61 and 63 are used to indicate the cross channels at each end of the stringers. All of the cross channels 62 may extend in the same direction, but the cross channels 61, 63 preferably have their upper and lower flanges turned outwardly.

The expanded metal covering is so cut that its

edge is located transversely of one of the intersections 83 of the diagonally extending frame portions 78, thus reducing to a minimum the number of loose ends of expanded metal at the edge. These portions 83 extend over the top flanges 71 of the end cross channels 61, 63, sufficiently so that the expanded metal may be bent backward on itself, as shown in Fig. 2, into the cross channels 61 or 63, thus providing a rounded edge for the top covering at 84 and 85.

At each of the other edges of the floor rack, that is, the ends of the cross channels 61-63, the cross channels may be provided with Z bars 86, 87 (Fig. 3). Each Z bar has a vertically extending web, which is substantially equal to the largest vertical dimension of the cross channels so that the web 88 of each Z bar may traverse the cross channel, and the top flange 89 of the Z bar may have its upper surface flush with the top of the cross channels 61-63 when the lower flange 90 of each Z bar engages underneath the cross channels 61, 63, as shown in Fig. 3.

The Z bars may then be welded to each of the cross channels along the web 88 and along the lower flange 90 also, if desired.

The upper flange 87 of each Z bar provides the top of the framework with an outwardly extending flange, about which the expanded metal covering 76 may again be bent back on itself to provide a rounded edge at 91. In this case the expanded metal is bent into U shape, engaging the lower side of the upper flange 89 of the Z bars 86, 87.

Referring to Fig. 4, the right edge of this floor rack shows a different mode of finishing the edge of the doorway floor rack. In this case a channel member is used, indicated with the numeral 92. Its upper flange 93 being located above the cross channels 61, 63, and its lower flange being located below the cross channels 61, 63. In this case the expanded metal is brought up into abutting relation with the edge of the upper flange 93, and the edge channel 92 may again have its web and two flanges welded to each of the cross channels 61, 63.

This structure for the edge of the floor rack, at the end of the cross channels, is preferably employed at that end of the door section which extends across the door opening.

Referring to Fig. 2, this is a view of the door section and the adjacent main rack section, which shows the mode of hinging the door section on the main section. It has already been stated that the flanges on the stringers are turned oppositely, as shown in Figs. 3 and 4.

In addition to this, the outermost stringers on the door section are spaced more widely than the outermost stringers on the main section from each other, as shown in Fig. 1, so that there is space between the flat faces of the stringers for the two hinge plates 95, 96, Figs. 2 and 10.

These hinge plates are substantially trapezoidal in section, and are provided with apertures for receiving the hinge bolt 97, which is secured in place by means of a nut 98. A washer 101 is interposed between the plates 95 and 96 to insure adequate spacing of all of the parts.

The plates are identical in shape, but are oppositely disposed, and each is provided with a diagonally extending upper edge 99, which may be parallel to the channel bearing flange 60 of the stringer, but is located on the other face of the stringer. It may be welded to the vertical flange 50 at the points indicated by the X marks.

The plate is also welded to the diagonal por-

tion of the stringer at the indicated X marks, which have been designated by the numeral 100, and other points of weld have also been indicated by X marks at the left on the plate 95 of Fig. 2 and Fig. 10.

Referring to Figs. 12 and 13, these are fragmentary views of the latching means for securing the door section to the main section, after the main section has been pivoted upward and secured to the wall. It has been previously pointed out that the flanges on the stringers are oppositely disposed and that the stringers are hinged to each other, as shown in Figs. 2, 10, and 11.

Referring to Figs. 46 and 42, in Fig. 1, which are the stringers located adjacent the center of the car, these two stringers are preferably provided with latching means, as shown in Figs. 12 and 13, for holding the door section 20 against the main section 21.

This latching means may be in the form of a block 102, welded to the door section 20, and provided with a latching member 103. While the section 21 carries a block 104, with a latching member 105 welded to it, the blocks 102 and 104 are welded to the stringers 46 and 42 on the flat sides thereof, in opposing relation.

The blocks merely serve to support the latching members 103, 105 in such manner that the latching member 103 is automatically cammed into its proper latching position, when the two sections are moved toward each other in the position of Fig. 13.

Thus the latching member 103 comprises a metal strip provided with a beveled edge at 106, and having a flat body provided with an upwardly bent outer end 107. The upwardly bent outer end 107 provides a sloping camming surface 108. The latching member 105 likewise has a flat body secured to the block 104, and it is provided with a beveled inner surface 109 and with a downwardly bent end portion 110, thus providing a sloping camming surface 111.

The operation of this latching device is as follows: The two sections are shown latched together in Fig. 13. In order to unlatch them, it is only necessary to lift up the section 20 until the latching plate 103 and its beveled end surface 106 clear the beveled surface 109 and the top of the plate 105, when the section 20 may be caused to swing, upon the vertical axis provided by the bolts 97 of the two hinges 31 and 30 (Fig. 1).

In order to effect a latching of these two members, the section 20 may pivot over on the same axis, after the section 21 has been secured in vertical position against the wall, and the camming surface 108 will meet the camming surface 111, causing plate 103 to ride up over the plate 105 until it reaches the position where the beveled surfaces 109, 106 come into engagement with each other, when the plate 103 drops into the position behind the plate 105, as shown in Fig. 13, thus latching the section 20 to the section 21 in vertical position.

Referring to Figs. 7, 8 and 9, these are fragmentary views, showing the improved form of hinges for securing the floor racks to the car wall. This is preferably done without having any bolts extending from metallic parts on the interior of the car to the exterior framing or steel structure of the car, as follows:

Referring to Fig. 8, 115 indicates one of the horizontal wooden frame members of the refrigerator car, which serves to support the sheathing 116. This frame member 115 is preferably

rabbetted at 117 to receive the metal supporting plate 118, which is secured in its recess in the frame member 115 by the countersunk bolt 119.

The waterproofing 120 of the floor of the refrigerator car preferably extends up under the sheathing, which is rabbetted or recessed at 117' to receive it, and a hinge securing pair of bolts 122 pass through the plate 118, the waterproofing 120, the sheathing 116, and are used to secure the hinge fixture 123 to the wall.

The hinge fixture 121 preferably comprises a cast metal member which is provided with a flat body portion 124, having the vertically extending reinforcing ribs 125 in its face and leading to the bearing portions 126.

The bearing portions 126 are provided with aligned through bores 127 for receiving the pintle shaft 128. The pintle shaft 128 comprises a stub shaft having apertures 129 at each end for receiving a cotter-pin 130. The hinge fixture 121 may also have the triangular end portions 131 at each end, and have the bolt apertures 132. The end portion 131 is also reinforced with a border rib 133 on its face. The part of the hinge carried by the floor rack member comprises the hinge plates 134, 135, which are identical in shape, but are secured in spaced relation to each other to provide a more rigid form of hinge.

Each of these plates has a flat outer edge at 136 for abutting against the web of the Z bar 86, to which it is welded, as indicated by the X marks. The hinge plates have a depressed flat edge at 138, which are welded to the lower edge of the expanded metal covering, as indicated by the X marks. The upper edge of each plate at 139 is higher, to provide sufficient body for an oblong pintle slot 140 in each of the plates.

This pintle slot is slightly wider than the diameter of the pintle shaft 128, and it is so located that when the rack is in the horizontal position it does not rest upon the pintle shaft 128, but rests only on its stringers and their floor-bearing flanges 58.

The operation of the hinge is as follows: When the edge of the rack at the Z bar 87 (Fig. 3) is lifted and the lift is sufficient to raise the rack off all its stringers, the hinge plates 135, 134 slide downward on the shaft 128 until the shaft meets the upper end of the oblong slot 140. The slot has its upper end located quite close to the upper edge 139, and this permits a pivotal movement of the hinge plate 135, with less clearance between the fixture 121 and the hinge plate; that is, the apertures 127 and the pintle can be located closer to the wall; this also locates the rack closer to the wall when the rack is down.

The swinging movement is then continued until the rack is pivoted up into flat engagement with the wall, where it is preferably secured in place by a latching device of a positive character, such as that illustrated in Figs. 14 to 16.

Referring to Fig. 14, 145 indicates a vertically extending Z bar forming one of the vertical frame members of the refrigerator car and adapted to support the sheet steel covering plates 146, 147. This frame member 145 preferably has its inner flange formed with the apertures 148 adapted to pass the head 149 of a special bolt 150, and the apertures 148 communicate with the square recesses 151 for receiving the square shank 152 of the bolt 150.

The bolt 150 has an annular shoulder at 153 engaging on the inside of the flange of the Z bar 145 so that bolts 150 are adapted to be quickly and conveniently secured to the Z bar. Two of

such bolts 150 are preferably carried by the Z bar and extend through the sheet insulation 154 and the bats of insulation 155 into the lumber furring strips 156, which compress and secure the bats 155 to the wall. When the furring strips are horizontal, then strip 156, is a separate short cripple post.

The nuts and washers 157 are preferably countersunk in the lumber strip 156. Ordinary carriage bolts 158 may then be located between the bolts 150 and may pass only through the lumber strip 156 for the purpose of securing a latch fitting 159 to the wall.

Thus there is no metal-to-metal contact between the latch fitting 159 and the steel frame members 145 or external steel sheets 146, 147.

The furring strips 156 support the inner sheathing 116, and the sheathing is formed with a rectangular aperture for receiving the fitting 159. The fitting 159 may consist of a stamped sheet metal member having a cup 160, which is substantially rectangular when viewed in plan, except for its rounded corners, the cup being formed by an external wall 161 and a wall 162.

The wall 161 carries the outwardly projecting border flange 163, which is preferably rabbetted in the sheathing 116, as indicated at 164. The apertures 165 in the rear plate are adapted to pass the carriage bolts 158 so that the fitting 159 may be secured to the furring strip 156 by a pair of the bolts 158.

The rear plate 162 is provided with a pair of spaced rectangular apertures 166 for receiving the legs of a U-shaped stirrup 167, made of a bent strap of sheet metal, and the ends of the legs of the stirrup 167 are welded to the rear plate 162 on the rear side at 168.

A closed or endless link 169, which is rectangular in elevation, being provided with the two straight sides 170 and straight ends 171, is pivotally carried by the stirrup 167, and its length and the location of the stirrup 167 is such that when it swings down freely, as shown in Fig. 16, it is entirely housed in the cup-shaped fitting 159.

Referring to Figs. 14 and 15, the sections 21 and 22 are provided on their edges, which are located in the middle of the car, with one or more hook members 172. This hook 172 may be made of a sheet metal strap of substantial thickness and of the same width as the stirrup 167, and it has two flanges bent at substantially right angles to each other. Its vertically extending flange is welded at 173 to the lower flange of the Z bar 86, which finishes the middle edges of the rack. Thus the other flange is adapted to extend outward from the wall or downward from the rack, when the rack is on the floor.

The length of the horizontal flange 174 in relation to the clearance between the top of the rack and the wall and the length of the link 169 is such that the rack can be pushed back against the wall to cause the end 171 of the link to clear the flange 174 in the hooking or unhooking operation.

When hooked as shown in Fig. 15, the arrangement is positive and safe, and there is no possibility of the rack becoming unhooked inadvertently.

It will thus be observed that I have invented an improved floor rack structure for refrigerator cars, which is adapted to assure a maximum circulation of air longitudinally of the car and transversely underneath the rack. The present floor racks are adapted to be used with ordinary ice bunkers or with an arrangement having one

or more centrifugal fans for withdrawing air from the lower part of the ice bunkers and forcing it under the floor racks. The present racks are adapted to come into engagement with sliding or slipping loads, without tearing or damaging the merchandise or boxes or bags, and by virtue of the foraminated covering the tendency to slippage of the boxes or bags in the car is substantially reduced, if not wholly eliminated.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a floor rack for freight cars, the combination of a plurality of elongated stringers, each stringer comprising a sheet metal member formed with a laterally turned floor-bearing flange at its base and with a laterally turned frame bearing flange adjacent its top, said stringer extending above said frame bearing flange being provided with a plurality of slots, metal frame members in said slots, and extending transversely of said stringers, said metal frame members being welded to said stringers at predetermined intersections of said frame members and stringers, and a foraminated metal covering for said frame members and secured thereto.

2. In a floor rack for freight cars, the combination of a plurality of elongated stringers, each stringer comprising a sheet metal member formed with a laterally turned floor-bearing flange at its base and with a laterally turned frame-bearing flange adjacent its top, said stringer extending above said frame bearing-flange being provided with a plurality of slots, metal frame members in said slots, and extending transversely of said stringers, said metal frame members being welded to said stringers at predetermined intersections of said frame members and stringers, and a foraminated metal covering for said frame members and secured thereto, said metal frame members comprising metal channels of substantially U shape, and having their webs of wider dimension than the side flanges.

3. In a floor rack for freight cars, the combination of a plurality of elongated stringers, each stringer comprising a sheet metal member formed with a laterally turned floor bearing flange at its base and with a laterally turned frame bearing flange adjacent its top, said stringer extending above said frame bearing flange being provided with a plurality of slots, metal frame members in said slots, and extending transversely of said stringers, said metal frame members being welded to said stringers at predetermined intersections of said frame members and stringers, and a foraminated metal covering for said frame members and secured thereto, said metal frame members comprising metal channels of substantially U shape, and having their webs of wider dimension than the side flanges, said channelled frame members being arranged with the webs extending upwardly from the frame bearing flanges of the stringers.

4. In a floor rack for freight cars, the combination of a plurality of elongated stringers, each stringer comprising a sheet metal member formed with a laterally turned floor bearing flange at its base and with a laterally turned

frame bearing flange adjacent its top, said stringer extending above said frame bearing flange being provided with a plurality of slots, metal frame members in said slots, and extending transversely of said stringers, said metal frame members being welded to said stringers at predetermined intersections of said frame members and stringers, and a foraminated metal covering for said frame members and secured thereto, said metal frame members comprising metal channels of substantially U shape, and having their webs of wider dimension than the side flanges, said stringers being provided with a plurality of integral metal tongues arranged to clamp the lower flanges of said frame members against said frame bearing flange when the frame members and stringers are arranged at right angles to each other.

5. In a floor rack for freight cars, the combination of a plurality of elongated stringers, each stringer comprising a sheet metal member formed with a laterally turned floor bearing flange at its base and with a laterally turned frame bearing flange adjacent its top, said stringer extending above said frame bearing flange being provided with a plurality of slots, metal frame members in said slots, and extending transversely of said stringers, said metal frame members being welded to said stringers at predetermined intersections of said frame members and stringers, and a foraminated metal covering for said frame members and secured thereto, said covering comprising an integral sheet metal member formed with diamond-shaped openings, and having diagonally extending frame members being beveled on both sides at the top thereof and being formed with a flat top surface.

6. In a floor rack for freight cars, the combination of a plurality of elongated stringers, each stringer comprising a sheet metal member formed with a laterally turned floor bearing flange at its base and with a laterally turned frame bearing flange adjacent its top, said stringer extending above said frame bearing flange being provided with a plurality of slots, metal frame members in said slots, and extending transversely of said stringers, said metal frame members being welded to said stringers at predetermined intersections of said frame members and stringers, and a foraminated metal covering for said frame members and secured thereto, said covering comprising an integral sheet metal member formed with diamond-shaped openings, and having diagonally extending frame members, said diagonally extending frame members being beveled on both sides at the top thereof and being formed with a flat top surface, the edges of said covering being bent backwardly under one of said frame members at the ends of said rack.

7. In a floor rack for freight cars, the combination of a plurality of elongated stringers, each stringer comprising a sheet metal member formed with a laterally turned floor bearing flange at its base and with a laterally turned frame bearing flange adjacent its top, said stringer extending above said frame bearing flange being provided with a plurality of slots, metal frame members in said slots, and extending transversely of said stringers, said metal frame members being welded to said stringers at predetermined intersections of said frame members and stringers, and a foraminated metal covering for said frame members and secured thereto, said stringers being formed with a plurality

of substantially triangular shaped openings extending over the major portion of the area of the body of the stringer and leaving diagonally extending portions of the stringer extending alternately in opposite directions.

8. In a floor rack for freight cars, the combination of a plurality of elongated stringers, each stringer comprising a sheet metal member formed with a laterally turned floor bearing flange at its base and with a laterally turned frame bearing flange adjacent its top, said stringer extending above said frame bearing flange being provided with a plurality of slots, metal frame members in said slots, and extending transversely of said stringers, said metal frame members being welded to said stringers at predetermined intersections of said frame members and stringers, and a foraminated metal covering for said frame members and secured thereto, said stringers being formed with a plurality of substantially triangular shaped openings extending over the major portions of the stringer extending alternately in opposite directions, said openings being provided with a border flange around each opening, and extending transversely to the body flange of said stringer.

9. In a floor rack for freight cars, the combination of a plurality of elongated stringers, each stringer comprising a sheet metal member formed with a laterally turned floor bearing flange at its base and with a laterally turned frame bearing flange adjacent its top, said stringer extending above said frame bearing flange being provided with a plurality of slots, metal frame members in said slots, and extending transversely of said stringers, said metal frame members being welded to said stringers at predetermined intersections of said frame members and stringers, and a foraminated metal covering for said frame members and secured thereto, and a metal frame member disposed at the ends of said first-mentioned frame members and extending transversely thereto.

10. In a metal floor rack for refrigerator cars, a stringer of truss-like characteristics, comprising a sheet metal member formed with a wide body flange and with a floor bearing flange extending at substantially right angles to the body flange, a channel bearing flange located at the top of said stringer and extending at substantially right angles to the body flange, and a vertical flange carried by the channel bearing flange, said vertical flange being formed with a plurality of slots for receiving channelled frame members.

11. In a metal floor rack for refrigerator cars, a stringer of truss-like characteristics, comprising a sheet metal member formed with a wide body flange and with a floor bearing flange extending at substantially right angles to the body flange, a channel bearing flange located at the top of said stringer and extending at substantially right angles to the body flange, and a vertical flange carried by the channel bearing flange, said vertical flange being formed with a plurality of slots for receiving channelled frame members, said slots each having a laterally projecting tongue located therein in position to clamp the lower flange of a channel against the channel bearing flange.

12. In a metal floor rack for refrigerator cars, a stringer of truss-like characteristics, comprising a sheet metal member formed with a wide body flange and with a floor bearing flange extending at substantially right angles to the body

flange, a channel bearing flange located at the top of said stringer and extending at substantially right angles to the body flange, and a vertical flange carried by the channel bearing flange, said vertical flange being formed with a plurality of slots for receiving channelled frame members, said body flange being formed with a multiplicity of substantially triangular apertures, the bases of the triangles being oppositely disposed, whereby there remains of the body flange a multiplicity of diagonally extending frame portions acting like parts of a truss.

13. In a metal floor rack for refrigerator cars, a stringer of truss-like characteristics, comprising a sheet metal member formed with a wide body flange and with a floor bearing flange extending at substantially right angles to the body flange, a channel bearing flange located at the top of said stringer and extending at substantially right angles to the body flange, and a vertical flange carried by the channel bearing flange, said vertical flange being formed with a plurality of slots for receiving channelled frame members, said body flange being formed with a multiplicity of substantially triangular apertures, the bases of the triangles being oppositely disposed, whereby there remains of the body flange a multiplicity of diagonally extending frame portions acting like parts of a truss, and said triangular apertures being provided with outwardly projecting border flanges located on the same side as said floor bearing flange.

14. In a latching arrangement for floor racks, the combination of a pair of floor racks, each floor rack comprising supporting stringers and a covering for said stringers, said floor racks having adjacent stringers pivotally secured together on an axis substantially midway between the upper and lower edges of the stringers, and latching means carried by two of said stringers comprising cooperating members, one of said members being on each of said stringers, and each member including a retaining shoulder and a camming shoulder, said members being adapted to cam over each other and to have their latching shoulders come into engagement with each other when the stringers of the two racks are pivoted over into latching position, said latching means being located intermediate the upper and lower edges of the stringers, and said stringers being offset on one rack with respect to the stringers on the other rack, whereby the racks are adapted to be latched with the stringers in overlapping position.

15. In a floor rack arrangement for railway freight cars, the combination of a floor rack section adapted to span half the width of the car floor, said section being pivoted to a wall of the car adjacent one of its edges with the second floor rack section adapted to have a similar span and to extend from the edge of the first-mentioned section into the space between the doorways of the car, said sections each comprising at least a pair of stringers extending longitudinally of the car, the stringers of the doorway section being offset with respect to the stringers of the first section, and a covering for said stringers, and hinge means connecting said sections at their stringers, said hinge means having its pivot located substantially midway between the top and bottom of said stringers, whereby the second section is adapted to swing over with its stringers overlapping the stringers of the first section, when the first section has been pivoted upward against the side wall of the car.

16. In a floor rack arrangement for railway freight cars, the combination of a floor rack section adapted to span half the width of the car floor, said section being pivoted to a wall of the car adjacent one of its edges with the second floor rack section adapted to have a similar span and to extend from the edge of the first-mentioned section into the space between the doorways of the car, said sections each comprising at least a pair of stringers extending longitudinally of the car, the stringers of the doorway section being offset with respect to the stringers of the first section, and a covering for said stringers, and hinge means connecting said sections at their stringers, said hinge means having its pivot located substantially midway between the top and bottom of said stringers, whereby the second section is adapted to swing over with its stringers overlapping the stringers of the first section, when the first section has been pivoted upward against the side wall of the car, said stringers comprising sheet metal members formed with a bottom transverse bearing flange, and said hinge means comprising a pair of plates welded to said

stringers and secured together by a pivot member passing through registering apertures.

17. In a floor rack assembly adapted to be self-sustaining until the parts of the rack are welded together, the combination of a pair of stringers, each stringer comprising a metal member having a vertical flange and a horizontal foot flange, with a plurality of cross frame members, said stringers having slots in their upper edges for receiving said cross frame members, said slots having horizontally projecting tongues, and said cross frame members having horizontally extending flanges, said stringers also having horizontally extending bearing flanges at the top and said slots extending into said latter bearing flanges, whereby the stringers may be arranged in predetermined spaced relation at an acute angle to the vertical and the cross frame members may then be moved into said slots, the stringers then being moved to vertical position and held on their foot bearing flanges while said tongues clamp the horizontal flange of said cross frame members against said upper bearing flanges of said stringers.

CHARLES S. JOHNSTON.