

[54] **BULKHEAD DOOR**

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[51] Int. Cl.....B60p 7/14

[58] Field of Search.....296/24, 39; 105/376

[56] **References Cited**

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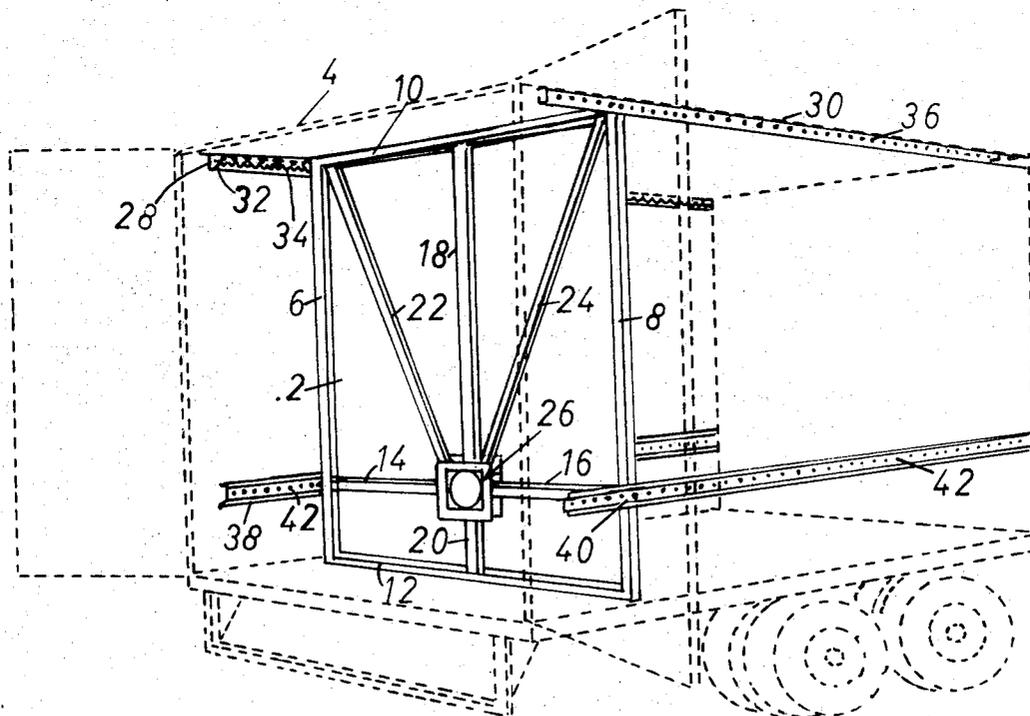
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[57] **ABSTRACT**

A bulkhead door adapted to be mounted within a container transversely of the side walls thereof and to be suspended from tracks which extend longitudinally of the container. The door is adapted to be suspended at its upper end by means of pinions mounted on and rotatable with a shaft extending transversely of the door and adapted to engage pinion racks extending longitudinally along the opposed side walls of the container. The door is provided with a three point locking system which includes a pair of locking members adapted to be projected from the sides of the door into apertured tracks which extend in spaced relationship parallel to the suspension pinion racks and a third locking member which, when projected, serves to prevent rotation of the transversely extending shaft and thus of the pinion racks.

11 Claims, 8 Drawing Figures



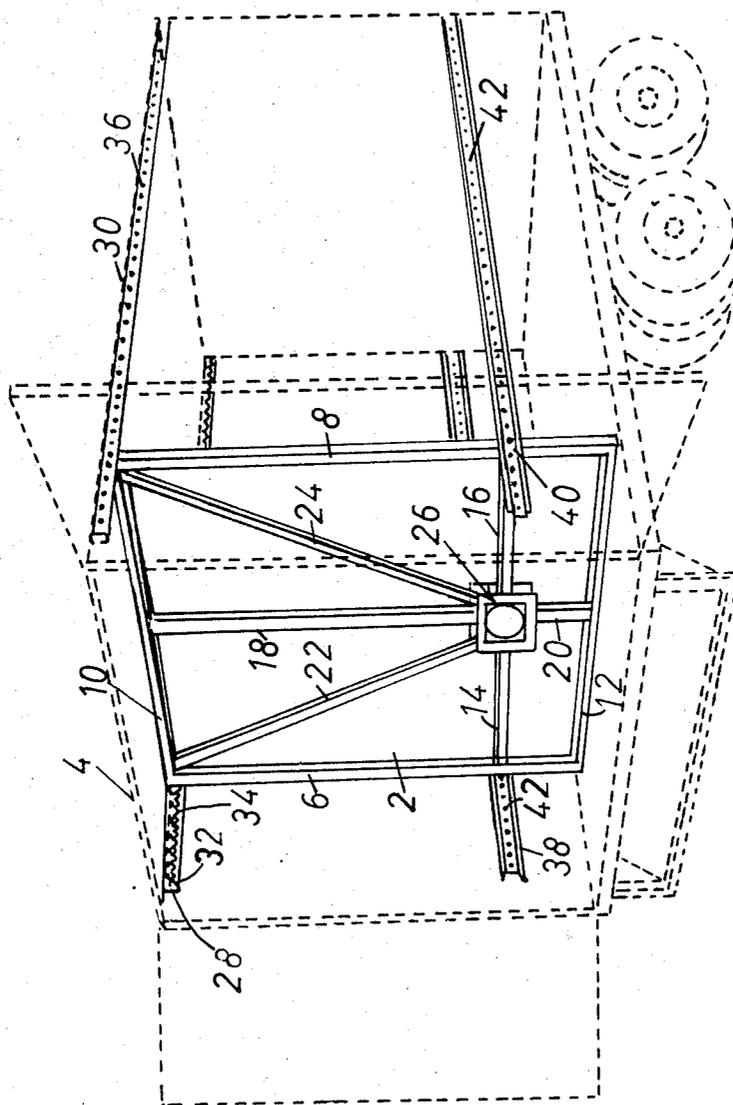


FIG. 1

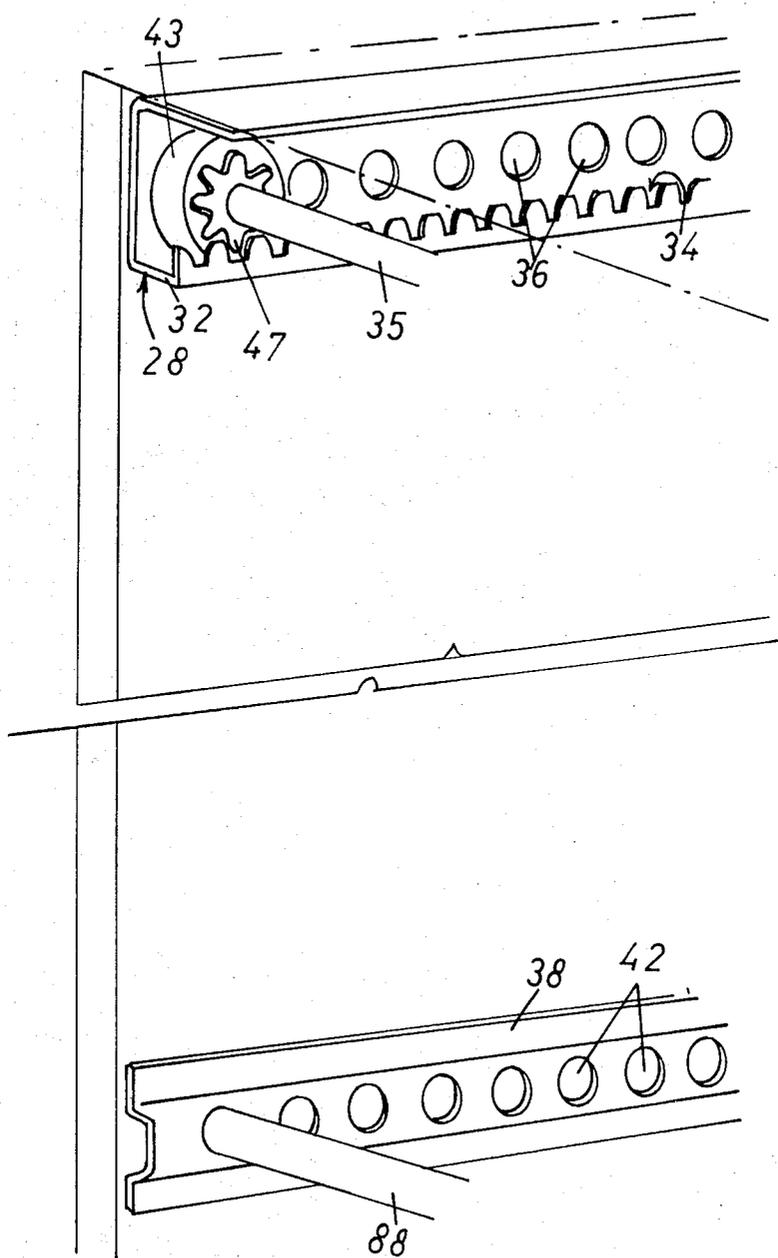


FIG. 4

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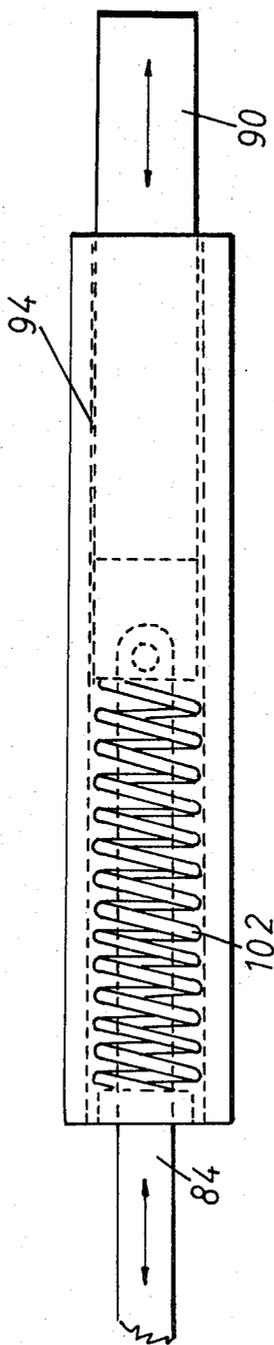


FIG. 5

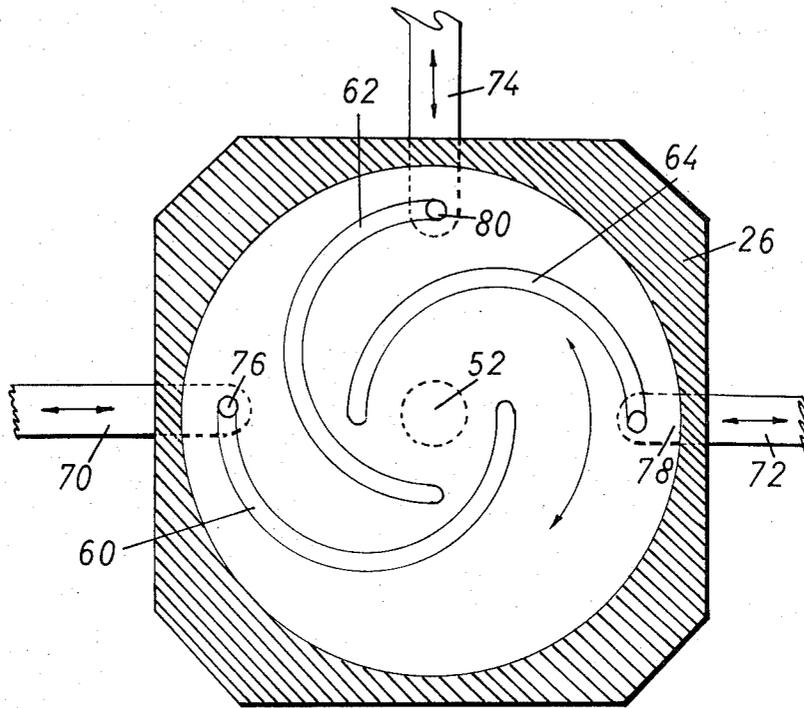


FIG. 6

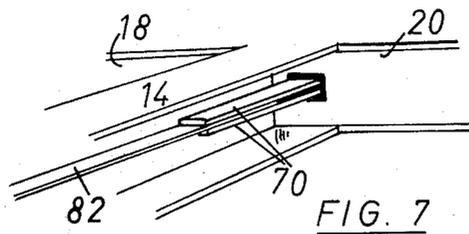
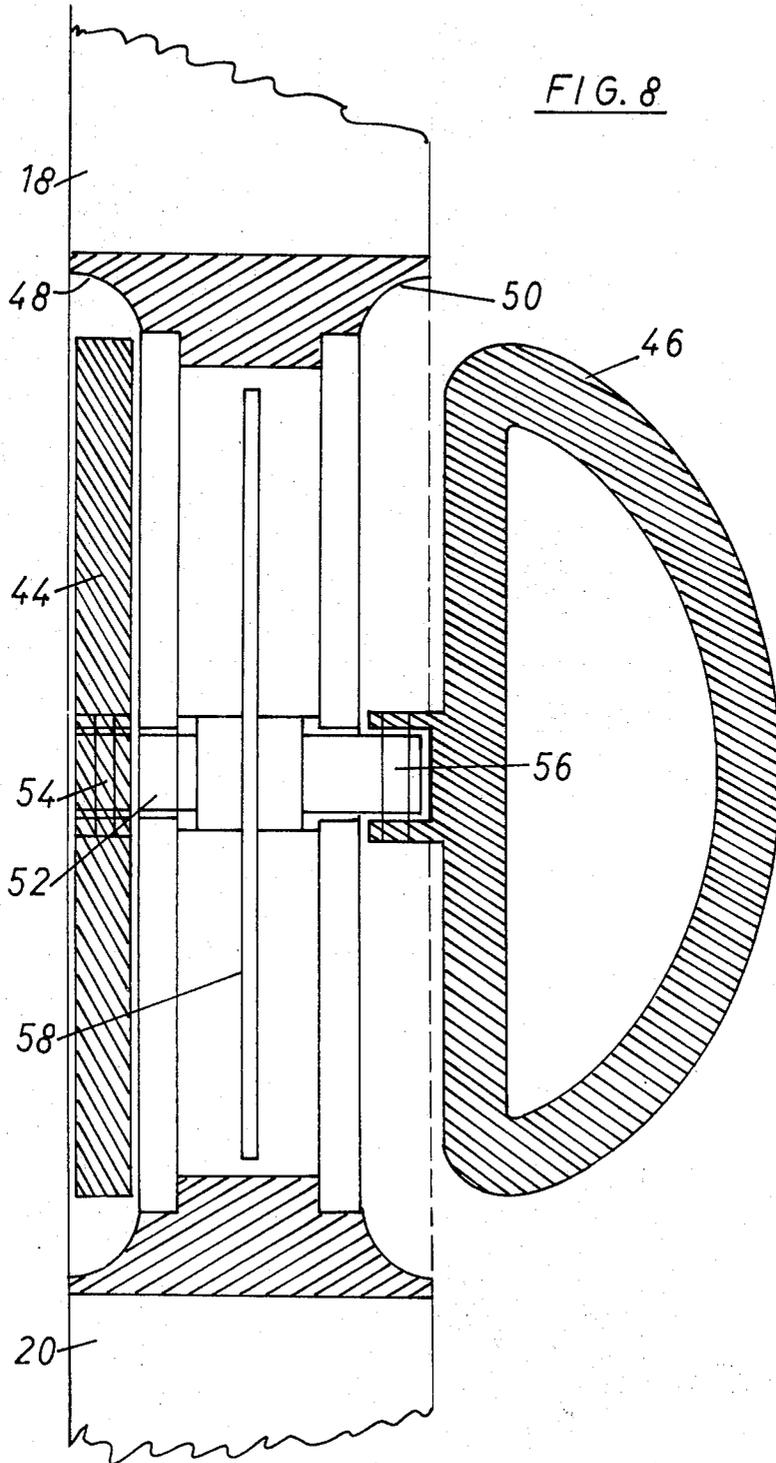


FIG. 7



BULKHEAD DOOR

The present invention relates to bulkhead doors for containers such as truck trailer bodies, railway vans or freight cars and the like.

The bulkhead door of the present invention is of the type which extends within a container transversely of the side walls thereof, is adapted to be suspended from tracks which extend longitudinally of the container, and is provided with means for releasably locking and maintaining it stationary at selected positions along the length of the container to form a movable load divider or bulkhead within the container.

The bulkhead door according to the present invention is of lightweight construction, is suspended at its upper end by means of pinions mounted on a shaft extending transversely of the door and adapted to engage pinion racks extending longitudinally along the opposed side walls of the container and can be moved freely by one operator to any selected position along the length of the container thereby enabling it to be located at any point behind the cargo position within the container. The bulkhead door is provided with a single master locking system which is adapted to be actuated by a simple twist of a handle which controls a pair of locking members adapted to be projected from the sides of the door into apertured tracks which extend in spaced relationship parallel to the suspension pinion rack and a third locking member which, when projected, serves to prevent rotation of the transversely extending shaft and thus of the pinions engaging the racks.

An object of the invention is to provide a bulkhead door for a load container which may be readily moved by a single operator to selected operative positions along the length of the container thereby to define load compartments of desired sizes within the container.

Another object of the invention is to provide a bulkhead door for a load container which, when not in use, can be stored overhead in a position whereat the door is releasably locked in a position immediately beneath and in a plane substantially parallel with that of the roof of the container.

A further object of the invention is to provide a bulkhead door which is suspended by means of pinions mounted on a shaft extending transversely of the door and meshing with toothed racks which extend longitudinally of the container along the opposite inner side walls thereof.

A still further object of the invention is to provide a bulkhead door having a multi-point locking system which enables the door to be positively, though releasably, secured at a multiplicity of spacially separated points along the container.

Yet other objects of the invention are to provide a bulkhead door which is of light weight yet durable and sturdy construction; which may, if desired, be filed with insulation to provide a refrigeration door; which can be installed in and moved between different positions longitudinally of the container and which can be moved between its operative and retracted positions in a simple and expeditious manner; and which can be releasably locked in any one of a multiplicity of closely spaced positions along the length of the container thereby to define load compartments of varying size within the container.

In accordance with the foregoing and other objects, the present invention contemplates the provision of a bulkhead door assembly for mounting within a container such as a truck trailer body or the like, said door having a shaft mounted for rotation about its longitudinal axis, said shaft extending transversely of said door adjacent the upper edge thereof and having a pinion gear keyed thereto adjacent opposite ends thereof, said pinion gears adapted to mesh with toothed racks extending along the opposed side walls of the container adjacent the top thereof, a pair of longitudinally extending strips provided with a plurality of spaced apertures and mounted on said opposed side walls of the container intermediate the top and bottom thereof and spaced from said toothed racks, and a locking mechanism comprising a plurality of locking members adapted to be moved in synchronism from a retracted position to an extended position whereat, with the bulkhead door in its operative position in a vertical plane, two of said members are adapted to project into corresponding apertures in said apertured strips and the third of said locking members is adapted to engage the shaft to lock it against rotation.

When not in use the door may be swung upwardly about the rack and pinion suspension to a position whereat it is disposed immediately below and in a plane generally parallel to the roof of the container and can be locked in the retracted position by the locking mechanism, the side locking members of which, in this position, are adapted to be projected into appropriate ones of a series of apertures formed in the toothed racks and which are spaced from each other by distances corresponding to the spacing between the apertures formed in said longitudinally extending strips.

The shaft may be continuous or may be in the form of two stub shafts interconnected at their inner ends, for common rotation, by a sleeve or the like and in either case the shaft is supported in suitably spaced bearings mounted on or secured to the door structure.

The door may be in the form of a frame constructed from suitable sections, which may be of channel-shape or any other suitable cross section, and provided if necessary with appropriate bracing sections and is preferably faced with panels of metal such as stainless steel, aluminum, or the like, or may be faced with panels of wood, fiberglass or indeed any other suitable materials providing the desired characteristics insofar as rigidity, strength, durability, ease of cleaning etc. as may be required depending on the particular application. Also the door may be filled with insulation particularly where it is to serve as a divider wall for a refrigerated compartment within a container such as a truck trailer body, or the like.

Other features which may be incorporated in accordance with the invention will be described hereinafter and referred to in the appended claims.

The invention will now be more particularly described with reference to embodiments thereof shown, by way of example, in the accompanying drawings, in which:

FIG. 1 is a view in perspective showing the bulkhead door mounted in a truck trailer body;

FIG. 2 is a front elevation of the bulkhead door with the front cover panel omitted to show constructional details of the door;

FIG. 3 is a detail, in perspective, of an upper corner of the bulkhead door;

FIG. 4 is a perspective view showing details of the rack and pinion suspension system and the side locking arrangement for the door;

FIG. 5 is a detail showing the construction of the locking pin arrangement;

FIG. 6 is a fragmentary view, partly in section, showing the lock control center;

FIG. 7 is a perspective view showing a detail of the construction of the locking bar mechanism; and

FIG. 8 is a fragmentary sectional view in side elevation of the locking mechanism control handle.

Referring to the drawings, and particularly to FIG. 1, the bulkhead door generally designated 2 is shown mounted within a truck trailer body shown in phantom outline at 4. The door is formed of a frame consisting of channel-section side members 6 and 8, and top and bottom members 10 and 12 respectively, suitably braced by horizontal frame members 14 and 16, vertical frame members 18 and 20, and diagonal frame members 22 and 24, all of which may be of similar channel-shape or other appropriate cross section and which radiate from a locking mechanism control center generally designated 26.

The bulkhead door is adapted to be mounted within the truck trailer body on a pair of longitudinally extending tracks 28 and 30 which tracks are mounted on the opposed side walls of the trailer body adjacent the upper ends thereof or may depend from the roof of the trailer body adjacent the tops of said side walls. The tracks 28 and 30 which are of identical constructions each have an inwardly open C-shaped cross section. The lower inwardly extending flange 32 of each of the tracks is formed with a rack 34 extending upwardly therefrom normal thereto and the webs of the tracks are formed with a series of spaced apertures 36. The door 2 is provided with a shaft 35 mounted for rotation in bearings 37, 39 and 41 secured to the door frame structure. The shaft 35 extends transversely of the door and is provided at the opposite ends thereof which project beyond the sides of the door with rollers 43 and 45 having pinion gears 47 and 49 secured to the inner faces 51 and 53 of the rollers or formed integral with the rollers. The shaft 35 extends within and is secured to a sleeve 55 for rotation therewith and the sleeve 55 is provided at three equally spaced points around its periphery with apertures 106 adapted to receive a locking pin as will be described hereinafter. The shaft 35 may be continuous or may be in the form of a pair of half shafts interconnected by means of the sleeve 55. The pinion gears 47 and 49 are adapted to mesh with the racks 34, 36 respectively and the rollers 43 and 45 are adapted to move along the lower webs 57 and 59 of the tracks 38 and 40 respectively.

A pair of rails 38 and 40 are mounted on the side walls of the trailer body inwardly at the bottoms thereof. The rails 38 and 40 are each formed with apertures 42 spaced apart at distances corresponding to the distances between the apertures 36 formed in the tracks 38 and 40 and with the apertures 36 and 42 aligned with each other in the vertical plane.

The locking mechanism control center 26 includes a pair of handles 44 and 46 which are accessible from opposite faces of the bulkhead door and each is adapted to actuate the locking mechanism independently of the

other. The handles 44 and 46 are normally retracted to the position of handle 44 as shown in FIG. 8 whereat they are housed within the recesses 48 and 50 in the control center housing but may be extended to their operative position i.e. the position of handle 46 as shown in FIG. 8, whereat they extend in a plane containing the axis of shaft 52 on opposite ends of which the handles are mounted. The handles are keyed to the shaft 52 by pins 54 and 56 whereby upon rotation thereof they are operative to rotate a cam plane 58 which is also mounted on shaft 52. The cam plate 58 is provided with three arcuate slots 60, 62 and 64. The centers of the arcuate slots 60, 62 and 64 are disposed eccentric relative to the shaft 52 and the axis of the cam plate 58.

Three pairs of locking bars 70, 72 and 74 are formed with pins 76, 78 and 80 respectively at their inner ends. The pins 76, 78 and 80 are passed through the slots 60, 62 and 64 respectively and are secured at their opposite ends to associated ones of the pairs of locking bars 70, 72 and 74 respectively.

The arrangement is such that upon rotation of shaft 52, the consequently cam plate 58, the slots 60, 62 and 64 ride over their associated pins 76, 78 and 80 and are operative to urge the locking bars longitudinally within the frame members 14, 16 and 18 respectively in a direction depending on the direction of rotation of the shaft.

One end of each of the locking rods 82, 84 and 86 is secured between the outer ends of the pairs of locking bars 70, 72 and 74 and the other ends of the locking rods 82, 84 and 86 are provided with locking pins 88, 90 and 92 respectively which pins are adapted to be reciprocated within housings 94, 96 and 98 respectively mounted on the outer ends of the frame members 14, 16 and 18 respectively, upon rotation of the shaft 52. The identical pins are spring loaded by means of springs 100, 102 and 104 respectively. The locking pins 100 and 102 in the extended position of the rods 82 and 84 project beyond the opposite sides of the door and are adapted to engage in corresponding ones of the apertures 42 in the rails 38 and 40 whilst the locking pin 92 is adapted, in the extended position of its associated rod 86, to engage in one of three symmetrically spaced apertures 106 formed in the periphery of the sleeve 108 which surrounds the shaft.

The locking arrangement according to the invention provides full control by the operator who can lock the door in a selected operative position, or in its retracted overhead position, by a simple twist of the control handle and can release the door in similar fashion when it is desired to move same to a new position within the container. Furthermore the rack and pinion suspension enables the door to be moved freely by a single operator to any desired position within the container. Also by mounting the two pinions on a common unitary or composite shaft positive alignment between the two pinions is assured whereby the pinion on one side of the bulkhead door is prevented from moving ahead of the pinion on the other side and thereby any tendency of the bulkhead door to bind during movement thereof longitudinally of the tracks is eliminated.

The bulkhead door may be provided on opposite faces thereof with panels of any suitable material such as stainless steel, aluminum or other metal sheeting, or

may be provided with face panels of wood, fiberglas or other suitable material. Furthermore the interior of the door may be filled with insulation material particularly in those cases where the door is to function as a bulkhead for a refrigerated compartment within a container.

Also to make the bulkhead door universally applicable within containers of varying internal dimensions and to ensure, where desired, a positive seal of the edges with the inner walls of the container suitable sealing means which are adapted to accomodate any irregularities in the walls of the container and may be permanently or removably mounted around the edges of the door. These sealing means may be in the form of strips or bands of any suitable materials, such as natural or synthetic rubber, plastics, such as neoprene, and the like, and sealing members may conveniently be constructed in a manner similar to that of the flexible skirts commonly used on air cushion vehicles.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A bulkhead door for mounting within a container, said door having a shaft mounted for rotation about its longitudinal axis, said shaft extending transversely of said door adjacent the upper edge thereof and having a pinion gear keyed thereto adjacent opposite ends thereof, said pinion gears adapted to mesh with racks extending along the opposed side walls of the container adjacent the top edges thereof, a pair of longitudinally extending rails provided with a plurality of spaced apertures and mounted on said opposed side walls of the container intermediate the top and bottom thereof and spaced from said racks, and a locking mechanism comprising a plurality of locking members adapted to be moved in synchronism from a retracted position to an extended position whereat, with the door in its operative position in a vertical plane, two of said members are adapted to project into corresponding apertures in said apertured rails and the third of said locking members is adapted to engage the shaft to lock it against rotation.

2. A bulkhead assembly as claimed in claim 1 wherein said door is adapted to be swung about the meshed rack and pinion gears to a retracted position whereat it lies immediately below and in a plane substantially parallel to the roof of the container, said two locking members adapted in this position of the door to be projected into aligned ones of series of spaced aper-

tures firmed in said rails and co-operating in their operative position with the third locking member which engages the shaft, said three locking members thereby releasably locking the door in its retracted position.

3. A bulkhead door assembly as claimed in claim 1 wherein said shaft has mounted at each end thereof, for rotation therewith, a roller adapted to roll along said track members, said rollers each having one of said pinion gears secured to the inner face thereof.

4. A bulkhead door assembly as claimed in claim 3 wherein said pinion gears are formed integral with said rollers.

5. A bulkhead door assembly as claimed in claim 1 wherein said locking mechanism comprises an actuator, said actuator consisting of a plate formed with a plurality of arcuate slots, the center of said slots being disposed eccentric relative to the center of the plate, the inner ends of said locking members provided with pins engaged with said slots, the arrangement being such that upon rotation of said plate the slots impart reciprocal motion to the locking members through said pins.

6. A bulkhead door assembly as claimed in claim 5 wherein each of said locking members is provided at its outer end with a spring loaded pin mounted for axial movement in a housing, reciprocation of said locking members imparting corresponding longitudinal reciprocal movement to said pins through their associated housings.

7. A bulkhead door assembly as claimed in claim 1 wherein said door consists of a braced frame provided on each face with a cover panel.

8. A bulkhead door assembly as claimed in claim 7 wherein said cover panel is made of a material selected from stainless steel, aluminum, wood and fiberglass.

9. A bulkhead door assembly as claimed in claim 7 or 8 wherein said door is filled with insulation material which completely fills the spaces

10. A bulkhead door assembly as claimed in claim 5 wherein said actuator has a central actuating shaft which extends through and is operatively connected to said plate, opposite ends of said actuating shaft being provided with handle members keyed thereto and extending from opposite sides of the door.

11. A bulkhead door assembly as claimed in claim 10 wherein said handles are pivotally mounted on said actuating shaft to permit retraction thereof, said handles when in their retracted position being disposed in recesses out of the plane of the cover panels.

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