

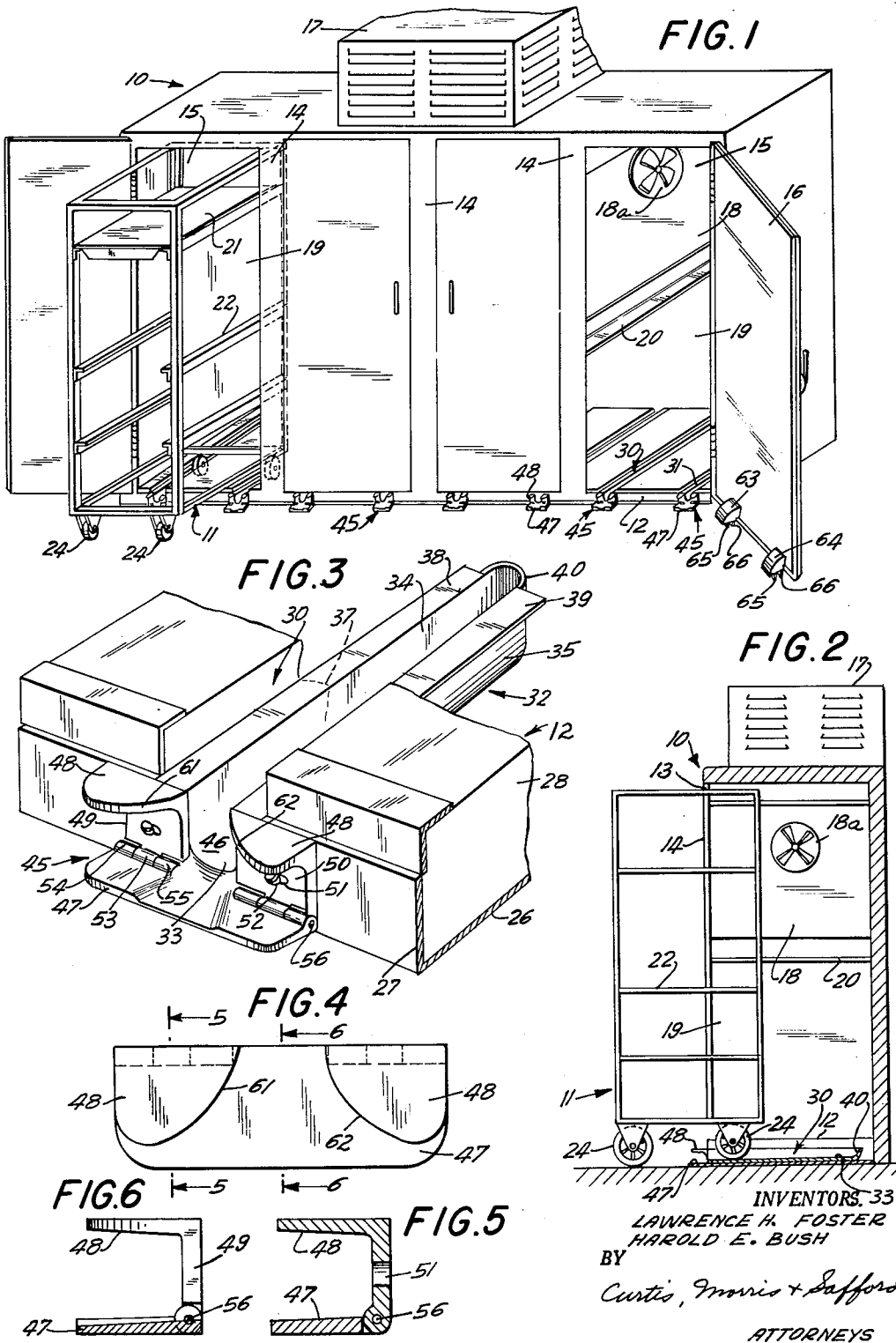
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REFRIGERATOR

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REFRIGERATOR

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The present invention relates to refrigeration and more particularly to a refrigerator for a roll-in cart on which perishable products are conveyed.

While the present invention may have other applications it is particularly adapted to refrigerate food products for periods between preparation and delivery. The products, such as individual trays of food, may be placed on a cart as they are prepared in a kitchen for delivery to a place where they are to be used. For example, the trays of food may be prepared in one part of a kitchen and then transported on the cart to another part of the kitchen or room for storage. In such an operation it is desirable to prepare a large number of the food trays before meal time so that they will be ready for delivery in one lot. However, such preparation presents a problem as the food products will deteriorate if left standing at room temperature, and may be unpalatable when served.

One of the objects of the present invention is to provide an improved apparatus for refrigerating perishable products while carried on a cart used for transporting the products to the place of delivery.

Another object is to provide a refrigerator which is so constructed as to facilitate the movement of a roll-in cart into and out of the interior thereof.

Another object is to provide a construction in a refrigerator which will guide the wheels of a cart into and out of the refrigerator and permit the cart to be rolled into and out of the refrigerator without any bumping or tilting of the cart.

Still another object is to provide a refrigerator of the type indicated which is of simple and compact construction, adapted for economical manufacture and one which is reliable in guiding a cart into the refrigerator without disturbing the produce mounted thereon.

These and other objects will become more apparent from the following description and drawing in which like reference characters denote like parts throughout the several views. It is to be expressly understood, however, that the drawing is for the purpose of illustration only and is not a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawing:

FIGURE 1 is a perspective view of a refrigerator incorporating the novel features of the present invention and showing a roll-in cart entering one of the stalls therein;

FIGURE 2 is a transverse sectional view of the refrigerator showing one of the pair of recessed tracks in its bottom wall and the fitting at the open end of the recessed track for guiding the wheels of the cart therein;

FIGURE 3 is an enlarged perspective view of a section of the bottom wall of the refrigerator and showing the channel forming a recessed track and the pivoted ramp and caster guides on the fitting;

FIGURE 4 is a plan view of the fitting showing the forwardly and outwardly curved inner edges of the wheel guides;

FIGURE 5 is a transverse sectional view taken on line 5—5 of FIGURE 4 showing one upright member of the fitting with the ramp pivoted to its lower end and the wheel guide at its upper end; and

FIGURE 6 is a transverse sectional view taken on line

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6—6 of FIGURE 4 to show the inclination of the ramp plate at its center.

Referring now to the drawings, the invention is shown applied to a refrigerator 10 adapted to receive a roll-in cart 11. The refrigerator 10 may be of a size to receive a single cart 11 or any desired number of carts 11 and in the illustrated embodiment, the refrigerator is adapted to receive four of the carts. Refrigerator 10 is placed on the floor of a building and has insulated walls including the bottom wall of floor 12 and an open front 13. The bottom wall of floor 12 of the refrigerator 10 has considerable thickness, three or more inches, to provide the required insulation so that it is positioned at a level above the level of the floor of the building. The open front 13 is divided by insulated mullions 14 forming four separate openings 15 extending throughout the height of the interior of the refrigerator. A door 16 is provided for each door opening 15 and the doors are hinged to the front of a side wall or mullion to swing from a closed to an open position.

The refrigerator 10 is cooled by a mechanical refrigerating unit 17 shown mounted on the top and connected in a conventional manner to a plurality of evaporators 18 positioned at the rear of the mullions 14. Each evaporator 18 is of a width slightly less than the width of the mullion 14, and, as shown in FIGURE 1, extends from the rear of a mullion to the rear wall of the refrigerator 10 and downwardly for substantially one-half the height of the refrigerator. Each evaporator 18 has a fan 18a for circulating air over the heat exchange elements thereof and delivering cooled air to the interior of the refrigerator. As will be observed in FIGURE 1, the evaporators 18 form walls which divide the interior of the refrigerator 10 into a plurality of stalls 19 at the rear of the door openings 15 and each evaporator has a drip-pan 20 thereunder for draining condensate to the exterior of the cabinet. Above and below the evaporators 18 of the refrigerator is open throughout its width to permit the free circulation of air between stalls 19.

The cart 11 may comprise an open frame or have enclosing walls and in the illustrated embodiment is shown as an open rectangular frame of an angle-shape construction having either shelves 21 or spaced rails 22, or both, for mounting food trays or other products. Each cart 11 is provided with pairs of front and rear caster wheels 24 mounted to swivel on the bottom of the cart. As stated above, the insulated bottom wall 12 of the refrigerator 10 has considerable thickness and would prevent the cart 11 from being rolled into a stall 19. For example, the bottom wall 12 has an under sheathing 26 of metal which rests on the building floor, see FIGURE 3, with an upturned flange 27 forming the front of the bottom wall and block insulating material 28, such as plastic foam or the like, mounted on the sheathing. Thus, the bottom wall 12 has a substantial height of three inches or more to provide the insulation required and which forms a barrier to the movement of the casters 24 and cart 11 into a stall 19.

In accordance with the present invention, the bottom wall 12 of the refrigerator 10 has spaced tracks in each stall 19 which are recessed in grooves of a width to accommodate the wheels of casters 24 and guides for guiding the casters on the cart into the grooved tracks.

The grooved tracks 30 and 31 in each stall 19 are recessed to a depth in the bottom wall 12 to position the bottom of the tracks only slightly above the level of the floor on which the refrigerator 10 is constructed. As shown most clearly in FIGURE 3, the grooved track 30 comprises a metal channel 32 having a depth to position its bottom wall 33 over the sheathing 26 with its side walls 34 and 35 extending upwardly from the bottom wall. The metal channel 32 is set in the slotted recess

or groove 30 in the insulating material 28 and the slotted recess is stepped to provide a narrow lower section adjacent the sides of the channel 32, a wider upper section to accommodate the wider portion of the caster above the wheels and intermediate horizontal shoulders 37 between the sections. The side walls 34 and 35 of the metal trough-like channel 32 have laterally projecting flanges 38 and 39 projecting horizontally to overlie the horizontal shoulders 37 with the forward end of the channel flush with the outside face of flange 27 at the front of bottom wall 12 of the refrigerator 10. The rearward end of the metal channel 32 has a transverse wall 40 closing the rearward end and forming a stop engaged by a wheel 24 on the cart 11 to limit its rearward movement when rolled into the refrigerator. Forwardly of the rear wall 40 the bottom wall is dimpled to provide a detent 41 to restrain forward movement of cart wheel 24. It will be observed that the channel 32 has a generally rounded bottom wall 33 and rearward wall 40 which adapts it to be easily cleaned. Furthermore, the rounded bottom wall 33 of greater radius than the transverse radius of the cart wheels 24 causes the cart wheels to be automatically guided to the center of the channel which eliminates binding of the wheel with a side of the track and thereby avoids any sway or bumping of the cart as it moves into and out of a stall 19 and spilling of products from the cart.

The caster guides are in the form of a fitting 45 attached to the front of the bottom wall 12 at the open end of the tracks 30 and 31. Each fitting 45 has a central opening 46 corresponding to the contour of the grooved track 30 or 31, a pivoted ramp 47 inclined from the level of the building floor to the bottom of the grooved track and wing guides 48 at each side of the opening for guiding a caster 24 into the track. Fitting 45 comprises spaced upright members 49 and 50 overlying the flange 27 on the front of the bottom wall of the refrigerator and each upright member has a slotted hole 51 for a fastening 52. The adjacent inner edges of the members 49 and 50 are spaced apart a distance equal to the spacing of the side walls 34 and 35 of the channel 32 so as to conform to the forward edges of the channel and provide a continuation thereof. Each ramp plate 47 may be pivotally mounted to the lower edges of members 49 and 50 by any suitable hinge means. In the illustrated embodiment the members 49 and 50 each have a hinge bearing 53 interleaved between spaced bearings 54 and 55 on the ramp plate and connected thereto by a hinge pin 56. Thus, the ramp plate 47 is adapted to rock with respect to the upright supporting members 49 and 50 of the fitting 45 to drop the front edge of the plate against the floor. The ramp plate 47 is inclined from its forward edge to its rearward edge, see FIGURE 6, and its rearward edge is shaped to the contour of the forward end of the channel 32. As shown most clearly, in FIGURE 3, the center portion of the ramp plate 45 is recessed in an outwardly diverging path from the end of the track channel 32 to partially guide a caster 24 into the open end of the channel.

Wing flanges 48 are formed as an integral part of the upright supporting members 49 and 50, respectively, and project forwardly therefrom to guide and tilt a caster 24 on cart 11 into the metal channel 32. The adjacent inner edges 61 and 62 of the opposed wing flanges 48 curve forwardly and outwardly to form a converging mouth into the open end of the channel 32. As shown in FIGURES 3, the wing flanges extend laterally beyond the sides 34 and 35 of the metal channel 32 a distance greater than the width of the channel and the curved edges 61 and 62 diverge forwardly and outwardly for at least two-thirds of the width of the wing flanges 48.

Each door 16 is provided with a pair of closure elements 63 and 64 adjacent its lower edge and so spaced as to enter the open ends of the upper wider sections of the grooved tracks 30 and 31 and close the opening.

Each closure element 63 and 64 carries a pair of depending wipers 65 and 66 of a flexible material, such as rubber, which project into the channels 32 to complete the closure of the open end of the tracks 30 and 31. One form of the invention having now been described in detail, the mode of operation is next explained.

For purposes of description, let it be assumed that the refrigerator of the present invention is to be used to refrigerate perishable food products after preparation and before delivery to, for example, another part of the kitchen for further processing. Let it further be assumed that the refrigerator 10 is located on the floor of a building either adjacent to the kitchen or somewhere between the places where the food products are prepared and used.

As the preparation of each tray of food is completed, it is placed on a shelf 21 or on the racks 22 of the cart 11. When the cart has been completely loaded with food trays, it is rolled to the refrigerator 10, a door 16 of a stall 19 opened and the cart rolled into the refrigerator. To this end, the attendant guides the cart manually toward the door opening and the casters 24 swivel to permit the direction of movement of the cart to be changed. Thus, the direction of movement of the cart can be easily controlled by the attendant within the range necessary to insure engagement of the pair of front wheel 24 between the guide wing 48 of the fittings 45 projecting forwardly from the bottom wall 12 of the refrigerator.

When the front casters 24 enter the throat between wing flanges 48 of the grooved tracks 30 and 31, the direction of movement of the casters is thereafter controlled by the curved edges 61 and 62 of the wing flanges to guide them into the grooved track. Casters 25 swivel to accommodate the change in the direction of the wheel as the cart continues to roll forwardly. Simultaneously the wheels 24 ride up the slight incline of the ramp plates 47 and also are partially guided by the concave recesses in the ramp plates into the open end of the channels 32 which are aligned with the opening in the fittings 45. Due to the gradual incline of the ramp plates 47 the wheels 24 ride up the incline smoothly which avoids any bumping of the cart 11 and food trays thereon.

Once the front pairs of casters 24 have entered the open end of the grooved tracks 30 and 31 they are guided by the sides 34 and 35 of the channels 32. The depth of the channels 32 are less than the radius of the caster wheels and the groove tracks 30 and 31 are offset laterally above the lateral flanges 38 and 39 to provide a clearance for the casters 25. As the cart 11 continues to move into the stall 19 the rearward pair of wheels 24 engage the ramp plates 47 and are guided by the wing flanges 48 as previously described and enter the open end of the groove tracks 30 and 31. The closed rearward ends 40 of the channels 32 are engaged by the front pair of casters 24 which act as stops to limit the forward movement of the cart 11 in the refrigerator. The cart 11 is then located wholly in the refrigerator 10 after which the door 16 is closed. As the door closes the closure elements 63 and 64 enter the upper wider portion of the grooved tracks 30 and 31 and the wipers 65 and 66 extend into the metal channels 32 to seal the opening formed by the recessed tracks. In some installations it is desirable to provide a pass through the refrigerator with doors at opposite sides in which case the channel 32 is continuous from one side to the other with caster guide fittings 45 at each end.

When the food trays are ready for delivery the door 16 is opened, the cart 11 rolled out of the stall 19 of the refrigerator 10 and the cart pushed to the place where the food trays are to be used. It will now be understood that other products than food trays, such as containers or cartons of food or bulb food products, may be carried on suitable carts for storage in the refrigerator.

It will now be observed that the present invention provides an improved apparatus for refrigerating perishable food products while mounted on a cart used for trans-

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porting the products from a place of preparation to a place of delivery. It will also be observed that the present invention provides a refrigerator which is so constructed as to facilitate the movement of a cart into and out of a refrigerator. It will still further be observed that the present invention provides a refrigerator construction which guides the casters of a cart into the refrigerator and permits the cart to roll into and out of the refrigerator without any bumping or sliding of the food products. It will still further be observed that the present invention provides an apparatus of the type indicated which is of simple and compact construction, economical to manufacture and one which is reliable in operation.

While a single embodiment of the invention is herein illustrated and described, it will be understood that changes may be made in the construction and arrangement of elements without departing from the spirit or scope of the invention. Therefore, without limitation in this respect the invention is defined by the following claims.

We claim:

1. Apparatus for storing perishable products comprising, in combination, a cart having casters freely movable in different directions for transporting the products to any desired location, a refrigerator having insulated side and bottom walls and a door opening through which the cart may be rolled in and out of the refrigerator, a refrigeration system having an evaporator in the refrigerator for cooling the interior of the refrigerator, recessed grooves in the insulated bottom wall of the refrigerator below the door opening and forming spaced tracks at a level only slightly above the level of the floor supporting the refrigerator, and a combined guide and ramp for each track mounted on the front of the bottom wall of the refrigerator for restricting the direction of movement of the casters of the cart and guiding them into the recessed track grooves.

2. Apparatus for storing perishable products comprising, in combination, a refrigerator having insulated side and bottom walls, an opening extending throughout the height of the refrigerator, a mechanical refrigeration system having an evaporator for cooling the interior of the refrigerator, a door for opening and closing the opening in the refrigerator, a cart having casters freely movable in different directions for transporting the perishable products and adapted to roll in and out of the refrigerator through the door opening, grooved tracks recessed in the insulated bottom wall of the refrigerator, a fixture attached to the front of the bottom wall for each grooved track and having a pivoted ramp aligned with the bottom of the track, upright members at each side of the track, and laterally flared caster guides projecting forwardly from each upright member to restrain the direction of movement of the casters on the cart whereby to guide the casters into the grooved tracks in the bottom wall of the refrigerator.

3. Apparatus for storing perishable products comprising, in combination, a refrigerator having insulated walls and an open front, spaced mullions extending vertically

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to divide the open front into adjacent door openings, evaporators extending rearwardly from the mullions and forming walls dividing the refrigerator into adjacent stalls, a mechanical refrigeration system connected to the evaporators to cool each stall in the refrigerator, carts having casters freely movable in different directions and adapted to roll in and out of the stalls of the refrigerator through the door openings at the front, each stall having spaced grooves recessed in the insulated bottom wall below the door openings and forming spaced tracks, and a combined guide and ramp for each track attached to the front of the bottom wall of the refrigerator for restricting the movement of the casters of a cart whereby to guide the casters into the recessed track grooves.

4. Apparatus for storing perishable products in accordance with claim 2 in which each grooved track comprises a recess in the insulated bottom wall and a channel mounted in the recess, the ramp of the fixture is a continuous plate extending beyond the sides of the track channel and inclined from its forward to its rearward edges, and the rearward edge of the ramp being pivotally connected to the upright members of the fixture.

5. Apparatus for storing perishable products in accordance with claim 4 in which the track channel has laterally projecting flanges at the upper edges of its opposite side, and the rearward edge of the ramp and adjacent sides of the upright members of the fixture having a shape conforming to the contour of and abutting the forward end of the track channel.

6. Apparatus for storing perishable products in accordance with claim 2 in which the ramp extends beyond the track channel at each side a distance at least equal to the width of the channel, and the flared caster guides extending throughout the width of the upright members with the inner edge being curved and diverging forwardly and laterally.

7. Apparatus for storing perishable products in accordance with claim 6 in which the ramp has a curved recess which conforms to the contour of the channel and flares to underlie the flared guides.

8. Apparatus for storing perishable products in accordance with claim 2 in which the grooved tracks are stepped with a wide upper section and a narrower lower section, closure elements mounted on the door to enter the wider upper sections of the grooved tracks, and flexible wipers depending from the closure elements into the narrower sections of the tracks to close the openings formed by the tracks.

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