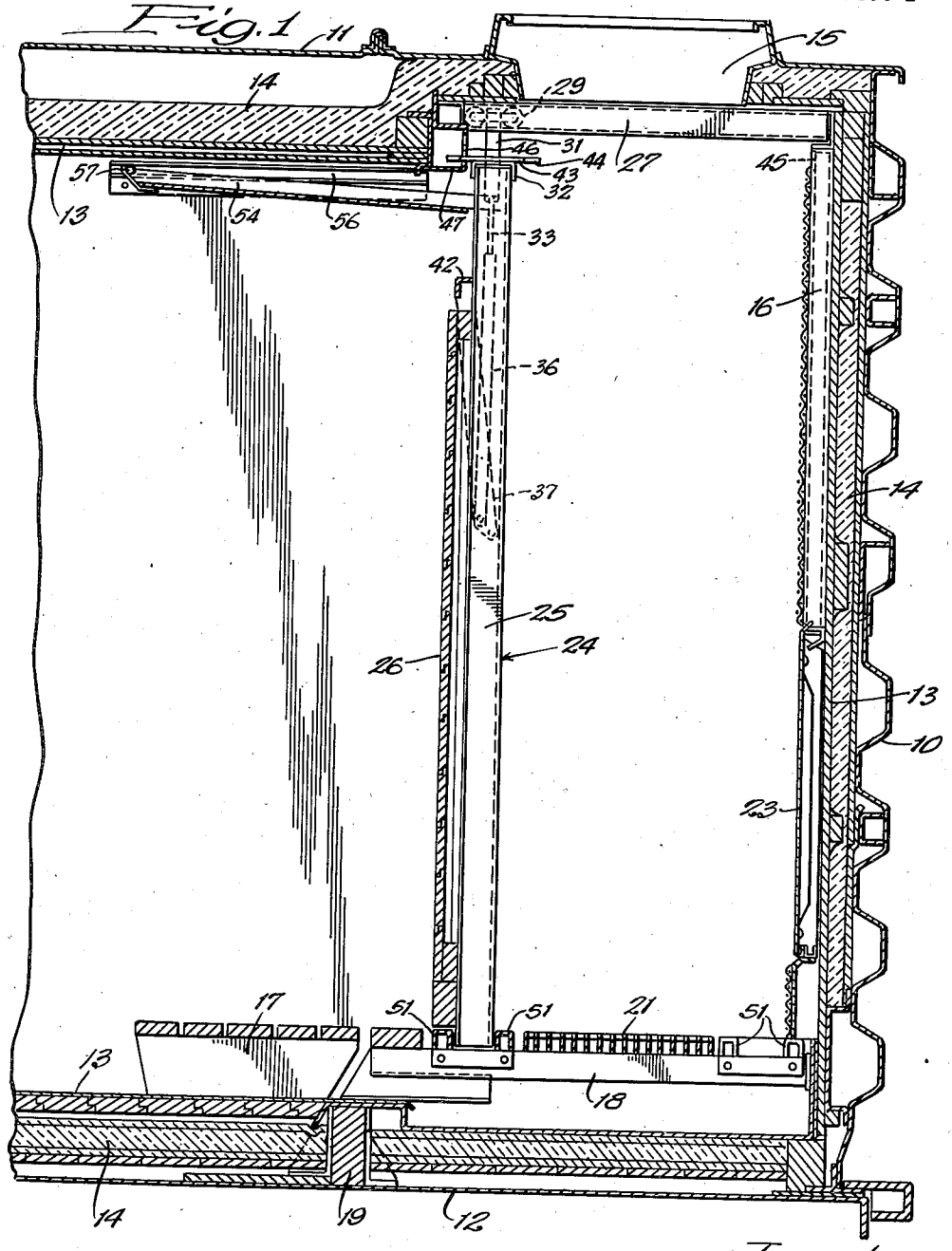
Sept. 7, 1943. J. S. LUNDVALL 2,328,820

MOVABLE BULKHEAD STRUCTURE

Filed April 22, 1942 4 Sheets-Sheet 1

Fig. 1



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Fig. 2

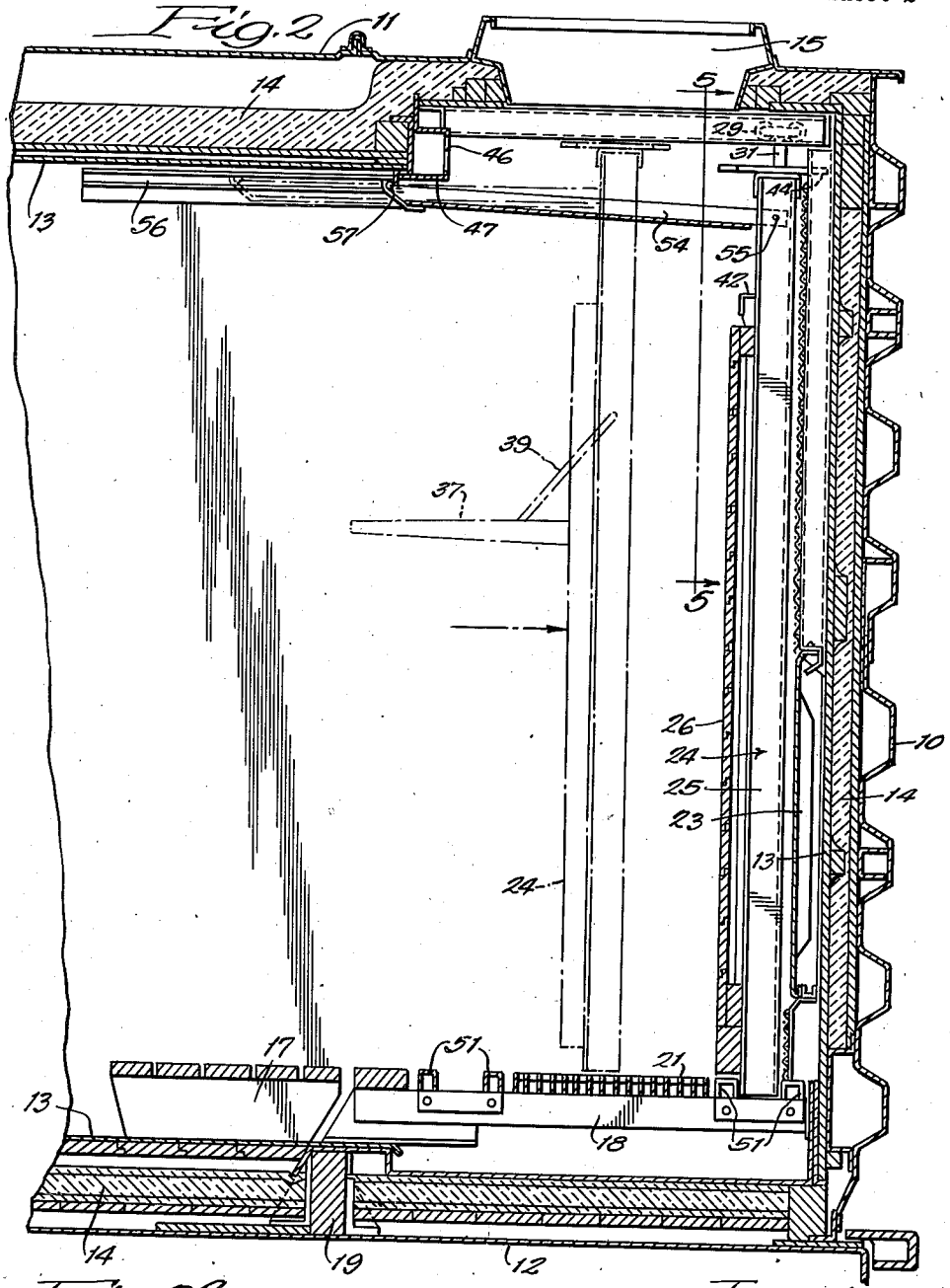
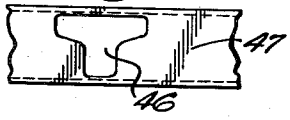


Fig. 2a



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MOVABLE BULKHEAD STRUCTURE

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Fig. 3

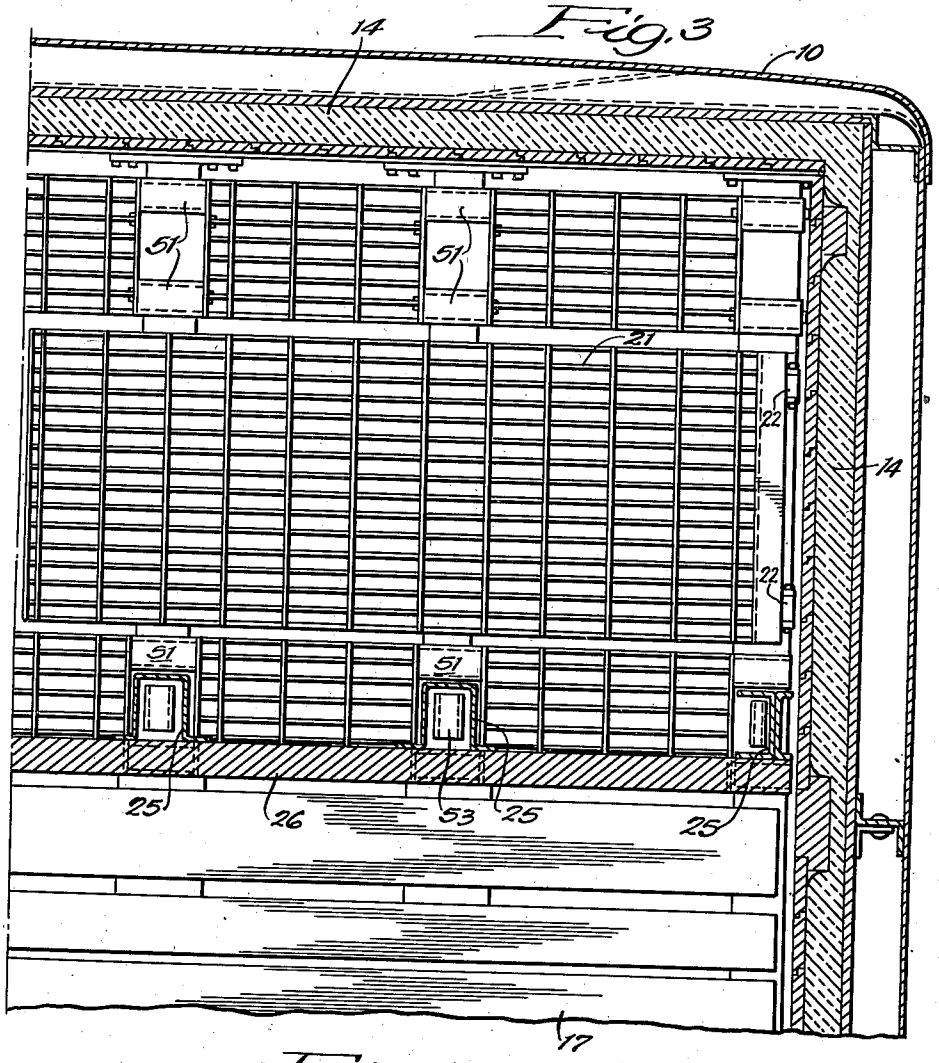
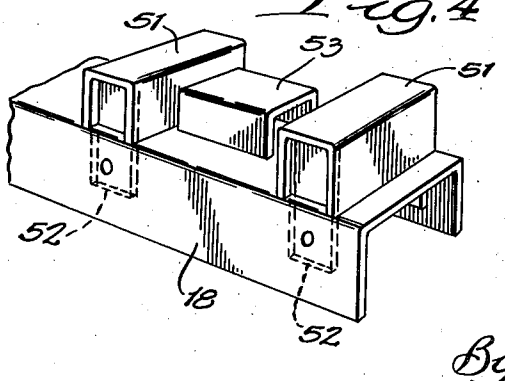


Fig. 4



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MOVABLE BULKHEAD STRUCTURE

Filed April 22, 1942 4 Sheets-Sheet 4

Fig. 6

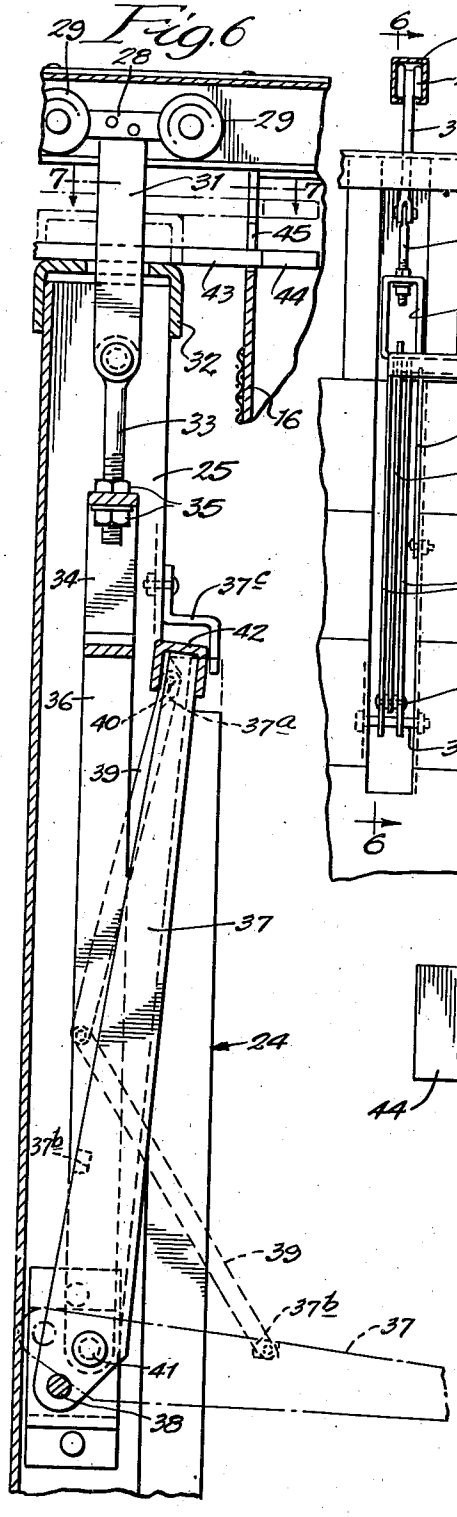


Fig. 5

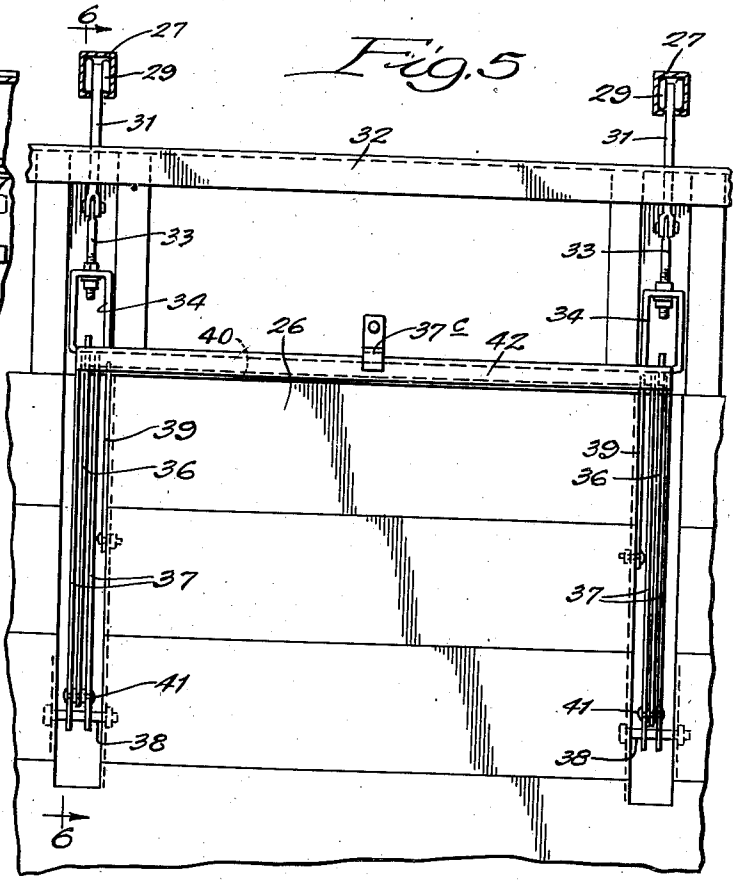
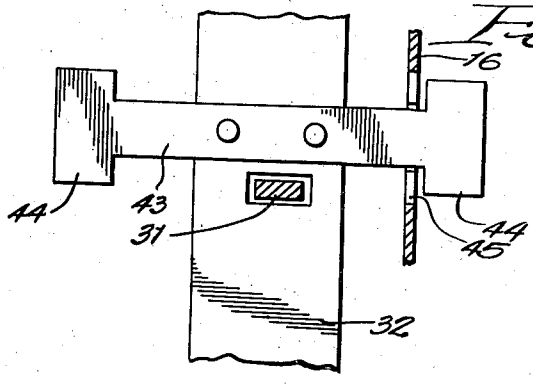


Fig. 7



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Patented Sept. 7, 1943

2,328,820

UNITED STATES PATENT OFFICE

2,328,820

MOVABLE BULKHEAD STRUCTURE

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Application April 22, 1942, Serial No. 440,027

15 Claims. (Cl. 105—376)

This invention relates to movable bulkheads and more particularly to bulkheads movably mounted in refrigerator or like cars to form ice bunkers adjacent the ends of the car or to move to a retracted position against the end of the car to increase the lading space.

One of the objects of the invention is to provide a movable bulkhead for refrigerator cars or the like of a relatively simple and inexpensive construction yet which operates easily to move from its retracted to its extended position.

Another object of the invention is to provide a movable bulkhead suspended from tracks in the top of the car and adapted to be raised and lowered by a system of simple links and levers. Preferably a plurality of parallel tracks are provided to support the bulkhead without additional bracing or like means and the link and lever system is interconnected so that the bulkhead may be raised uniformly throughout its width.

Another object of the invention is to provide a movable bulkhead which is freely movable in the car when in its raised position and which is held rigidly against movement when it is lowered.

Still another object of the invention is to provide a movable bulkhead having associated therewith a hatch cover automatically moved into register with a hatch opening in the car when the bulkhead is retracted. According to one feature the bulkhead and hatch cover are pivotally connected so that raising and lowering of the bulkhead will not interfere with the mounting of the hatch cover.

A further object of the invention is to provide a movable bulkhead having a latch automatically operable to hold it in raised position when it is raised.

The above and other objects and advantages of the invention will be apparent from the following description of the embodiment shown in the accompanying drawings, in which—

Figure 1 is a partial longitudinal section of a refrigerator car equipped with a convertible bulkhead according to the invention;

Figure 2 is a view similar to Figure 1 showing the bulkhead in a different position;

Figure 2a is a partial elevation showing the opening for cooperation with the latch bar at the top of the bulkhead;

Figure 3 is a partial plan view of the car;

Figure 4 is a perspective view of a construction for anchoring the lower end of the bulkhead;

Figure 5 is a partial elevation of the bulkhead showing the raising mechanism taken on the line 5—5 of Figure 2;

Figure 6 is an enlarged partial section on the line 6—6 of Figure 5; and

Figure 7 is a partial section on the line 7—7 of Figure 6.

The car illustrated in the drawings may be a more or less conventional refrigerator car having an end wall 10 and top and bottom walls 11 and 12 with inner sheathing 13 spaced therefrom to provide a hollow wall which may be insulated by insulating material indicated at 14. A hatch opening 15 is provided in the top of the car adjacent its end for filling the ice bunker portion of the car with ice, a suitable external cover, not shown, being provided for the hatch opening.

At the end of the car inside of the sheathing 13 there is provided a sheet metal duct 16 having a perforated inner face and forming a convection duct for circulating cooled air throughout the car when it is used as a refrigerator car. The bottom of the car in the intermediate lading space carries a floor rack 17 and the end of the car is provided with a series of longitudinal beams 18 spaced above the floor thereof and supported by a cross beam 19 in the lower part of the car. Floor racks 21 are hinged at 22 adjacent the sides of the car and may be swung up for cleaning the floor of the car. An ice-grate 23 is pivotally supported adjacent the end of the car and is adapted to be swung to a horizontal position to support a load of ice in the top portion of the bunker.

A bulkhead indicated generally at 24 is slidably supported in the car and is movable therein from a retracted position adjacent the end wall to an extended position spaced from the end wall to provide an ice-bunker space therebetween. The bulkhead, as shown, is formed by a plurality of vertically extending channel beams 25 with their open channels facing toward the center of the car and formed with flanges carrying a wall portion 26. As shown, the wall portion terminates short of the top of the channel beams to provide a space thereabove for air circulation and the beams preferably extend slightly below the bottom edge of the wall portion, as shown.

The bulkhead is adapted to be suspended from a pair of horizontal tracks 27 extending longitudinally adjacent the top of the car and slidably supporting carriages 28 provided with rollers 29 at their ends. According to one feature of the invention, the tracks 27 are supported above the ceiling of the car in a recess at one end thereof so that the lading space of the car is not interfered with. Straps 31 are connected to the carriages and extend downwardly therefrom into

the open channels of two of the beams **25** respectively. As shown in Figure 6, the upper ends of the channels may be closed by a capping strip **32** which is provided with slotted openings to receive the straps **31**. Each strap at its lower end carries a threaded rod **33** extending into a yoke or loop **34** and adjustably connected thereto by nuts **35**. The yoke or loop **34** has rigidly secured to its lower end a rod or strap **36** extending downwardly through the open channel of the beam to a point adjacent its central portion but preferably above the center thereof.

The straps or rods **36** are connected to the bulkhead by means of levers **37** extending into the open channel portions of the beams and pivoted thereto at their outer ends on bolts **38** which extend across the channel and are secured in the sides thereof. As shown, the levers comprise spaced parts between which the strap or rod **36** passes and the lower end of each rod **36** is pivotally connected to the corresponding lever **37** by a bolt or rivet **41** spaced longitudinally of the lever from the pivot connection **38**.

In order that the levers **37** may operate freely the wall **26** of the bulkhead is cut away to form longitudinally extending slots opening into the channels of the beams and into which the levers may swing. The two levers **37** are connected at their tops by a rigid channel member **42** so that they may both be operated together, it being apparent that when the levers are swung downwardly the bulkhead will be raised while when the levers are allowed to be swung upwardly to the position shown in Figures 1 and 7, the bulkhead will be lowered.

When the levers **37** are swung down to raise the bulkhead they may be held down to latch the bulkhead in raised position by a pair of levers **39** pivoted to the channels and carrying a latch bar **40**. The latch bar is received in notches **37***a* and **37***b* adjacent the outer ends and in the central portions respectively of the levers **37**. When the levers **37** are raised to lower the bulkhead as shown in Figures 5 and 6, the bar **40** lies in the outer notches **37**ª so that the levers **37** may be moved closely against the bulkhead without interference. The levers may be held in this position by a latch in the form of a bent plate or arm **37**ᶜ pivotally connected to the bulkhead as shown in Figure 6.

When the levers **37** are pulled down to raise the bulkhead the latch will follow with the bar **40** riding against the upper surface of the levers until it drops into the notches **37**ᵇ as shown in dotted lines in Figure 6. Thus the latch will hold the levers against swinging up under the weight of the bulkhead. To lower the bulkhead the latch may be released manually to allow the levers **37** to move up.

The bulkhead is adapted to be rigidly held in either its extended or retracted position by interengaging means on the opposite ends of the bulkhead and on the car which engage when the bulkhead is lowered but are free when the bulkhead is raised. This means, as shown, at the upper end of the bulkhead comprises a cross bar or plate **43** secured to the top of the bulkhead and extending transversely across it to terminate in T-shaped heads **44** at its opposite ends. One of the T-shaped heads **44** is adapted to cooperate with a slot **45** formed in the upper portion of the duct **16** having an enlarged upper end through which the T-shaped head may pass and a reduced lower end for engaging the head. When the bulkhead is in its raised position the head **44** will register with the enlarged upper portion of the slot while when the bulkhead is lowered the head **44** will engage behind the edges of the slot and hold the bulkhead against movement away from the end wall of the car. At the opposite end of the tracks the other head **44** cooperates with a similarly shaped slot **46** in the outer surface of a sheet metal beam **47** extending transversely across the car above the ceiling level thereof and serving to support one end of the tracks **27**.

The lower end of the bulkhead is adapted to be held against movement when in its lowered position by means of bars **51** spaced longitudinally of the car and supported on the beams **18**. The bars **51** may, if desired, be formed of sheet metal secured to the beams **18** by projections **52** extending through the tops of the beams and bolted or riveted to the side walls thereof. As shown, two sets of bars are provided, one set adjacent the end of the car to receive the lower ends of the channel beams **25** when the bulkhead is in its retracted position and another set spaced from the end of the car to receive the lower ends of the channel beams when the bulkhead is in its extended position. Preferably, the upper surfaces of the bars **51** are substantially flush with the floor racks **17** and **21** to provide a substantially continuous floor surface in the car. In order to anchor the lower ends of the beams more securely blocks **53** may be secured to the beams **18** between the bars **51** to fit into the open lower ends of the channel beams when they are lowered.

In order to close the hatch opening **15** to prevent ingress to the car when the bulkhead is retracted, a hatch cover **54** is provided. The hatch cover is preferably formed by a series of spaced bars or arms, the ends of which extend into the open channels of the beams **25** and are pivotally connected thereto by pivot pins **55**. The outer end of the hatch cover is slidably supported on a pair of tracks **56** mounted on the sides of the car adjacent the top and receiving the ends of a transverse pin **57** carried by the hatch cover. The hatch cover extends the full width of the car so that it may be supported on tracks on the sides of the car and so that foreign material cannot enter the car around its sides.

In operation when the car is to be used as a refrigerator car the bulkhead is moved to the position shown in Figure 1 and is lowered to interengage the T-shaped head of the bar **43** with the slot **46** and to drop the lower ends of the channel beams **25** between the spaced bars **51** on the beams **18**. In this position the bulkhead is rigidly held against movement at a point spaced from the end of the car to provide an ice-bunker space adjacent the car end.

When it is desired to use the car as a ventilated car without refrigeration, the levers **37** may be swung down to raise the bulkhead thereby freeing the bar **43** from the slot **46** and elevating the lower ends of the beams **25** above the bars **51**. The bulkhead may then be pushed back against the end of the car riding on the tracks **27** until it is in its extreme retracted position. At this time the levers **37** may be swung upwardly lowering the bulkhead so that its lower ends will engage with the bars **51** and so that the head **44** on the bar **43** will interlock with the slot **45**. During this operation the hatch cover **54** is moved into register with the hatch, the pivot connection between the hatch cover and the bulkhead permitting the bulkhead to be raised and low-

ered freely without interference from the hatch cover.

While one embodiment of the invention has been shown and described in detail, it will be understood that this is illustrative only and is not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A movable bulkhead structure for a refrigerator car or the like comprising a pair of spaced horizontal tracks adjacent the top of the car, rollers riding on the tracks respectively, a vertical bulkhead below the tracks, links suspended from the rollers, a pair of levers pivoted at spaced points to the bulkhead intermediate its height and to the links respectively, and a bar rigidly connecting the free ends of the levers whereby they are moved together.

2. A movable bulkhead structure for a refrigerator car or the like comprising a pair of spaced horizontal tracks adjacent the top of the car, rollers riding on the tracks respectively, a vertical bulkhead below the tracks including a plurality of spaced vertical channel beams and a wall portion secured to the open channel side of the beams, a pair of links suspended from the rollers respectively and lying within the channels of two of the beams, a pair of levers pivoted respectively at spaced points adjacent one end to the links and to said beams, and a bar rigidly connecting the opposite ends of the levers whereby they may be moved together.

3. A movable bulkhead structure for a refrigerator car or the like comprising a pair of spaced horizontal tracks adjacent the top of the car, a vertical bulkhead in the car below the tracks, means suspending the bulkhead from the tracks and adjustable to raise and lower the bulkhead, a transverse beam secured to the top of the car adjacent one end of the tracks and having latch means thereon, and a T-shaped member secured to the top of the bulkhead and adapted to enter the latch means when the bulkhead is raised and moved longitudinally of the car and to engage the latch means when the bulkhead is lowered to hold the bulkhead against movement.

4. A movable bulkhead structure for a refrigerator car or the like comprising a pair of spaced horizontal tracks adjacent the top of the car, a vertical bulkhead in the car below the tracks, means suspending the bulkhead from the tracks and adjustable to raise and lower the bulkhead, a transverse beam secured to the top of the car adjacent one end of the tracks and having an opening therein with an enlarged upper portion and a reduced lower portion, a wall adjacent the end of the car formed with an opening having an enlarged upper portion, and a plate secured to the top of the bulkhead and formed with a T-shaped portion at each side thereof, one part of which is adapted to engage one of said openings when the bulkhead is at one end of the tracks and the other part of which is adapted to engage the other of said openings when the bulkhead is at the other end of the tracks.

5. A movable bulkhead structure for a refrigerator car or the like having a series of longitudinally extending floor beams adjacent its floor comprising track means adjacent the top of the car, a vertical bulkhead, means suspending the bulkhead from the track means and adjustable to raise and lower the bulkhead, and spaced bars on the beams to receive the lower end of the bulkhead between them when the bulkhead is lowered to prevent movement thereof, the lower end of the bulkhead clearing the bars when the bulkhead is raised.

6. A movable bulkhead structure for a refrigerator car or the like having a series of longitudinally extending floor beams adjacent its floor comprising track means adjacent the top of the car, a vertical bulkhead, means suspending the bulkhead from the track means and adjustable to raise and lower the bulkhead, the bulkhead including vertical channel beams open at their bottom, spaced bars on the floor beams to receive the lower ends of the channel beams between them, and blocks carried by the floor beams between the bars to fit into the lower open ends of the channel beams.

7. A movable bulkhead structure for a refrigerator car or the like having a hatch opening in its top comprising track means in the car longitudinally coextensive with the hatch opening, a bulkhead supported on the track means for movement thereon from a retracted to an extended position, a hatch cover pivotally connected at one end to the bulkhead, and means slidably supporting the other end of the hatch cover.

8. A movable bulkhead structure for a refrigerator car or the like having a hatch opening in its top comprising track means in the car longitudinally coextensive with the hatch opening, a bulkhead supported on the track means for movement thereon from a retracted to an extended position, means for raising and lowering the bulkhead, means to hold the bulkhead against movement when it is lowered, a hatch cover pivotally connected at one end to the bulkhead, and means slidably supporting the other end of the hatch cover.

9. A movable bulkhead structure for a refrigerator car or the like having a hatch opening in its top comprising track means in the car longitudinally coextensive with the hatch opening, a bulkhead supported on the track means for movement thereon from a retracted to an extended position, the bulkhead including a series of vertical channel beams, a hatch cover including a pair of supporting arms projecting at one end into the channels of two of the beams and pivoted thereto, and means for slidably supporting the opposite ends of the supporting arms.

10. A movable bulkhead structure for a refrigerator car or the like having a hatch opening in its top comprising track means in the car longitudinally coextensive with the hatch opening, a bulkhead supported on the track means for movement thereon from a retracted to an extended position, the bulkhead including a series of vertical channel beams, a hatch cover including a pair of supporting arms projecting at one end into the channels of two of the beams and pivoted thereto, a second track means adjacent the top of the car beyond the hatch opening, and means slidably supporting the opposite ends of the arms on the second track means.

11. A movable bulkhead structure for a refrigerator car or the like having a hatch opening in its top comprising track means in the car longitudinally coextensive with the hatch opening, a bulkhead supported on the track means for movement thereon from a retracted to an extended position, a hatch cover movably mounted in the upper portion of the car and extending from side to side thereof, and means connecting the hatch cover to the bulkhead so that it will underlie the hatch opening when the bulkhead is moved to its retracted position.

12. A movable bulkhead structure for a refrigerator car or the like having a hatch opening in its top comprising track means in the car longitudinally coextensive with the hatch opening, a bulkhead supported on the track means for movement thereon from a retracted to an extended position, a hatch cover movably mounted in the upper portion of the car and extending from side to side thereof, a pair of tracks mounted on the sides of the car slidably supporting one end of the hatch cover, and means connecting the other end of the hatch cover to the bulkhead.

13. A movable bulkhead structure for a refrigerator car or the like comprising track means adjacent the top of the car, a bulkhead below the track means, adjustable means suspending the bulkhead from the track means and including an operating lever swingable about a horizontal axis on the bulkhead to raise and lower the bulkhead, and latch means operable automatically when the lever is swung to a position to raise the bulkhead to engage the lever and latch it in that position.

14. A movable bulkhead structure for a refrigerator car or the like comprising track means adjacent the top of the car, a bulkhead below the track means, a lever pivoted on a horizontal axis on the bulkhead, means connecting the lever to the track means so that when the lever is swung down the bulkhead will be raised, and a latch member pivoted on the bulkhead to swing down when the lever swings down to latch the lever in its down position.

15. A movable bulkhead structure for a refrigerator car or the like comprising track means adjacent the top of the car, a bulkhead below the track means, a lever pivoted on a horizontal axis on the bulkhead, means connecting the lever to the track means so that when the lever is swung down the bulkhead will be raised, a latch lever pivoted on the bulkhead on a horizontal axis above the pivotal axis of the lever, and means on the free end of the latch lever to engage the lever and hold it in its down position.

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