Nov. 30, 1943. E. SAYEN 2,335,613

MULTISTATION TRANSFER EQUIPMENT

Filed Aug. 12, 1942 5 Sheets-Sheet 1

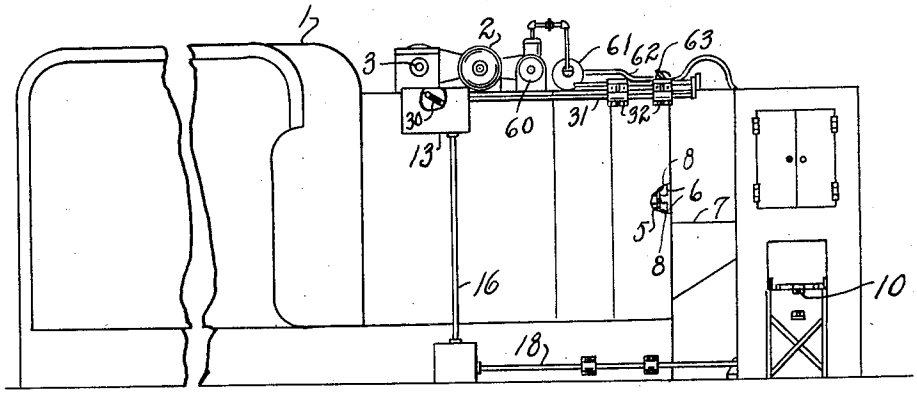


FIG. 1

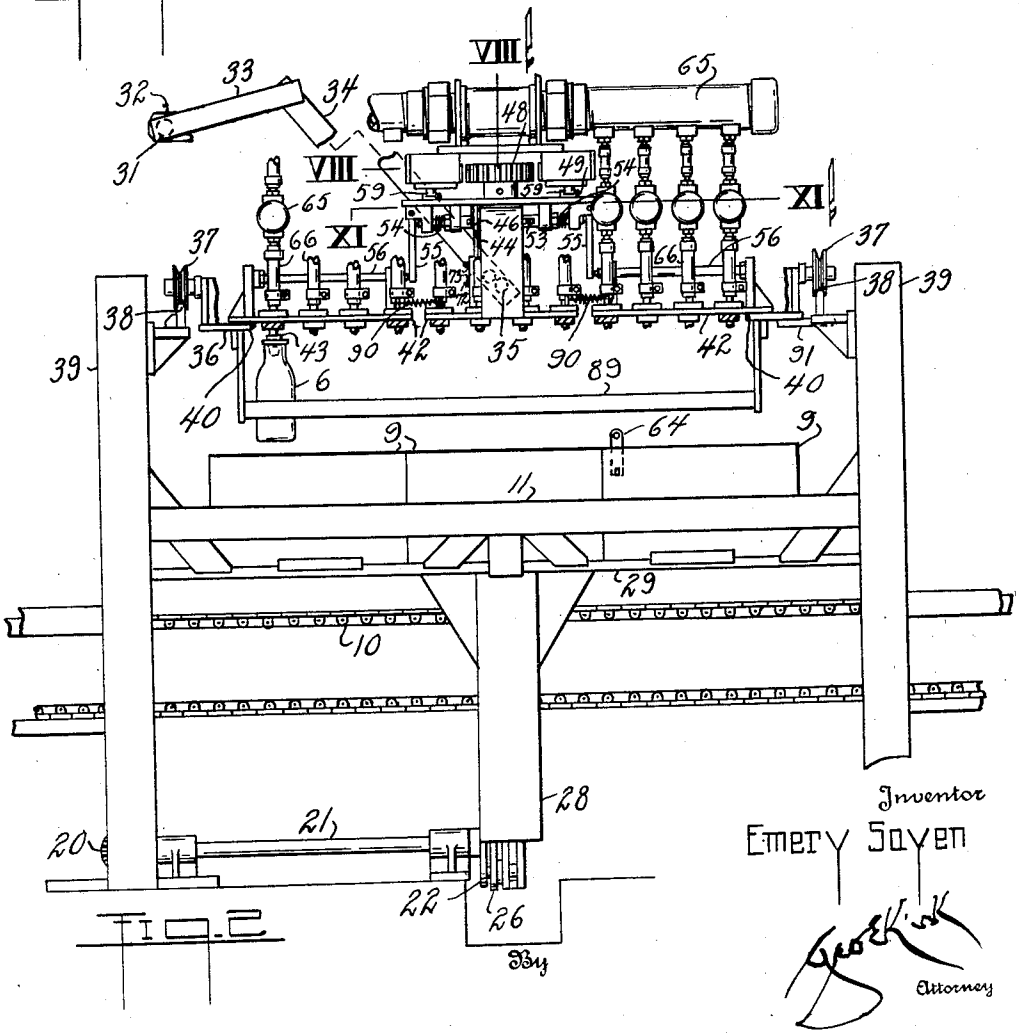


FIG. 2

Inventor
Emery Sayen
By
Attorney

Nov. 30, 1943. E. SAYEN 2,335,613

MULTISTATION TRANSFER EQUIPMENT

Filed Aug. 12, 1942 5 Sheets-Sheet 2

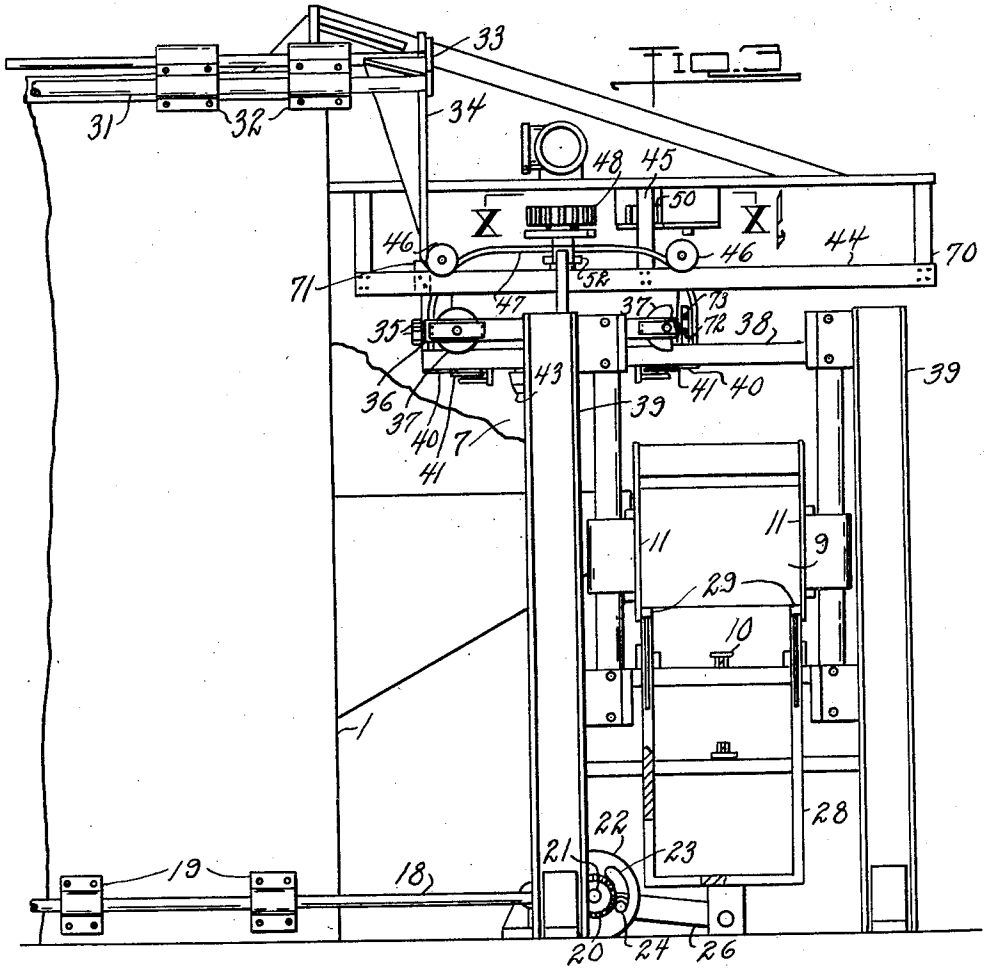


FIG. 1

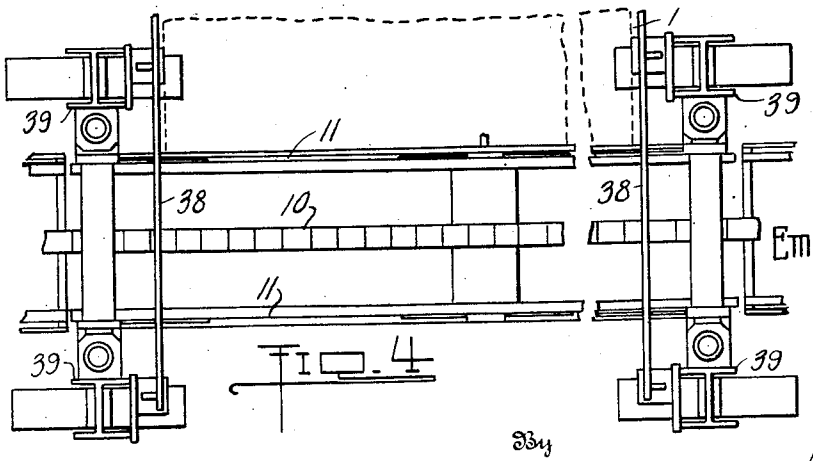


FIG. 4

Emery Sayen
Inventor

By

Attorney

Nov. 30, 1943. E. SAYEN 2,335,613

MULTISTATION TRANSFER EQUIPMENT

Filed Aug. 12, 1942 5 Sheets-Sheet 3

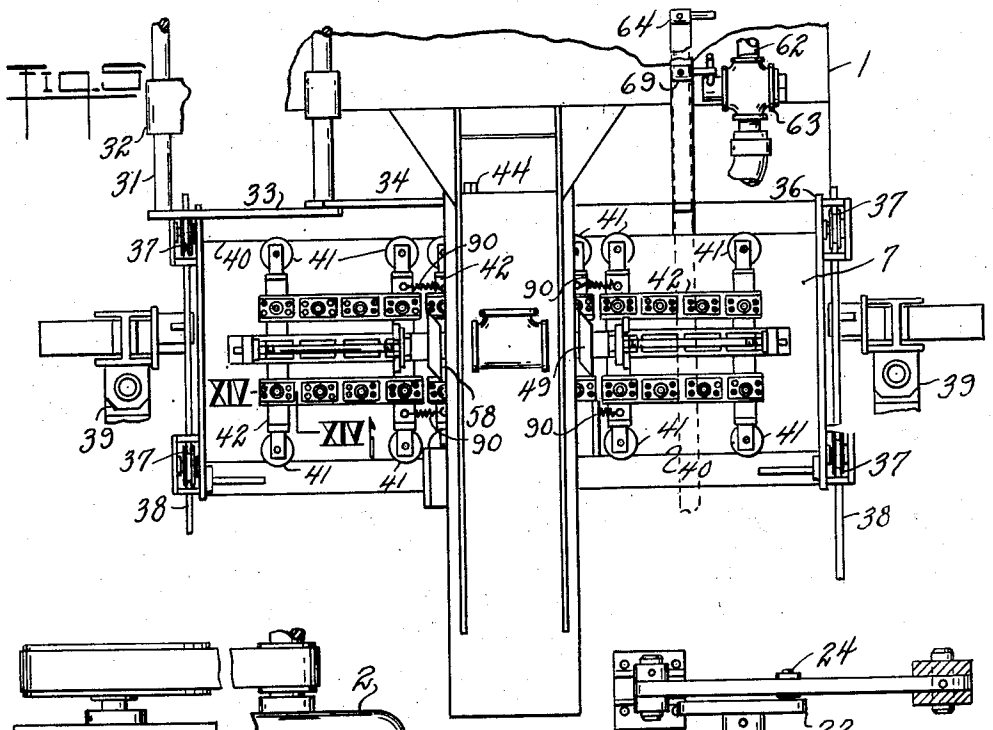


FIG. 5

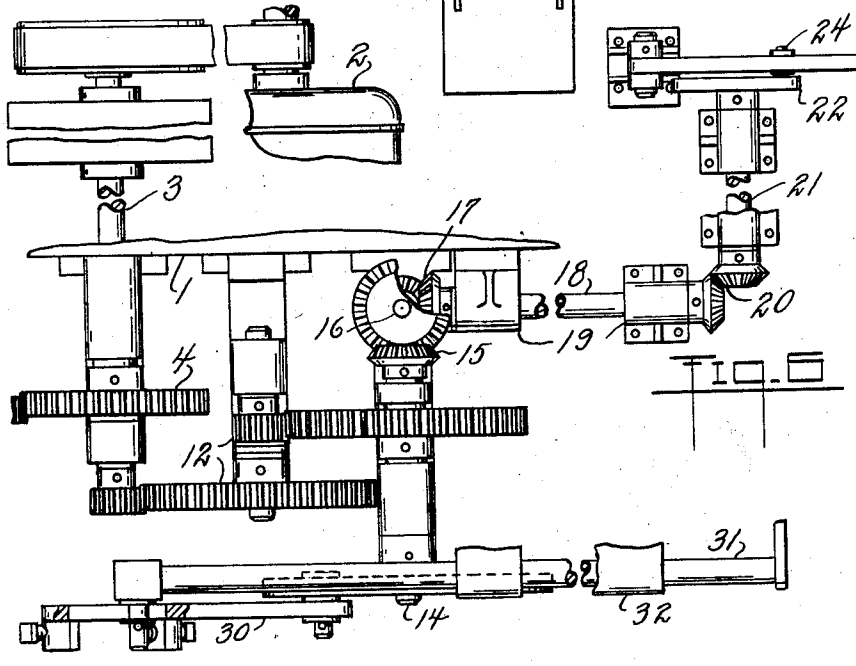


FIG. 6

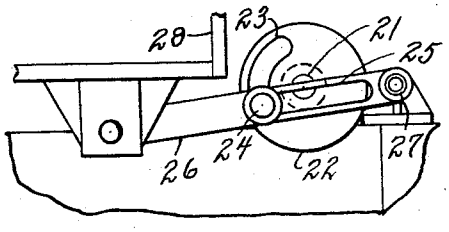


FIG. 7

Inventor
Emery Sayen

By

Attorney

Nov. 30, 1943. E. SAYEN 2,335,613

MULTISTATION TRANSFER EQUIPMENT

Filed Aug. 12, 1942 5 Sheets-Sheet 4

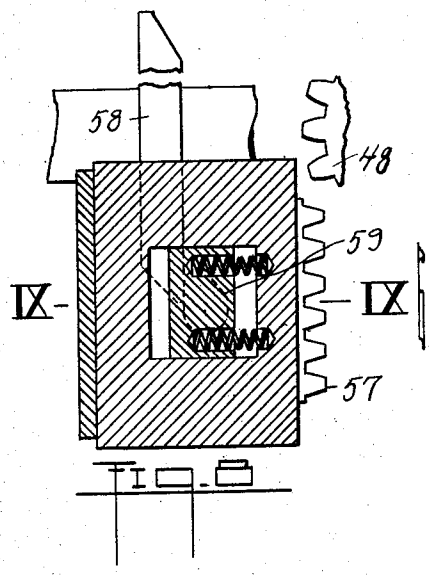


FIG. 8

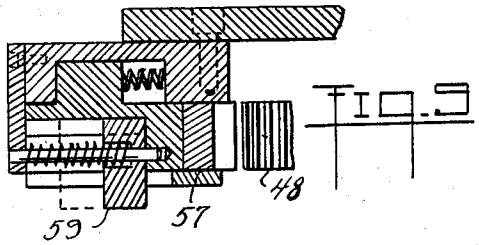


FIG. 9

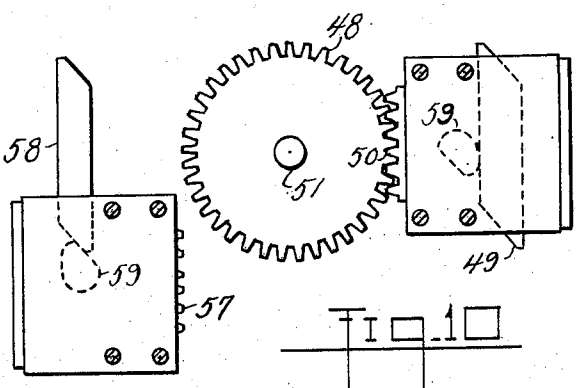


FIG. 10

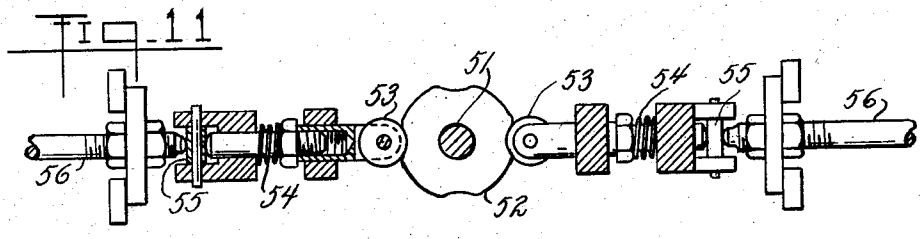


FIG. 11

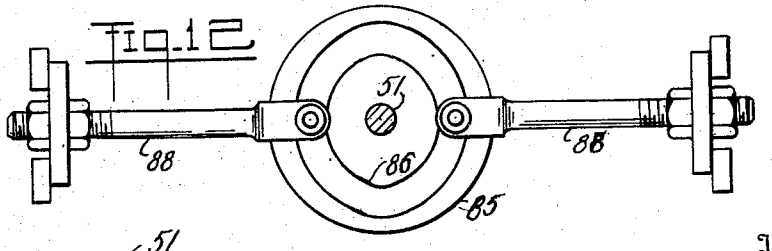


FIG. 12

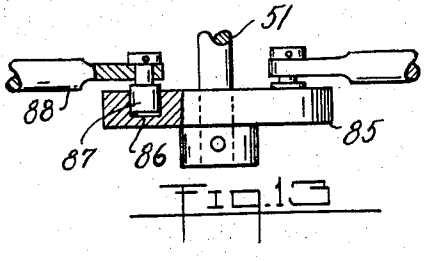


FIG. 13

Inventor
Emery Sayen
By
Attorney

Nov. 30, 1943. E. SAYEN 2,335,613

MULTISTATION TRANSFER EQUIPMENT

Filed Aug. 12, 1942 5 Sheets-Sheet 5

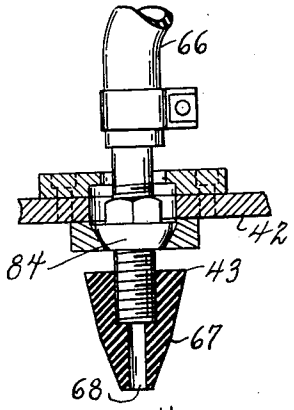


FIG. 14

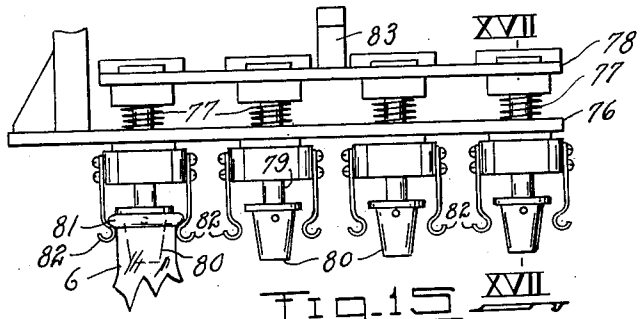


FIG. 15

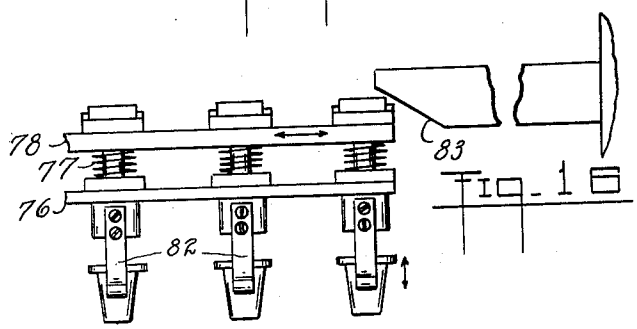


FIG. 16

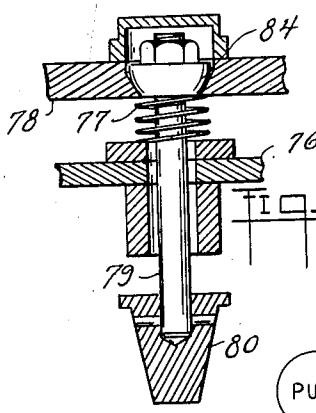


FIG. 17

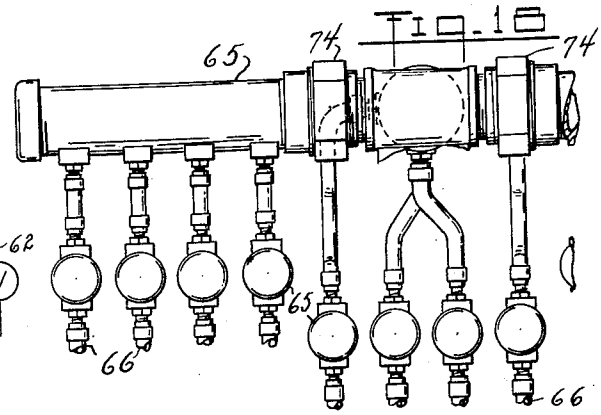


FIG. 18

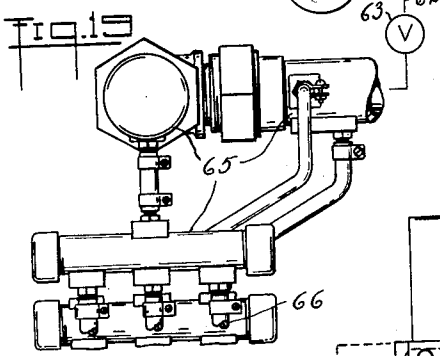


FIG. 19

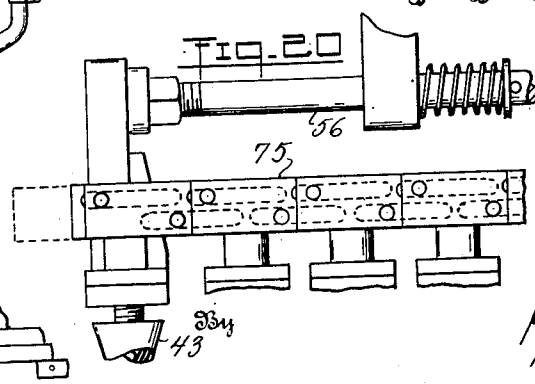


FIG. 20

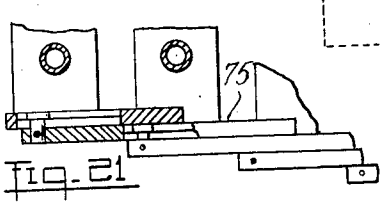


FIG. 21

Inventor
Emery Sayen

By

Attorney

Patented Nov. 30, 1943

2,335,613

UNITED STATES PATENT OFFICE

2,335,613

MULTISTATION TRANSFER EQUIPMENT

Emery Sayen, Toledo, Ohio

Application August 12, 1942, Serial No. 454,483

5 Claims. (Cl. 214—1)

This invention relates to group handling of articles.

This invention has utility when incorporated in specially locating an assembly of articles, as milk bottles in cases, for delivery of the respective bottles, even to a different assembly or spacing relation to a washer.

Referring to the drawings:

Fig. 1 is a fragmentary view in side elevation of a bottle washer, having an embodiment of the automatic transfer equipment or feeder adapted thereto;

Fig. 2 is a view in elevation from the right of Fig. 1, parts being broken away, showing some features of the pick-up or elevator for the cases from the supply conveyor, and the bottle engaging means for grasping the bottles as the cases are dropped away therefrom, for the bottles as cleared of the cases, then to be shifted onto the bottle washer conveyor;

Fig. 3 is a view in elevation of the feeder as forming the showing in Fig. 1, the housing being removed;

Fig. 4 is a fragmentary view in plan of the bottle case elevator from the supply conveyor;

Fig. 5 is a plan view of the bottle engaging means and shifter means as operable in taking the bottles from the cases and delivering into the washer;

Fig. 6 is a plan view, with parts broken away, of transmission connections from the bottle washer power means or drive, to the case elevator and to the bottle engaging means of the feeder;

Fig. 7 is a detail view of the elevator operating lever device;

Fig. 8 is a section on the line VIII—VIII, Fig. 2, showing features of the shifting means for the bottle engaging means, being here in the form of one-way acting rack mechanism;

Fig. 9 is a section on the line IX—IX, Fig. 8;

Fig. 10 is a view on the line X—X, Fig. 3, looking in the direction of the arrow, showing the pinion reversing racks;

Fig. 11 is a view on the line XI—XI, Fig. 2, showing the bottle engaging means shifting device as operated by the pinion from the racks of Fig. 10;

Fig. 12 is a view similar to Fig. 11, showing modified form as a closed path cam, instead of springs against open cam of Fig. 11;

Fig. 13 is a detail view in side elevation of the cam of Fig. 12 and transmission arm connections therefrom;

Fig. 14 is a section on the line XIV—XIV, Fig. 5, showing suction type of bottle engaging means or pick-up;

Fig. 15 is a grouping of bottle engaging means of spring grapple form, in lieu of the suction or pneumatic device of Fig. 14;

Fig. 16 is a view from the right of Fig. 15, of the release for the bottles picked up by the grapple springs;

Fig. 17 is a section on the line XVII—XVII, Fig. 15, showng the universal joint or rockable mounting to facilitate swinging of the spring grapple into bottle centering engagement;

Fig. 18 is a detail of manifolds and flexible duct connections for the pneumatic engaging means of Figs. 2, 14;

Fig. 19 is a view from the right of Fig. 18;

Fig. 20 shows features of slide and slot for spacing ranges between the pneumatic bottle engaging means, adaptable to differing size or capacity of bottles and characters of cases; and

Fig. 21 is a fragmentary plan view of the slides of Fig. 20 with the pin and slot interengagement therebetween.

Bottle washer 1 (Figs. 1, 2, 3, 6) has thereon motor 2 connected to rotate shaft 3 having fixed therewith gear 4 cooperating to actuate the mechanism of the washer 1. Extending through the washer 1 is conveyor 5 for milk bottles 6 received at feed section 7. The milk bottles 6 are given special spacing in delivery at stations provided by pockets or carrier elements 8 for transit through the washer on the conveyor 5.

Power drive for the washer 1 is from a motor 2, which has transmissions therefrom, in accordance with the invention herein, effective to operate automatic feeding mechanism in transferring bottles 6 in cases 9 urged along in lineal series by conveyor 10 horizontally extending between guides 11 to a position crosswise of an end of the washer 1. This supply conveyor 10 is below the conveyor 5 and spaced slightly away therefrom adjacent the feed section 7.

The elevator

Speed reduction gearing 12 in housing 13 on the washer 1 (Fig. 6), adjacent the motor 2, rotates shaft 14 connected through bevel gearing 15 with vertical shaft 16, having extending therefrom bevel gear connection 17 to lower horizontally extending shaft 18. Bearing brackets 19 on the washer 1 carry the shaft 18 to bevel gear connection 20 rotating horizontal shaft 21 terminally carrying disk 22. Drive therefrom is effective for direct lifting of a group of cases 9 from the conveyor 10 with quick descent and time

interval for accumulation of a succeeding group of cases. This sequence arises from the constantly rotating shaft 21, because the disk 22 has slot 23 to engage crank pin 24 (Fig. 7) in slot 25 of lever 26 having fixed fulcrum 27. The free end of the lever 26 has upwardly extending forked means 28 between which the conveyor 10 travels. As thus astride the horizontal reaches of the conveyor 10, the means 28 may thrust upward from the upper reach of the conveyor 10 tray sections 29 to lift a group of the cases 9 from the conveyor 10.

The bottle transfer

The shaft 14 has crank connection by means of adjustable link 30 (Fig. 6) to reciprocate rod 31 in brackets extending along the side of the washer 1 horizontally above the shaft 18. The free end of this rod 31 beyond the brackets 32 has angular extension 33 (Figs. 2, 3, 5). From the extension upward and inward, there is downward and inward extension 34 to detachable connection 35 with truck or carriage 36 having wheels 37 on tracks 38 mounted on brackets from uprights 39.

The truck 36 has secondary tracks 40 engaged by rollers 41 for groupers 42 having bottle engaging means 43. In the instance that cases 9 are for quart milk bottles, the bottles being in four rows of three bottles each, the grouper 42 as a minor truck, may have similarly arranged such series of bottle engaging means 43. Inasmuch as the stations 8 in the washer 1 at the feed section 7 are approximately uniformly spaced, there is occasion for some departures in the washer from the bottle positions, especially as between cases 9. Accordingly, as the elevator lifts the cases with the bottles 6, it is important that this automatic feeder be effective in locating the respective engaging means 43 in registering position with each of the bottles in the case 9.

There is timed movement of the truck 36 away from the washer 1 and to a position over the conveyor 10. The structure carrying the primary truck 36 with its secondary trucks 42 has thereover a track 44 from the washer 1 with central bracing 45 (Fig. 3). Wheels 46 on the track 44 movably mount over-carriage section 47 to carry a pinion 48 (Fig. 10). In the outward travel, a fixed guide or wedge 49 holds a rack 50 to rotate the pinion 48. This angular shifting of the pinion 48 turns to like extent the vertical shaft 51 on which the pinion is fixed with cam 52. Rollers 53, acting against the resistance of compression springs 54, thrust pusher elements 55 (Figs. 2, 11). The cam 52 is so designed that this shifting of the elements 55 acts on rods 56 to carry its grouper 42 to accommodate the clearance of the bottles 6 from the bottles in the intermediate case 9.

In this outward transit of the section 47 from the washer 1, the pinion 48 is acted upon only by the rack 50. In the outward travel of the pinion 48, it is clear of a rack 57 retracted by a fixed wedge cam 58, the reverse of the cam wedge 49, to act upon depending portions 59 (Figs. 8, 9, 10) to retract the rack 57 clear of the pinion 48. As the carriage 47 is retracted the rack 57 is in mesh for rotating the pinion 48 and the cam 52 fixed on the shaft 51, as is the pinion 48. Rollers 53 as urged by springs 54, ride into the shorter radius portions of the cam 52. During the further retraction transit of the carriage section, the wedge 49 retracts the rack 50 to be clear of the pinion 48.

The pneumatic bottle engagement control

The motor 2 has drive connection to suction pump 60 connected to vacuum tank 61 (Figs. 1, 2, 14, 18, 19) having duct 62 therefrom to valve 63 which has its arm turned through an angle by the upward travel of the bar means 64 from the tray device 29. In this operation, the means 64 (Figs. 2, 5) opens the valve 63 for sub-atmospheric pressure to prevail in manifolds 65, and by way of flexible tube connections 66 therefrom to respective friction or flexible rubber cone centering devices 67 mounted in the groupers 42. Passage 68 central of each device 67 so exhausts the respective bottles as thrust thereover by the elevator that the uncracked or good bottles are retained as the case rapidly descends. This is thus an automatic sorting device for good bottles. The rapid interval of case descent is followed, at once the bottles are clear of the case, by the return travel of the trucks, the rack 57 shifts the devices in changing the spacing between the bottles. As the bottles are positioned at the stations 8, the carriages, carrying bar means 69 (Figs. 2, 5) close the valve 63 and simultaneously release the vacuum holding operations at the devices 67. The respective bottles 6 are thus freed from the suction support and drop clear of the respective means 43, one bottle at each station 8.

Stop 70 (Fig. 3) precludes out travel excess for the carriages, while stop 71 effects proper inward positioning. This means that there is insured at the forward travel, an appropriate location for the bottle engaging means to function upon the lifted bottles, while at the recover position, the bottle release is timely and in the places desired. The timing is such for automatic operation that synchronism may be maintained. Incoming fully charged cases 9 of bottles 6 may shove along the emptied cases 9, for the newly arrived cases to be elevated, bottles removed and such returned. In practice, an attendant may effect speed up, altho the conveyor 10 does not stop during the elevator operation, but may accumulate cases for entrance at once to fill the tray 29. As cases may be adapted to containers or bottles of varying or different capacities, such as two quart sizes, pints, half pints, or otherwise depart in dimension for the articles to be transferred, groupers 42 in conformity thereto may be installed. To this end pin 72 (Figs. 2, 3) and bolts 73 permit carriage withdrawals for replacement. In the pneumatic control, manifold connectors 74 may be disconnected.

The pneumatic control for engaging, readily permits ranges of flexibility for variable spacing of the device 67, say by slide slots and pin mechanism 75 (Figs. 20, 21).

The mechanical engagement control

Instead of pneumatic control for bottle engagement means, grouper 76 (Figs. 15, 16, 17) may have springs 77 supporting crosshead 78, having fixed therewith depending stems 79 to bottle entering cones 80. At the outer travel limit for the grouper 76 as over the elevator, the elevator trays 29 thrust the cases 9 to have the cones 80 enter the bottle necks to center the respective bottles to have the outwardly extending lips or ribs 81 of the bottle top engaged by yieldable arms or springs 82 fixed with the

grouper 76 in pairs for a bottle therebetween. As the grouper 76 recedes to the washer 1, fixed wedge or cam 83 acts on the crosshead 78 further to compress the helical springs 77, and thereby cause the centering cones 80 to push the bottles 6 away from the grouper into landing positions at the stations 8. Universal joint or rocking bearing 84 permits a range for directing the cones 80.

Closed cam 85 (Figs. 12, 13) has cam way 86 for cam rollers 87 to thrust rods 88 in the pushing control for the grouper or minor trucks 42.

Under the set up herein, as the trucks have moved away from the elevator and to position at the station 7 for the bottles 6 to be released, there is safeguard provision in bar 89 (Fig. 2) to hold the bottles in any slight descent to the washer structure from rolling or falling away.

The groupers 42, whether thrust outward by the cam device 52 (Fig. 11) or the closed cam 85 (Fig. 12) at the increased radius position, automatically recovers or retracts as the reduced radius portions of the cams come into play. This is effected by tension helical springs 90 (Fig. 5) against which the outward thrusts have been effective.

The primary truck 36, may adjacent the termini of its forward track 40, have extension 91 to ride under the track 38. The purpose of this slide guide is to avoid any tendency of the truck to tilt as thrust out or pulled back by the rod 31 and the connections 33, 34 therefrom.

From the foregoing it is to be seen that applicant provides an automatic feeder for a bottle washer, in which cases 9 of dirty empty milk bottles 6 are brought by conveyor 10 to position adjacent the washer 1 having the feed section 7. It has been found desirable to have an inspector, and such duties need not require any lifting. In lieu of stop for holding the received cases 9 in register with the trays 29 for the lift, the inspector may care for such timing or positioning, and likewise that the conveyor 10 clears the empty cases 9 from the trays 29, in the event such empties cases be not elsewhere shifted.

Upon the trays 29 reacning the upward shift limit the bottle gripping or engaging means, say 43, if pneumatic, has the suction thereto. The suction is brought into action by the trip or bar means 64 in opening the valve 63. Mechanically, the upward thrust of the bottles 6 by the trays 29 may cause the springs 82 (Fig. 15) to engage the lips 81 of the bottles. In either event, the tray drive control (Fig. 7), at once allows the cases 9 to descend clear of the suspended bottles 6.

In synchronism with this clearing of the bottles from the cases, the transmission from the washer drive, is effective. The transmission to the tray control is by way of shafts 18, 21 (Fig. 3), while reciprocable rod 31 has now become active to retract the truck mechanism which has the suspended bottles 6.

During this transit of the truck mechanism, reassembly of the bottle engaging means may occur. The rockable joints or bearings 84 (Figs. 14, 17) may account for partial misalignment of the cones 67, 80. Wider arrangement schedule is allowed by pin and slide scheme 75 (Figs. 20, 21). The flexible ducts 66 allow for the shiftings. In those instances where the practice may involve more or less standardized type of milk cases 9, such re-grouping may be in order to the major extent as between the abutting cases, inasmuch as herein disclosed a full charge for the washer 1 may take several cases, herein shown as three. The cam 52 (Fig. 11) for a 90° control rotation, or the cam 85 (Fig. 12) for 180°. During this recover interval, the rack device (Fig. 10) allows the springs to bring the suspended bottles into appropriate register position as to the stations 8, at which time the engaging means automatically release the bottles 6 as device 69 cuts off the suction from the valve 63 and allows atmospheric pressure to enter. For the mechanical control, the cam 83 effects freeing of the bottles 6 (Figs. 15, 16). The bottles are thus released to the washer 1 at the respective washer stations 8. The stations, positions or locations 8 are at the respective spacings for placement therefrom into registry with the brushes of the washer.

The cycle is repeated to care for the succeeding supply of cases by the truck being thrust outward over the trays 29 for the next lift of cases charged with the milk bottles to be cleaned.

What is claimed and it is desired to secure by Letters Patent is:

1. Equipment for transferring articles from a supply way to a handling apparatus wherein the spacing between the articles on the way is different from that in the apparatus, comprising a carriage movable relatively to the way and positioned thereabove, said carriage including article gripping means shiftably mounted thereon, thrusting means positioned adjacent the way for moving articles from the way into engagement with the gripping means, and control means responsive to the travel of the carriage for relatively shifting the gripping means as the carriage moves toward the apparatus, whereby the desired respacing of the articles is obtained.

2. Equipment for transferring articles from a supply way to a handling apparatus wherein the spacing between the articles on the way is different from that in the apparatus, comprising a track horizontally extending from above the way and toward the apparatus, a carriage mounted on the track for travel between the way and apparatus, said carriage including article gripping means shiftably mounted thereon, thrusting means positioned adjacent the way for moving articles from the way into proximity to the gripping means, said gripping means as shiftably mounted being movable into registry with the articles to be transferred, and control means responsive to the travel of the carriage for relatively shifting the gripping means as the carriage moves toward the apparatus, whereby the desired respacing of the articles is obtained.

3. Equipment for transferring articles from a supply way to a handling apparatus wherein the spacing between the articles on the way is different from that in the apparatus, comprising a carriage movable relatively to the way and positioned thereabove, said carriage including article gripping means shiftably mounted thereon, upwardly effective thrusting means for lifting articles from the way into engagement with the gripping means, and control means responsive to the travel of the carriage for relatively shifting the gripping means as the carriage moves toward the apparatus, whereby the desired respacing of the articles is obtained.

4. Equipment for transferring articles from a supply way to a handling apparatus wherein the spacing between the articles on the way is different from that in the apparatus, comprising a carriage movable relatively to the way and posi-

tioned thereabove, said carriage including article gripping means shiftably mounted thereon, thrusting means positioned adjacent the way for moving articles from the way into engagement with the gripping means, control means responsive to the travel of the carriage for relatively shifting the gripping means as the carriage moves toward the apparatus, whereby the desired respacing of the articles is obtained, and power transmission mechanism for the thrusting means and carriage in sequence for transit of the articles.

5. Equipment for transferring articles from a supply way to a handling apparatus wherein the spacing between the articles on the way is different from that in the apparatus, comprising a track horizontally extending from above the way and toward the apparatus, a carriage mounted on the track for travel between the way and apparatus, said carriage including article gripping means shiftably mounted thereon, upwardly effective thrusting means for lifting articles from the way into engagement with the gripping means, control means responsive to the travel of the carriage for relatively shifting the gripping means as the carriage moves toward the apparatus, whereby the desired respacing of the articles is obtained, and power transmission mechanism for the thrusting means and carriage in sequence for transit of the articles.

EMERY SAYEN.