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G. D. STOUGH
MEANS FOR ANCHORING MERCHANDISE CARRYING RACKS
WITHIN TRANSPORT VEHICLES

2,988,017

Filed May 6, 1957

2 Sheets-Sheet 1

FIG. 1.

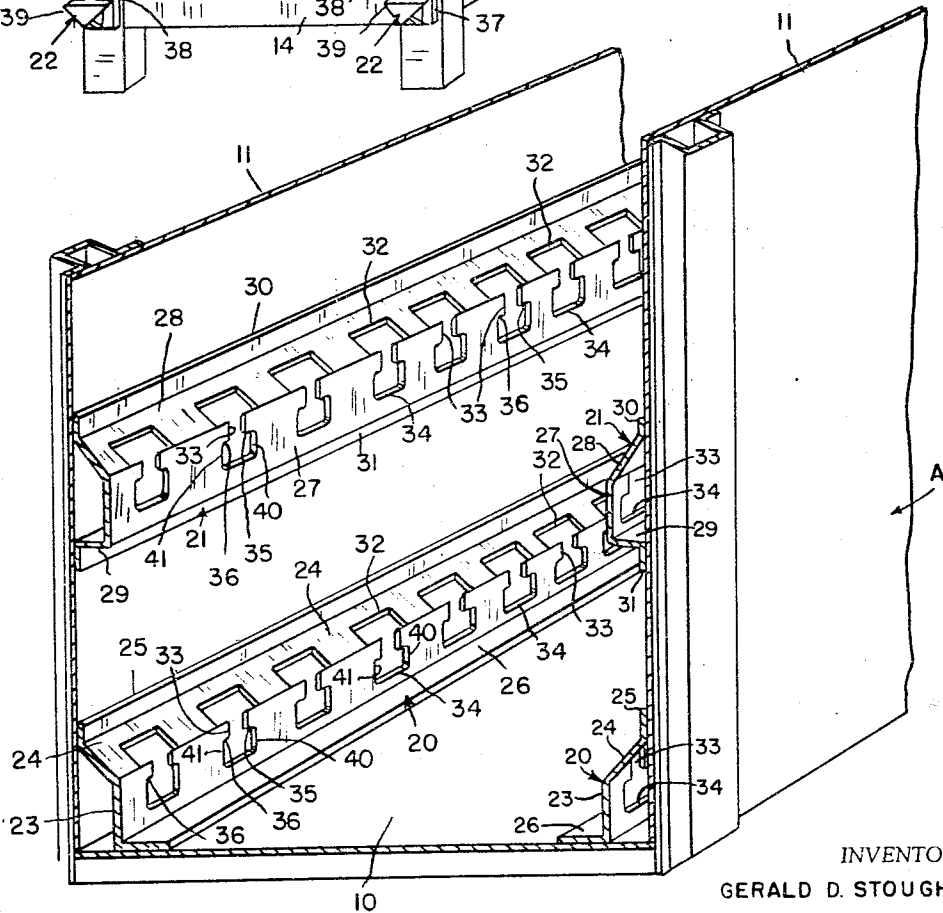
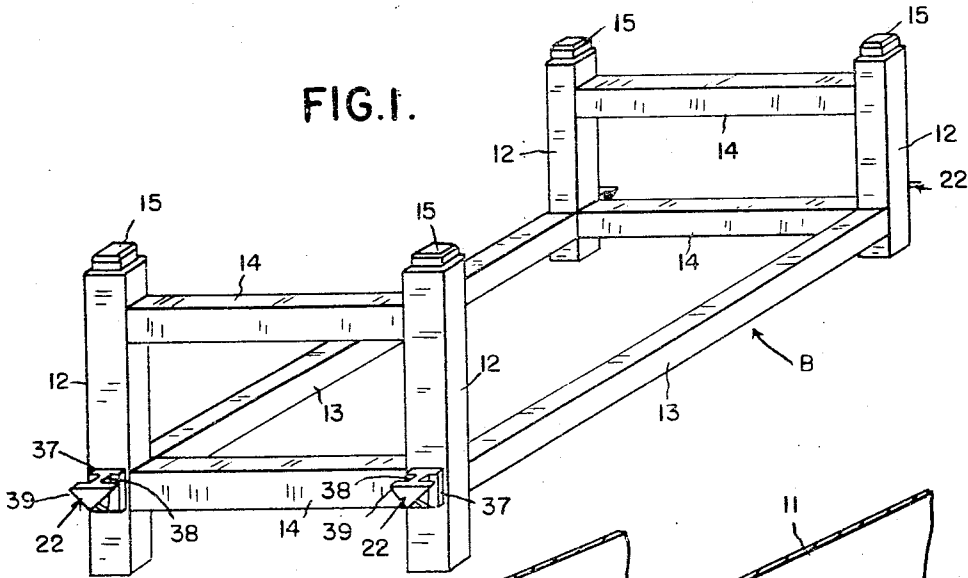


FIG. 2.

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FIG. 4.

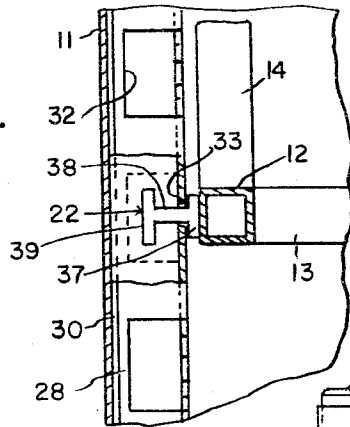


FIG. 5.

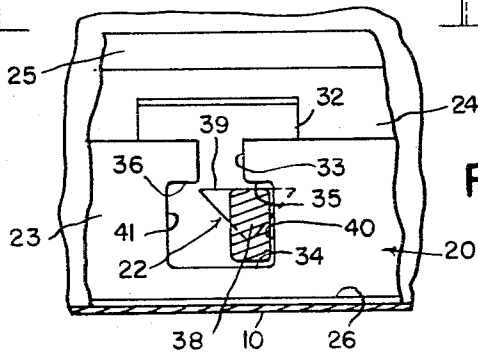
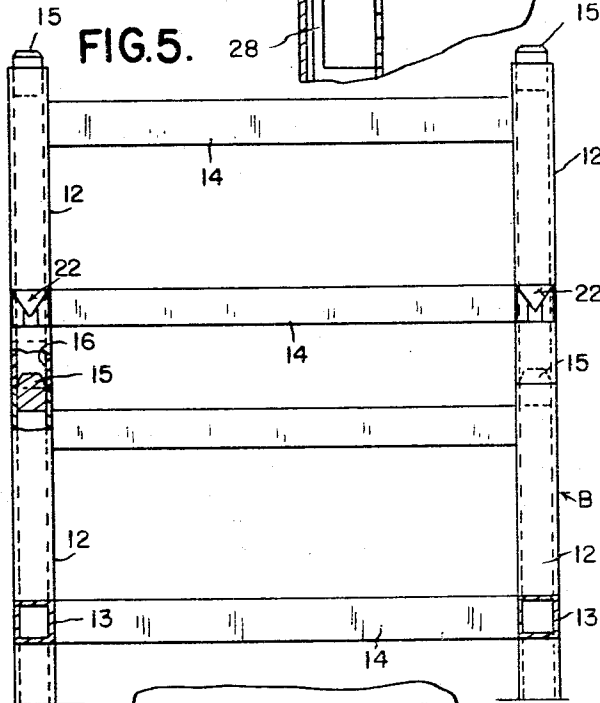


FIG. 6.

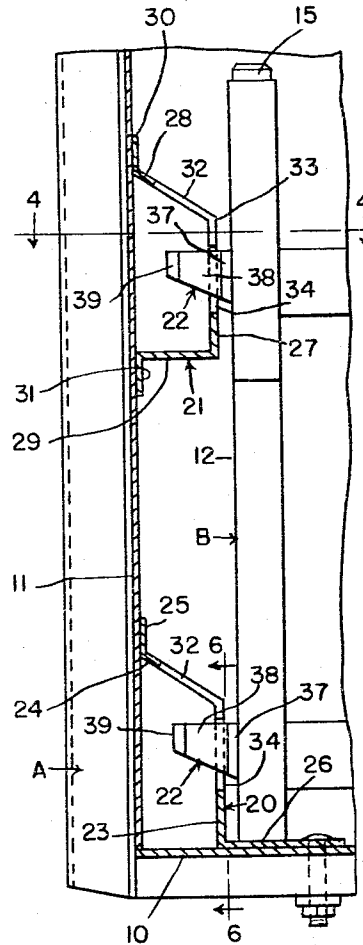


FIG. 3.

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MEANS FOR ANCHORING MERCHANDISE CARRYING RACKS WITHIN TRANSPORT VEHICLES

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This invention relates generally to means for storing and anchoring articles of merchandise within storage chambers of either transport vehicles or stationary depots, and refers more particularly to means by which portable merchandise carrying racks or holders may be detachably anchored within such storage chambers.

One of the essential objects of the invention is to provide a portable rack that may be loaded with merchandise at the factory where such merchandise is manufactured and that may thereafter be transferred intact to and anchored within the storage chamber of the transport vehicle or depot.

Another object is to provide a portable rack of the type mentioned that can be readily moved when loaded with merchandise into and properly positioned within the storage chamber of a transport vehicle or depot by means of a lift truck, and that can be automatically anchored within the storage chamber while being moved vertically therein toward the floor thereof by the lift truck.

Another object is to provide a portable rack and anchorage means therefor that will enable substantially all available space within the storage chamber of the vehicle or depot to be utilized without waste for storage of the merchandise carrying racks.

Another object is to provide a portable rack and anchorage means therefor that are so constructed that the static load of the racks and merchandise thereon may be carried entirely by the floor of the storage chamber independently of the upright walls thereof and independently of the rack anchorage means on said upright walls.

Another object is to provide anchorage means respectively on the upright walls of the storage chamber and anchoring means on the racks that not only are interengageable during vertical movement of the racks toward the floor of the storage chamber, but also are operable when interengaged as aforesaid to hold the racks against displacement horizontally relative to said upright walls.

Another object is to provide on the upright walls of the storage chamber of a transport vehicle anchorage means that not only is capable of resisting the shock load when the racks tend to move horizontally in a direction lengthwise of the transport vehicle when the latter is stopped suddenly while in motion, but also is operable at the same time to restrain upward tilting or rocking movement of the racks and the anchoring means thereon relative to the floor of the transport vehicle.

Another object is to provide a portable rack capable of being stacked one on top of the other so that the upper space within the storage chamber may be occupied, and so that the gravitation load of the upper racks of the stack will be carried downward through the lower racks to the floor of the storage chamber.

Another object is to provide a portable rack and anchorage means therefor capable of preventing a rack on one level in the storage chamber from transmitting any stress horizontally to an adjacent rack on the same level.

Other objects, advantages and novel details of construction of this invention will be made more apparent as

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this description proceeds, especially when considered in connection with the accompanying drawings wherein: FIGURE 1 is a perspective view of one of the portable racks or holders embodying my invention;

FIGURE 2 is a fragmentary perspective view of a storage chamber of a transport vehicle and showing on the spaced upright side walls of said chamber anchorage members for portable racks;

FIGURE 3 is a fragmentary cross sectional view through the storage chamber of the transport vehicle and showing the anchoring members at one end of stacked racks in engagement with the anchorage members upon the adjacent upright wall of said storage chamber;

FIGURE 4 is a horizontal sectional view taken substantially on the line 4-4 of FIGURE 3;

FIGURE 5 is a fragmentary elevational view of a plurality of racks or holders arranged in a vertical stack;

FIGURE 6 is a sectional view taken substantially on the line 6-6 of FIGURE 3.

Referring now to the drawings, A is a transport vehicle storage chamber having a load-sustaining floor 10 and spaced upright side walls 11 extending upwardly from and rigid with said floor, and B is a portable rectangular rack or holder having a length substantially equal to the distance between the side walls 11 of the storage chamber and comprising upright corner posts 12 and substantially horizontal side and end bars 13 and 14 respectively extending between and rigidly connected to said posts intermediate their upper and lower ends. Such posts 12 and bars 13 and 14 may be any suitable construction and may be formed of any suitable material. Thus the bars 13 and 14 may initially be varied in construction or configuration according to the nature of the merchandise to be carried thereby. The posts 12 constitute load-sustaining elements and are adapted to be supported upon the floor 10 of the storage chamber to transmit thereto the weight of the rack and merchandise carried thereby.

Preferably the upper ends of the posts 12 are provided with upwardly projecting pilot portions 15 for engagement with the recesses 16 in the lower ends of posts of a superimposed rack, whereby the racks may be arranged in stacked relation within either the storage chamber of a transport vehicle or the storage chamber of a stationary depot. Thus all available space within storage chambers of the type mentioned may be utilized for the reception of the racks.

In the present instance, the means for anchoring the racks B within a transport vehicle storage chamber A comprises vertically spaced substantially horizontal anchorage rails or anchorage members 20 and 21 fixed to the upright side walls 11 of the storage chamber, and laterally spaced substantially T-shaped lugs or anchoring members 22 fixed to and projecting horizontally from the posts 12 of the racks at opposite ends thereof.

The rails 20 and 21 may be formed of any suitable material such as sheet metal and may be rigidly secured by any suitable means to the upright walls 11. Preferably the lowermost rails 20 have upright or vertically extending plate-like portions 23 spaced from the upright walls 11, laterally extending portions 24 at the upper edges of the upright portions 23 and attaching flanges 25 and 26 respectively at the outer edges of the lateral portions 24 and at the lower edges of the upright portions 23 and rigidly secured to the upright walls 11 and floor 10 of the transport vehicle. The upper rails 21 have upright or vertically extending plate-like portions 27 spaced from the upright walls 11, laterally extending portions 28 and 29 respectively at the upper and lower edges of said upright portions 27, and attaching flanges 30 and 31 respectively at the outer edges of said lateral

portions 28 and 29 and rigidly secured to the upright walls 11.

The lateral portions 24 and 28 respectively of the rails 20 and 21 are provided with longitudinally spaced vertically open substantially rectangular apertures 32, while the upright portions 23 and 27 respectively of the rails 20 and 21 are provided at longitudinally spaced points thereof with vertically extending slots having upper and lower portions 33 and 34 respectively. As shown, the upper portions 33 of the slots are uniform in width and open upwardly through the upper edges of the upright portions 23 into the apertures 32 substantially midway the ends thereof; and open downwardly into the lower portions 34 of the slots substantially midway opposite upright side edges thereof.

The spacing of the apertures 32 in the lateral portions 24 and 28 and the spacing of the upper portions 33 of the slots and the lower portions 34 of the slots in the upright portions 23 and 27 of the rails correspond to the spacing of the T-shaped lugs 22 on opposite ends of the racks or holders B. Moreover, the rails 20 and 21 and the apertures and slots in said rails are so constructed and arranged that the apertures and slots mentioned may be engaged automatically by the lugs 22 on opposite ends of the racks when the latter are lowered vertically by a lift truck (not shown), to permit the load of the racks B to be carried entirely by the floor 10 of the vehicle independently of the upright walls 11 and rails 20 and 21.

The lugs 22 on opposite ends of the racks have vertical attaching flanges 37 rigidly secured to the posts 12 of the racks at opposite ends thereof, and have horizontally extending stem portions 38 of substantially uniform or equal width provided at their outer ends with vertically extending head portions 39.

In use, a rack B may be initially moved by a suitable lift truck (not shown) into proper elevated position extending transversely of the storage chamber A of the vehicle. Then the rack B is lowered vertically by the lift truck so that the heads 39 of the lugs 22 will move downwardly through the apertures 32 in the lateral portions 24 of the rails 20. Further vertical downward movement of the rack by the lift truck will cause the heads 39 of the lugs 22 to pass downwardly behind and become detachably interlocked with the upright portions 23 of the rails 20 and will cause the stems 38 to move downwardly in the upper portions 33 of the slots and thence into the lower portions 34 of the slots. When the stems 38 of the lugs 22 are received in the elongated slots 34, the posts 12 of the rack B will rest upon and be supported by the floor 10 of the storage chamber of the vehicle. When the racks B are arranged in stacked relation, the posts 12 of the upper racks will rest upon and be supported by the posts 12 of the lower racks. Thus the load of any single rack or the load of the stacked racks is carried by the floor 10 of the vehicle independently of the side walls 11 and rails 20 and 21.

When the transport vehicle in which the racks are anchored is stopped suddenly while in motion in either a forward or a rearward direction, there is a tendency of the racks B to tilt or move upwardly and/or to shift horizontally lengthwise of the vehicle. When this occurs, either the upright side edges 40 or the upright side edges 41 of the lower portions 34 of the slots will be engaged by and will constitute abutments for the stem portions 38 of the lugs 22 on the racks, depending upon the direction lengthwise of the vehicle in which the racks shift horizontally, whereupon the engaged upright side edges 40 or 41 will limit such horizontal shifting movement of the racks lengthwise of said vehicle and will resist the shock load. Also, either of the shoulders formed by the upper longitudinal edge 35 or the upper longitudinal edge 36 of the lower portions 34 of the slots will then overlie and constitute abutments for the stems 38 of the lugs 22 on the racks, depending upon the direction in

which the racks shift, and will effectively restrain accidental tilting or rocking movement of the racks relative to the floor 10 of the vehicle.

The head portions 39 of the lugs 22, in cooperation with the upright portions 23 and 27 respectively of the rails 20 and 21 will effectively restrain the racks or holders from any displacement transversely of the vehicle. Thus in each instance the stresses occasioned by any longitudinal or transverse movement of the racks B will be transmitted to the rails 20 and 21 and through them to the side walls 11 of the vehicle, but the static load of the racks will always be transmitted by the posts 12 of the racks to the floor 10 of the vehicle independently of said side walls 11 and rails 20 and 21. When the racks are in stacked relation, the upright side edges 40 and 41 and the upper longitudinal edges 35 and 36 of the lower portions 34 of the slots will effectively prevent any accidental displacement of the recesses 16 of the upper racks from the pilot portions 15 of the lower racks.

As above stated, the racks B may be anchored as described within a storage chamber of either a transport vehicle or a stationary depot. In either case the merchandise carried by the racks need not be removed therefrom the time such merchandise is initially loaded onto the racks at the factory where such merchandise is manufactured. By use of a lift truck, the racks B individually or in a stack may be moved into and positioned within the storage chamber of either a transport vehicle or depot to be engageable automatically as described with the apertures and slots in the rails. In a similar manner such racks B may be removed from the storage chamber of the transport vehicle or depot. Thus, after the original loading on the racks at the factory, the merchandise may remain intact on the racks until they reach their final destination. Accordingly, a great saving in labor, time and cost may be obtained. Moreover, the construction of the anchoring means is such that the racks will be effectively held while in transit. In this connection the transport vehicle may be either a cargo truck, trailer, boxcar, boat or airplane.

What I claim as my invention is:

1. A structure for use within a transport vehicle of the boxcar type for anchoring a portable merchandise carrying rack equipped with horizontally spaced anchoring lugs provided with horizontally extending stem portions; comprising a horizontally extending rail attachable in substantially parallel longitudinally extending relation to an upright side wall of the transport vehicle and having a horizontally extending upright plate-like portion to be spaced from said upright side wall, said horizontally extending upright plate-like portion having vertically extending slotted formations at longitudinally spaced points thereof for the reception of said horizontally extending stem portions, each slotted formation including a pair of vertically aligned slots, the uppermost of each pair of vertically aligned slots having a width less than the width of the lowermost of each pair of aligned slots, each uppermost slot having horizontally spaced upright side edges and opening upwardly through the upper edge of said upright plate-like portion to provide an entrance for horizontally extending stem portion aforesaid to each slotted formation, each uppermost slot also opening downwardly into an adjacent vertically aligned lowermost slot to enable a horizontally extending stem portion aforesaid to be moved into and withdrawn from each lowermost slot when the rack is intentionally moved vertically relative to a floor of the transport vehicle, each lowermost slot being spaced from the upper edge of said upright plate-like portion to receive a horizontally extending stem portion of an anchoring lug on a rack when the latter is supported upon the floor of the transport vehicle, each lowermost slot having horizontally spaced substantially parallel upright edges respectively disposed laterally beyond the spaced upright edges aforesaid of an adjacent vertically aligned uppermost

slot, said parallel upright edges being upon opposite sides of a horizontally extending stem portion of an anchoring lug on a rack when the latter is supported upon the floor of the transport vehicle and constituting abutments for said horizontally extending stem portion to restrain horizontal movement of said rack lengthwise of said rail when the transport vehicle is stopped suddenly while in motion, each lowermost slot having at the upper end thereof horizontally spaced upper edge portions respectively extending from the parallel upright edges aforesaid to the upright side edges of the adjacent vertically aligned uppermost slot, said spaced upper edge portions overhanging the space within each lowermost slot and constituting abutments for a horizontally extending stem portion of an anchoring lug on a rack to restrain accidental upward tilting movement of said rack relative to said transport vehicle, each lowermost slot having a lower edge portion spaced from said overhanging upper edge portions a distance greater than the vertical depth of each horizontally extending stem portion so that said lower edge portion is spaced from said horizontally extending stem portion when said rack is supported upon the floor of the transport vehicle to thereby permit the static load of said rack to be carried by said floor independently of said elongated rail.

2. The structure defined in claim 1, wherein each vertical slotted formation is inverted T shape, and wherein the pair of vertically aligned slots of each slotted formation successively receive said horizontally extending stem portion of the anchoring lug.

3. The structure defined in claim 1, wherein the parallel upright edges of the lowermost slots are alternately engageable by said horizontally extending stem portion to restrain horizontal movement of said rack in opposite directions lengthwise of said rail, and the spaced upper edge portions of the lowermost slots are alternately engageable by said horizontally extending stem portion to restrain upward tilting movement of said rack in opposite directions lengthwise of said rail.

4. The combination with a transport vehicle having a longitudinally extending elongated storage chamber provided with a load-sustaining floor and provided above said floor with opposed substantially parallel longitudinally extending upright side walls, of horizontally opposed members respectively secured to and extending along said opposed side walls and constituting anchorage means

for transversely extending elongated portable merchandise carrying racks shiftably supported upon said floor, each of said members having an upright plate-like portion spaced from an adjacent upright side wall and provided with longitudinally spaced upwardly opening vertically extending slots to receive portions of horizontally projecting rigid anchoring members on said racks at opposite ends thereof when said racks are intentionally moved downward in a vertical direction relative to said members to be supported upon the floor of said storage chamber, the lower portions of said slots being wider than the upper portions thereof and having opposed spaced upright substantially parallel edges alternately engageable by the portions of said horizontally projecting anchoring members to limit horizontal shifting movement of said racks in a direction lengthwise of said storage chamber when said racks are supported upon the floor of said storage chamber, the upper portions of said slots having opposed upright edges spaced closer together than the opposed upright substantially parallel edges aforesaid so that horizontally opposed spaced shoulders are provided between the opposed upright edges of the upper portions of said slots and the opposed upright edges of the lower portions of said slots, the undersides of said shoulders being alternately engageable by the portions of said horizontally projecting anchoring members to limit accidental upward movement of said racks relative to said floor and to thereby prevent accidental disengagement of the portions of said horizontally projecting anchoring members from the lower portions aforesaid of said slots.

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