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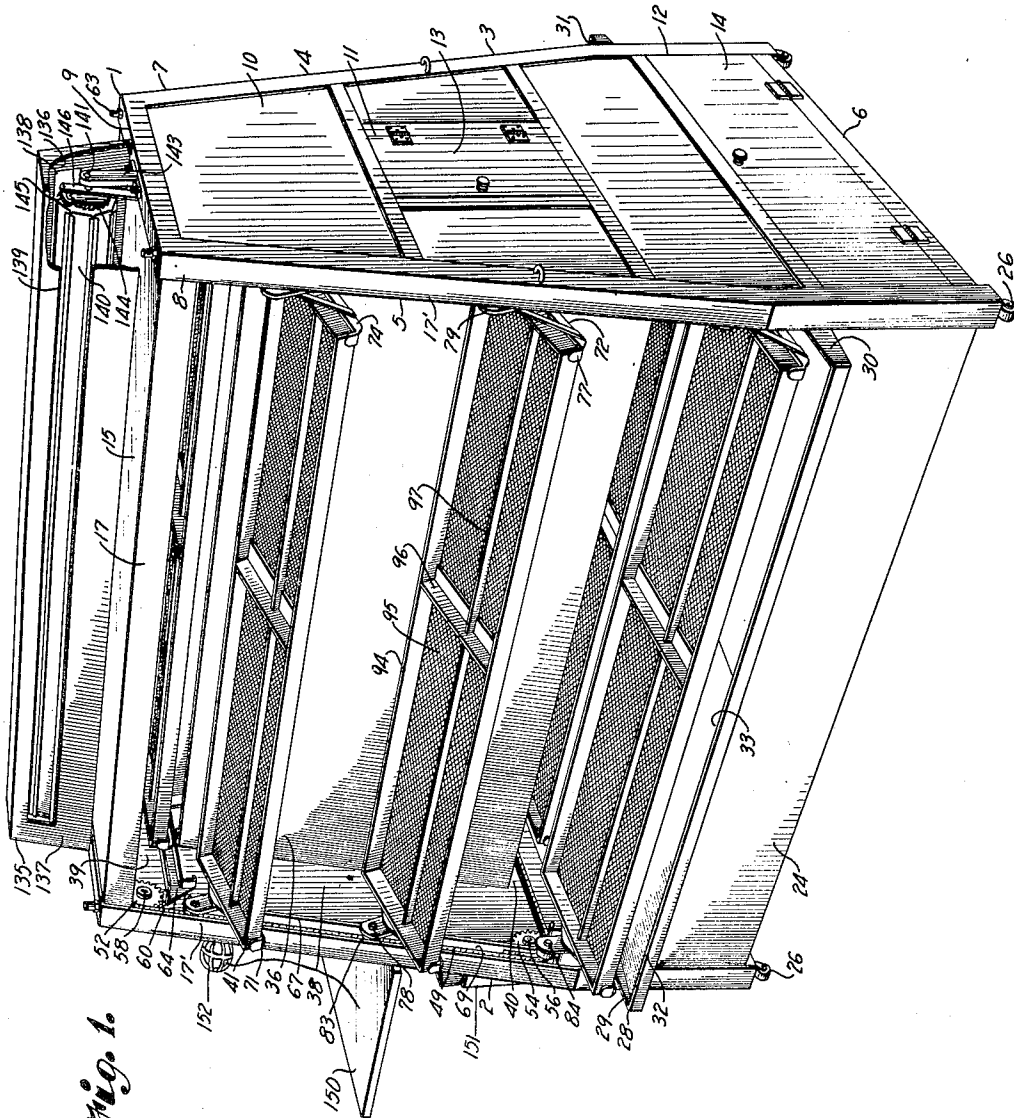
W. A. REICH

1,959,926

DISPLAY RACK

Filed May 15, 1933

3 Sheets-Sheet 1



INVENTOR  
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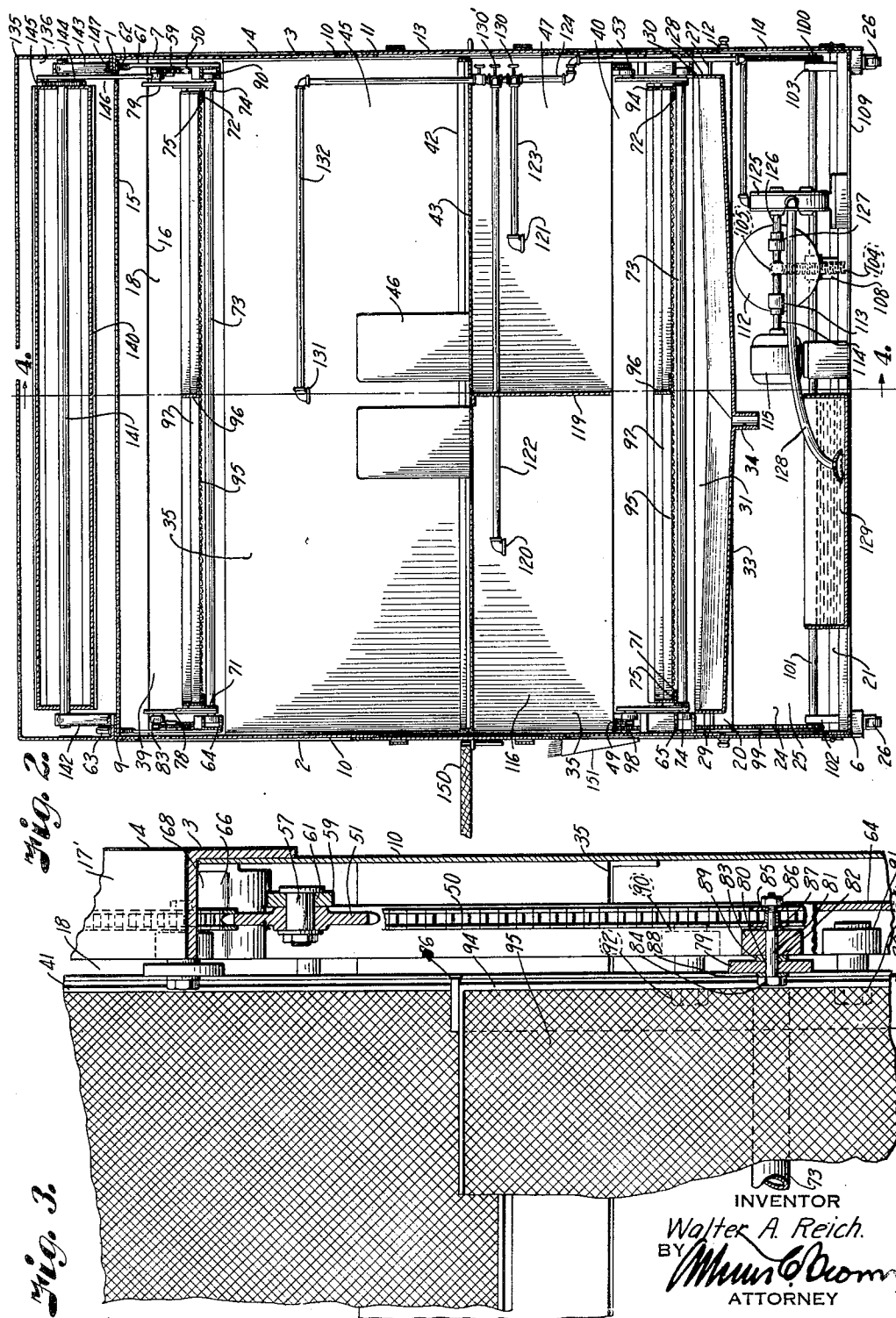
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## DISPLAY RACK

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3 Sheets-Sheet 2



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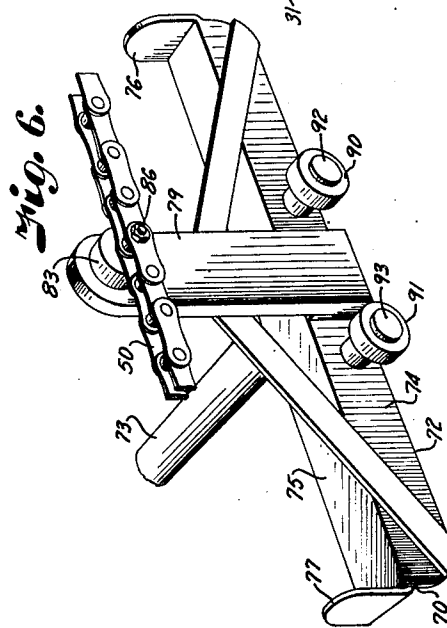
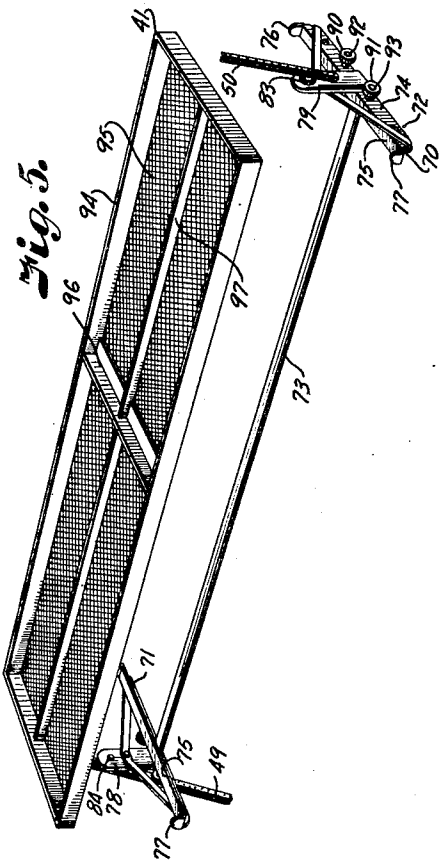
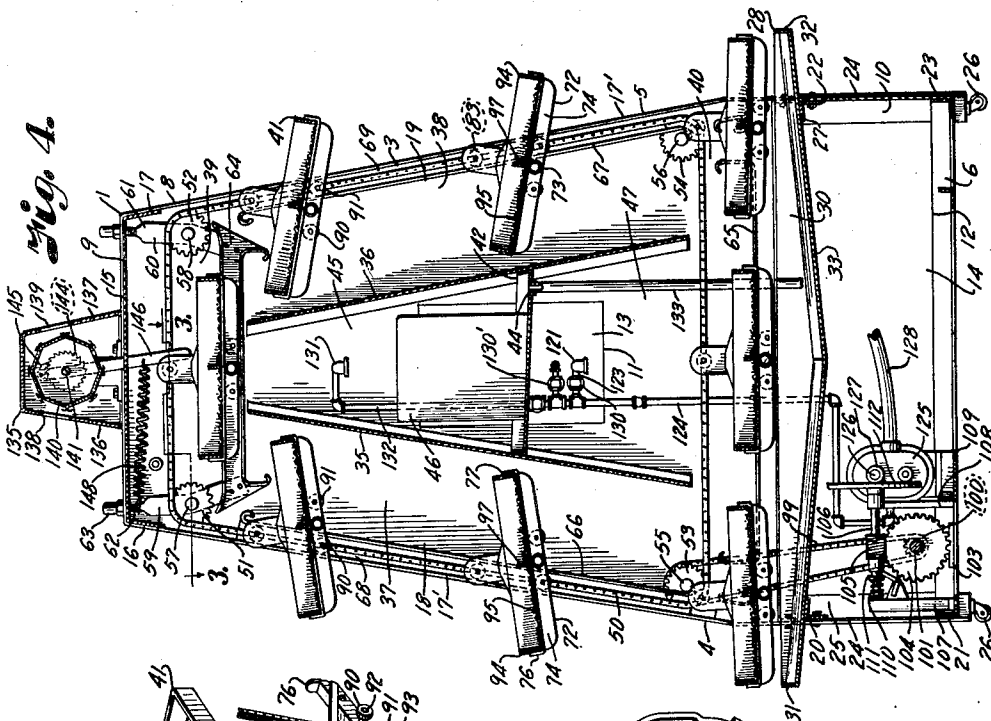
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DISPLAY RACK

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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

1,959,926

## DISPLAY RACK

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Application May 15, 1933, Serial No. 671,059

10 Claims. (Cl. 211—127)

My invention relates to display racks, and more particularly to those of that character for displaying fresh vegetables, fruits and similar articles of merchandise, and has for its principle objects to retain the articles in cool fresh condition, to provide an attractive animated display of the articles, and to provide ready access to the display whereby the articles may be dispensed directly from the rack.

Other important objects of the invention are to provide a mobile self-contained display rack, to provide for automatically stopping operation of the display, to provide ready removal of the display trays from the rack, to protect the articles displayed from oil and grease that is required to lubricate the moving parts, and to equip the rack with accessories necessary in wrapping the articles.

Other important objects of the invention are to spray the vegetables to retain the normal moisture content thereof and to provide for intermittently passing the vegetables through the spray so as not to waterlog or cause breaking down of their fiber structure.

In accomplishing these and other objects of the invention I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of an animated display rack constructed in accordance with my invention.

Fig. 2 is a vertical longitudinal section through the center of the rack.

Fig. 3 is an enlarged fragmentary section on the line 3—3, Fig. 4.

Fig. 4 is a vertical cross section through the rack on the line 4—4, Fig. 2.

Fig. 5 is a perspective view of one of the tray carriers and a tray shown in spaced relation therewith.

Fig. 6 is an enlarged detail perspective view of one end of a tray carrier particularly illustrating the rollers controlling the tilting angle of the tray.

Referring more in detail to the drawings:

1 designates the frame of the rack which includes spaced end members 2 and 3, each comprising vertical angle members 4 and 5 connected at their lower ends by an angle bar 6 and having upwardly converging ends 7 and 8 connected by a horizontal angle bar 9. The flanges of the angle members 4 and 5 cooperate with the inwardly extending flanges of the horizontal angle members to support end panels 10.

The end panels are preferably provided with upper and lower openings 11 and 12 that are closed by suitable doors 13 and 14 whereby access may be had to ice and spray compartments through the door opening 11 and to the operating machinery through the door opening 12.

The upper ends of the side frame members 2 and 3 are connected by a horizontal plate 15 having depending longitudinal flanges 16 and 17 cooperating with the outer flanges 17' of the vertical angle members to form front and rear openings 18 and 19, through which the merchandise is respectively displayed and dispensed, as later described.

The lower portion of the vertical angle members are connected by vertically spaced longitudinal angles 20, 21 and 22, 23 having their ends connected to the flanges 17', as illustrated in Fig. 4. The spacings between the pairs of angle members 20, 21 and 22, 23 are closed by side plates 24 which cooperate with the doors 14 to form an isolated compartment 25 housing the operating machinery so that the merchandise is not subjected to contamination by the oil and grease required for lubrication of the operating mechanism.

The supporting frame thus described is preferably mounted on suitable casters 26 whereby it is readily movable to different locations in a store.

The inwardly extending flanges 27 of the upper angle members 20 and 22 form supports for a rectangular open-topped water catch pan 28 having end walls 29 and 30 supported by the end frame members, longitudinal front and rear walls 31 and 32 extending outwardly beyond the plane of the plates 24 at the opposite sides of the rack, and a downwardly converging bottom 33 sloping toward a central drain outlet 34.

Also connecting the end members 2 and 3 and spaced inwardly from the plane of the openings 18 and 19 are partition plates 35 and 36 extending parallel with the upwardly converging ends of the vertical angle members to form passageways 37 and 38, the upper and lower ends of the partitions being spaced from the upper plate 15 and from the top of the pan 28 to provide upper and lower horizontal passageways 39 and 40 communicating with the upper and lower ends of the passageways 37 and 38 to form a rectangular path of travel or raceway for the display trays 41 later described.

Extending between the partitions 35 and 36 at a point substantially midway of the height

of the door opening 11 is a pan 42 having a bottom 43 sloping downwardly toward a drain outlet 44. The pan 42 cooperates with the upper portion of the partitions 35 and 36 to form an ice compartment 45 in which blocks of ice 46 are inserted through the upper part of the door openings 11. The pan 42 also forms the top of a spray chamber 47, later described.

In order to move the display trays through the raceway I provide endless conveyor chains 49 and 50 which operate in close proximity to the flanges 17' of the vertical angle members over aligned pairs of sprockets 51, 52 and 53, 54. The pairs of sprockets 53 and 54 are rotatably mounted on stub shafts 55 and 56 carried by the end frame members in substantially horizontal alignment with the lower edges of the partitions 35 and 36, and the upper sprockets 51 and 52 are rotatably mounted on stub shafts 57 and 58 carried by adjustable brackets 59 and 60 adjacent the respective corners of the rack.

The brackets 59 and 60 preferably include flat bar portions having threaded shanks 62 extending upwardly through suitable openings in the horizontal flanges of the angle bars 9, as best illustrated in Figs. 1 and 4, whereby the axes of the sprockets are adjustably positioned to tension the conveyor belts upon manipulation of adjusting nuts 63 that are threaded on the projecting ends of the shanks and which engage the outer faces of the flanges of the angles 9.

The lower ends of the bar portions extend downwardly within the rack housing and are connected by horizontally positioned channel-shaped guides 64 extending across the tops of the partitions 35 and 36 to guide the tray carriers as they are moved by the chains across the horizontal passageway 39. The tray carriers are also guided through the lower passageway 42 by similar channel-shaped guides 65 fixed to the end members 2 and 3.

The trays are also retained in guided relation as they are moved through the vertical passageways 37 and 38 by flanges 66 and 67 which cooperate with the flanges 17' to provide vertical guide channels 68 and 69.

The chains 49 and 50 thus operate over the sprockets 51 and 52 through the upper horizontal passageways 39 at a point above the upper guideway, down through the channel guides 69, under the lower sprockets 53 and 54 at a point above the lower guide, and up the guides 68 to move the trays, as now to be described.

The trays are preferably removably mounted in tray carriers 70, best illustrated in Figs. 5 and 6 and include spaced angle member supports 71 and 72 connected by reach rods or tubes 73 having their ends fixed to the vertical flanges 74 of the angle supports. The horizontal flanges 75 of the angle members form end supports for the trays 41 and the ends thereof are turned upwardly to provide guide ears 76 and 77 to prevent lateral displacement of the trays on the carriers.

The supporting members 71 and 72 are suspended from the chains by straps 78 and 79 having their lower ends fixed to the flanges 74 and their upper ends provided with bearing openings 80 for pins or trunnions 81 extending from certain of the links of the conveyor chains 49 and 50, as best illustrated in Fig. 3. The trunnions preferably include bearing portions 82 extending through the openings 80 of the members 78—79 and also rotatably mount guide

rollers 83 arranged to operate in the channel-shaped guides previously described.

The trunnions 81 include heads 84 for engaging the inner faces of the strap members 78 and 79 and have reduced shanks 85 extending through the selective links of the belts, the shanks 85 being retained in the links by nuts 86 for drawing the shoulders 87 formed by the reduced shanks against the opposite side faces of the belt, as shown in Fig. 3. Suitable washers 88 and 89 may be inserted between the heads 84 and the rollers 83 to provide free relative movement between the rollers 83 and the strap members 78 and 79.

It is thus apparent that the carriers are freely supported on the trunnions and will retain substantially horizontal positions throughout their planetation; however, I provide for tilting the carriers during their movement through the vertical passageways whereby the trays are inclined to better disclose the merchandise carried therein.

This is accomplished by spaced guide rollers 90 and 91 mounted on headed studs 92 and 93 extending from the vertical flanges 74 of the carriers at the opposite sides of the members 78 and 79. The rollers 90 and 91 engage between the horizontal flanges of the upper and lower channel members to retain the carriers in horizontal position as they move through the horizontal passageways, but as the carriers are moved upwardly through the vertical passageway 37 on the display side of the rack, the rollers 90 enter the guide channels 68 to cooperate with the rollers 83 for moving the trays to tilted position, as shown in Fig. 4. As the carriers move down the opposite side of the rack, the rollers 91 enter the channel-shaped guide 69 to retain the trays tilted in the reverse direction and in view of the clerk dispensing merchandise therefrom.

The trays 41 are best illustrated in Fig. 5 and include a rectangular frame 94 having a foraminated bottom 95 through which the moisture may drain from the merchandise and through which air may circulate when the trays are moved through their path of travel to evaporate the moisture and thereby maintain the merchandise in cool fresh condition.

In order to brace the longitudinal members of the frame I provide intermediate angles 96 having their ends connected to the longitudinal members at a point intermediate their lengths. The angles 96 also form divisions for the trays whereby different merchandise may be isolated in the respective ends thereof.

To prevent movement of the merchandise across the width of the trays as the trays are moved to tilted position, I provide longitudinal angle bars 97 connected to the end members of the frame and to the division angles 96, as clearly illustrated in Fig. 5.

In order to operate the conveyor chains 49 and 50 the stub shafts 55 carry sprockets 98 which are driven by chain belts 99 operating over sprockets 100 on the ends of a drive shaft 101 of the actuating mechanism now to be described.

The shaft 101 extends longitudinally of the rack and has its ends rotatably mounted in bearings 102 and 103 carried by the horizontal bars 6, as best shown in Fig. 2. Keyed to the shaft 101 is a worm gear 104 that is driven by a worm 105 on a counter shaft 106. The counter shaft is rotatably supported in right angular

relation to the shaft 101 in bearing brackets 107 and 108 which are carried on the angle member 21 and on a spaced parallel angle member 109 having its ends connected to the end angle members 6.

The worm 105 is slidably keyed on the shaft 106 and is normally retained in meshing engagement with the worm gear by a spring 110 coiled about the shaft 106 and having one end bearing against the bearing bracket 107 and its opposite end against a collar 111 on the worm 105 so that in case something should wedge between the trays, the resistance thereof will cause the worm to move out of engagement with the worm gear and prevent damage to the operating machinery.

The shaft 106 carries a disk 112 that is driven by a friction roller 113 on the shaft 114 of a motor 115, the roller being adjustable relatively to the center of the friction disk to operate the worm gear at selective speeds depending upon the point of engagement of the roller with the friction disk, as in ordinary friction driving mechanism, the motor 115 being mounted on the angle 109.

The spray chamber 47 is preferably divided into two compartments 116 and 117 by means of a partition 119 extending between the partitions 35 and 36 at a point midway of the length of the spray chamber. Located in the respective compartments are spray nozzles 120 and 121 that are connected by pipes 122 and 123 with a vertical pipe 124 leading from a pump 125 which is mounted in axial alignment with the motor shaft 114 and has its drive shaft 126 overlying the face of the friction disk and provided with a friction roller 127 adjustably engaged therewith whereby the pump may be driven at selective speeds to vary the pressure of the water discharged through the nozzles 120 and 121.

The inlet of the pump 125 is connected with a conduit 128 having its inlet end positioned within a body of water carried in a pan 129 that is located below the drain 34 to receive the moisture collected by the pan 28, whereby water is drawn from the pan 129 and discharged by the pump through the nozzles 120 and 121 onto the merchandise carried in the trays as they move through the lower horizontal passageway 40.

Flow through the respective branch pipes 122 and 123 is controlled by suitable valves 130 and 130' whereby the sprays 120 and 121 may be selectively operated so that if desired only the merchandise in one end of the trays need be sprayed.

In order to assist melting of the ice for supplying cold water to the pan 129 I provide a third spray nozzle 131 connected with the vertical conduit 124 by a valved branch pipe 132 so that warm water from the pan 129 may be discharged over the ice. The sprayed water and the water of the melting ice flows through the outlet 44 into a conduit 133 which empties into the catch pan 28 and the water flows therefrom into the pan 129, as illustrated in Figs. 2 and 4.

In order to add to the attractiveness of the display and to provide an animated sign cooperating therewith, the top plate 15 carries a housing 135 having side walls 136 and 137 provided with longitudinal sight openings 138 and 139 through which indicia is disclosed to the customer. The indicia is carried on a rotatable drum 140 mounted on a shaft 141 having its

ends supported in bearings 142 and 143 carried on the horizontal flanges of the angle members 9.

To operate the drum the end thereof carries a ratchet wheel 144 adapted to be operated by a pawl 145 pivotally mounted on the upper end of a rocker arm 146 which is loosely mounted on the shaft 141, as shown in Fig. 4.

To actuate the rocker arm 146 the lower end thereof depends through a slot 147 in the plate 15 and into the path of travel of the rollers 83 so that as each roller moves through the upper horizontal passageway 39 it will engage the end of the arm to move the pawl in an anti-clockwise direction freely over the ratchet wheel 144, Fig. 4. When the end of the arm rides off the roller, a spring 148 returns the arm to its retracted position, causing the pawl to rotate the drum to bring another sign into position in alignment with the respective openings 138 and 139. The spring 148 has one end anchored to the bracket carrying the sprocket 51 and its other end is hooked in an opening in the rocker arm.

The drum 140 is preferably of octagonal shape to accommodate eight signs, every other one of which is readable through the opening 138 and the intermediate signs through the opening 139 so that when the respective signs are in position relatively to the openings, the indicia will be in correct reading position when the drum stops between each actuation of the rocker arm. The stroke of the pawl must therefor be sufficient to advance the drum two spaces upon each actuation of the rocker arm in order to bring the signs into view through the respective sight openings.

To make the unit complete the end wall 2 may carry a suitable wrapping shelf 150, sack racks 151 and twine 152 for the convenience of the clerk dispensing the merchandise.

In operating a display rack constructed and assembled as described, and assuming that the rack is to be used for displaying both fruits and vegetables, the fruits are placed in one end of the trays and the vegetables at the other end, the partitions 96 dividing the fruits from the vegetables. The valve 130 is opened to supply water to the spray nozzle 121 to spray the vegetables as they pass through the lower passageway, but the valve controlling flow to the spray nozzle 120 is closed when fruit is displayed at that end of the trays. The friction roller 113 is then adjusted on the motor shaft 114 to drive the friction disk 112 at the desired speed to move the conveyor chains at a rate best suited for display of the merchandise carried in the trays. The friction roller 127 is also adjusted on the pump shaft to effect delivery of the proper amount of water to the spray nozzle 121. The pan 129 is then filled with water to supply the pump and if the temperature requires it, the ice compartment may be supplied with a plurality of blocks of ice located below the spray nozzle 131, or the ice may be placed directly into the water carried in the pan 129.

The motor 115 is then energized to cause operation of the conveyor chains and operation of the pump to supply the spray nozzles. Movement of the conveyor chains carries the trays upwardly through the passageway 37 on the display side of the rack with the trays in slightly inclined position, as illustrated in Fig. 4, due to the fact that both rollers 83 and 90 enter the guide channel 68 as the tray carriers

move about the periphery of the lower sprocket 53.

As the rollers 83 reach the peripheries of the upper sprockets 51, the rollers 90 and 91 are then in position to engage the upper horizontal guideway 64 so that continued movement of the carriers causes the rollers 90 and 91 to enter the horizontal guideways and retain the trays in horizontal position as they move through the horizontal passageway 39. As the rollers 83 move across the top of the sprocket wheels 52, the rollers 90 and 91 are moved out of engagement with the horizontal guide channel 64 so that the trays are free to move downwardly on the dispensing side of the rack and the roller 91 is in position to enter the guide 69. The trays then move downwardly at the display side of the rack in tilted position reversely to their position on the display side of the rack. When the trays reach the end of the vertical passageway 38, the rollers 90 and 91 are in position to enter the lower horizontal guide channel 65 so that the trays are moved in horizontal position across the lower passageway 40.

As the trays move across the passageway below the spray compartment, the vegetables are sprayed with water from the nozzle 121. This is an important feature of the invention because the movement of the tray upwardly through the display passageway causes air to move through the perforated bottom of the trays to evaporate the moisture, thereby retaining the vegetables in a cool fresh condition at a temperature below that of the spray water.

If the vegetables are to be placed in both ends of the trays, the nozzle 120 will be brought into service by opening the valve 130' so that the vegetables are sprayed across the entire length of the trays as they move through the spray compartment.

Simultaneously with the operation of the trays, the drum 140 is operated to effect intermittent movement of the signs across the sight openings 138 and 139. This is accomplished by the rollers 83 engaging the depending end of the lever 146 so that when the lever is rocked in an anti-clockwise direction, Fig. 4, by the rollers, the spring 148 will return the lever to retracted position, causing the pawl to advance the drum two spaces for bringing the next succeeding signs in position relatively to the sight openings.

If it is necessary to tighten the belts, this may be accomplished by adjusting the brackets carrying the upper sprockets. When making this adjustment, attention is directed to the fact that the upper guide channel, being carried with the brackets, is also moved therewith so that the required spacing of the upper run of the belts relatively thereto is maintained.

From the foregoing it is apparent that vegetables are retained in cool moist condition since they successively move through a spray zone and then through an evaporating zone, whereby the moisture is evaporated from the vegetables to reduce their temperature below that of the water discharged from the spray.

It is also obvious that the merchandise dispensed from the trays at the dispensing side of the rack is removed from the inner sides of the trays and when the trays are moved upwardly at the display side of the rack, an attractive display is maintained in view of the customer.

When it is desired to remove the vegetables

from the display rack for storage, the trays may be lifted from the tray carriers and readily replaced without interfering with the arrangement of the vegetables therein.

Attention is directed to the fact that the water sprays are hooded by the lower ends of the partitions 35 and 36 so that the water cannot reach the customer or the clerk dispensing the merchandise. Consequently a strong spray may be provided so as to reach all parts of the trays and the vegetables carried thereby.

What I claim and desire to secure by Letters Patent, is:

1. In a rack of the character described, a frame having central ice and spray compartments and a raceway extending around said compartments, a plurality of trays, sprockets carried by the frame in said raceway, chains operating over said sprockets, means supporting the trays from the chains for movement through said spray compartment and said raceway, and means supplying water from the ice compartment to the spray compartment for moistening merchandise carried in said trays.

2. In a device of the character described, a frame having open sides through which merchandise is exposed, a substantially rectangular raceway having ways extending across the open sides of the frame, sprockets located in said raceway, chains operating over the sprockets, a plurality of trays, means for pivotally supporting the trays from the chains for movement thereby through the raceway, and means carried with the trays and engaging said ways for tilting the trays.

3. In a device of the character described, a frame having open sides through which merchandise is exposed, a substantially rectangular raceway having ways extending across the open sides of the frame, sprockets located in said raceway, chains operating over the sprockets, a plurality of trays, means for pivotally supporting the trays from the chains for movement thereby through the raceway, means carried with the trays and engaging said ways for tilting the trays, and a spray nozzle located in the path of the trays to add moisture to the merchandise carried in the trays.

4. In a device of the character described, a frame having open sides through which merchandise is exposed, a substantially rectangular raceway having ways extending across the open sides of the frame, sprockets located in said raceway, chains operating over the sprockets, a plurality of trays, means for pivotally supporting the trays from the chains for movement thereby through the raceway, roller guides in said ways, and rollers carried with the trays for tilting the trays upon movement through said ways.

5. In a device of the character described, a frame having open sides through which merchandise is exposed, a substantially rectangular raceway having ways extending across the open sides of the frame, sprockets located in said raceway, chains operating over the sprockets, a plurality of tray carriers, means for pivotally supporting the tray carriers from the chains for movement thereby through the raceway, means carried with said ways for tilting the tray carriers, and removable trays supported in said carriers.

6. A device for displaying perishable merchandise of the character described including

a rack, a carrier supported by the rack for containing said merchandise, a spray device for moistening said merchandise, means in the rack forming an evaporating zone, and means carried  
5 by the rack for successively moving the carrier across the spray discharged from the spray device and through the evaporating zone to effect reduction of temperature of the merchandise incidental to evaporation of the moisture applied by said spray device.

7. A device for displaying perishable merchandise of the character described including a rack, means in the rack forming a substantially rectangular way to provide a horizontal spraying zone and a vertical evaporating zone,  
15 a carrier supported by the rack for movement about said way, trays supported by the carrier for containing said merchandise, a spray device supported in the spraying zone for spraying said merchandise, and means for actuating the carrier to move said merchandise successively through said spraying and evaporating zones whereby evaporation of the spraying received in said moisture zone effects reduction of temperature of the merchandise.

8. A device for displaying perishable merchandise of the character described including a frame having open sides for displaying and dispensing the merchandise, means supported  
30 by the frame between said openings for applying moisture to the merchandise, a carrier supported by the frame for moving the merchandise continuously across said openings and past said moistening means whereby moisture applied to the merchandise by said moistening means is evaporated while the merchandise is being moved across said display openings to effect

reduction of temperature of the merchandise and to effect elimination of surplus moisture by the time the merchandise has reached the dispensing opening.

9. A device for displaying perishable merchandise of the character described including a rack, a carrier supported by the rack for containing said merchandise, means in a portion of the rack for defining an enclosed spray chamber, a spray device in said spray chamber for moistening said merchandise, means in the rack forming an evaporating zone, and means carried by the rack for successively moving the carrier across said spray chamber and through the evaporating zone to effect reduction of temperature of the merchandise incidental to evaporation of the moisture applied by said spray device.

10. A device for displaying perishable merchandise of the character described including a frame having open sides for displaying and dispensing the merchandise, means supported by the frame and forming a substantially confined spray chamber between said openings, a spray device in said chamber for supplying moisture to the merchandise, a carrier supported by the frame for moving the merchandise continuously across said openings and past said moistening means whereby moisture applied to the merchandise in said spray chamber is evaporated while the merchandise is being moved across said display openings to effect reduction of temperature of the merchandise and to effect elimination of surplus moisture by the time the merchandise has reached the dispensing opening.

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