Jan. 6, 1942. J. F. PRICE 2,268,897

CONTAINER HANDLING MACHINE

Original Filed Nov. 23, 1938 3 Sheets-Sheet 1

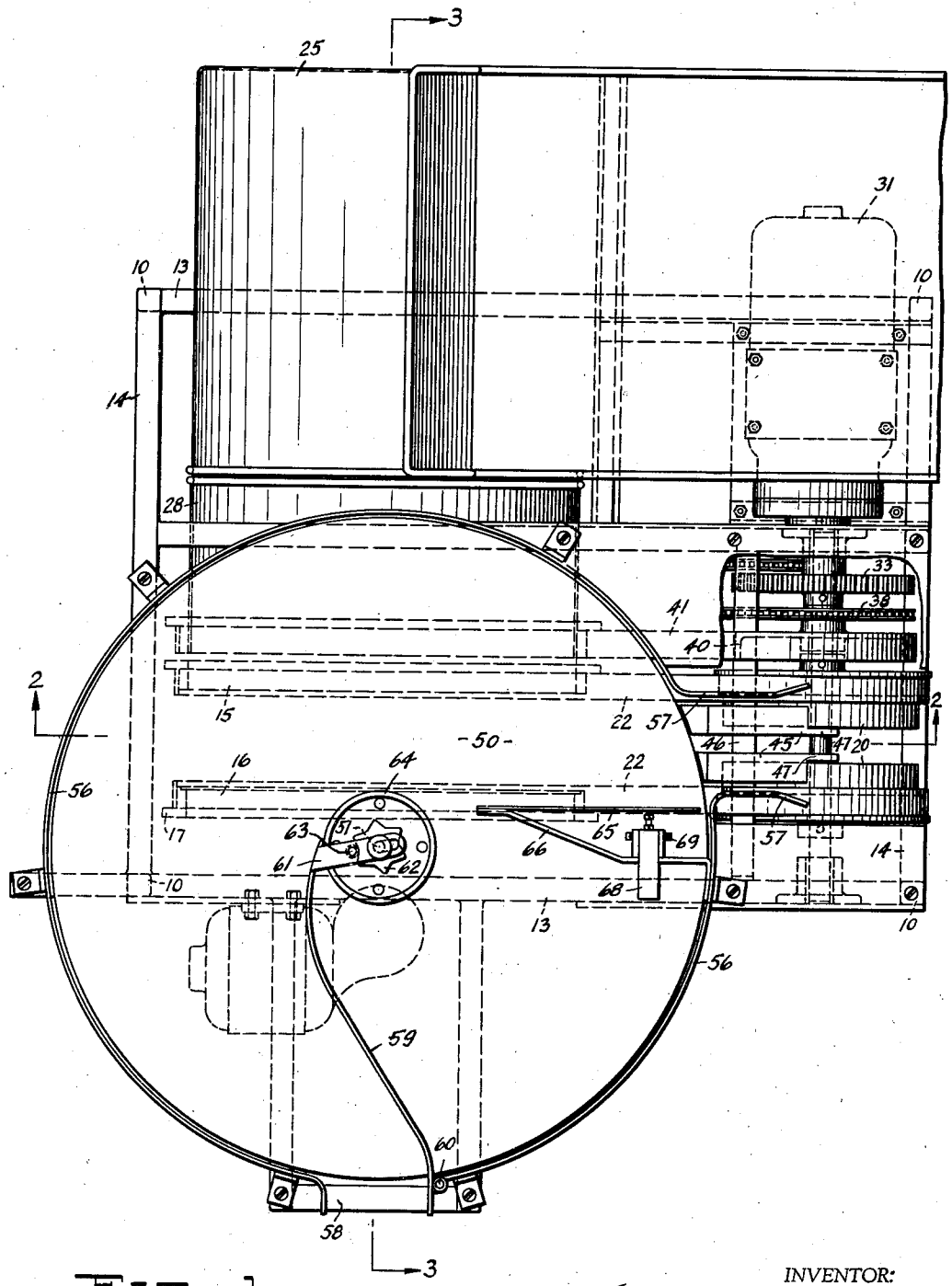

FIG. 1

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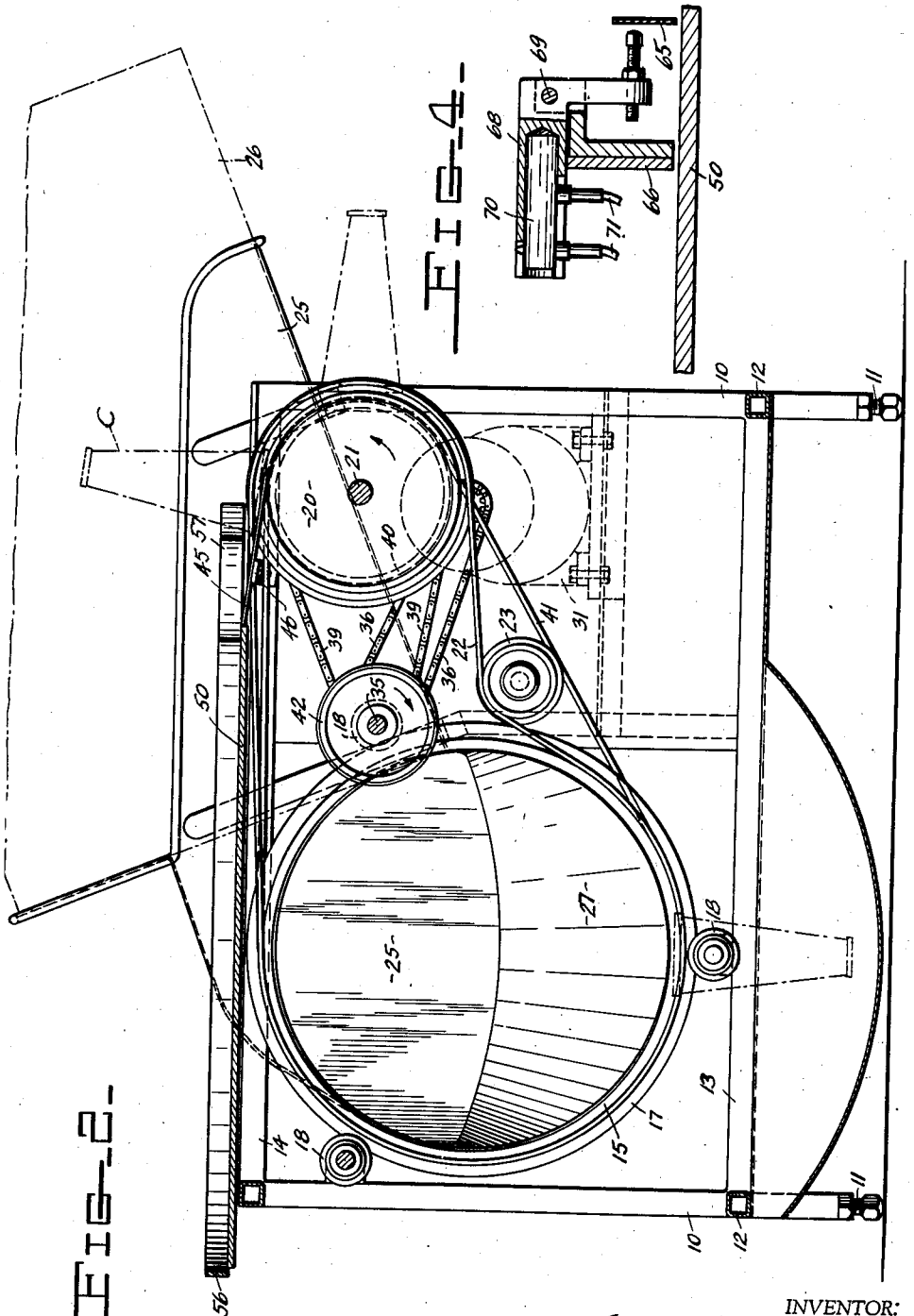

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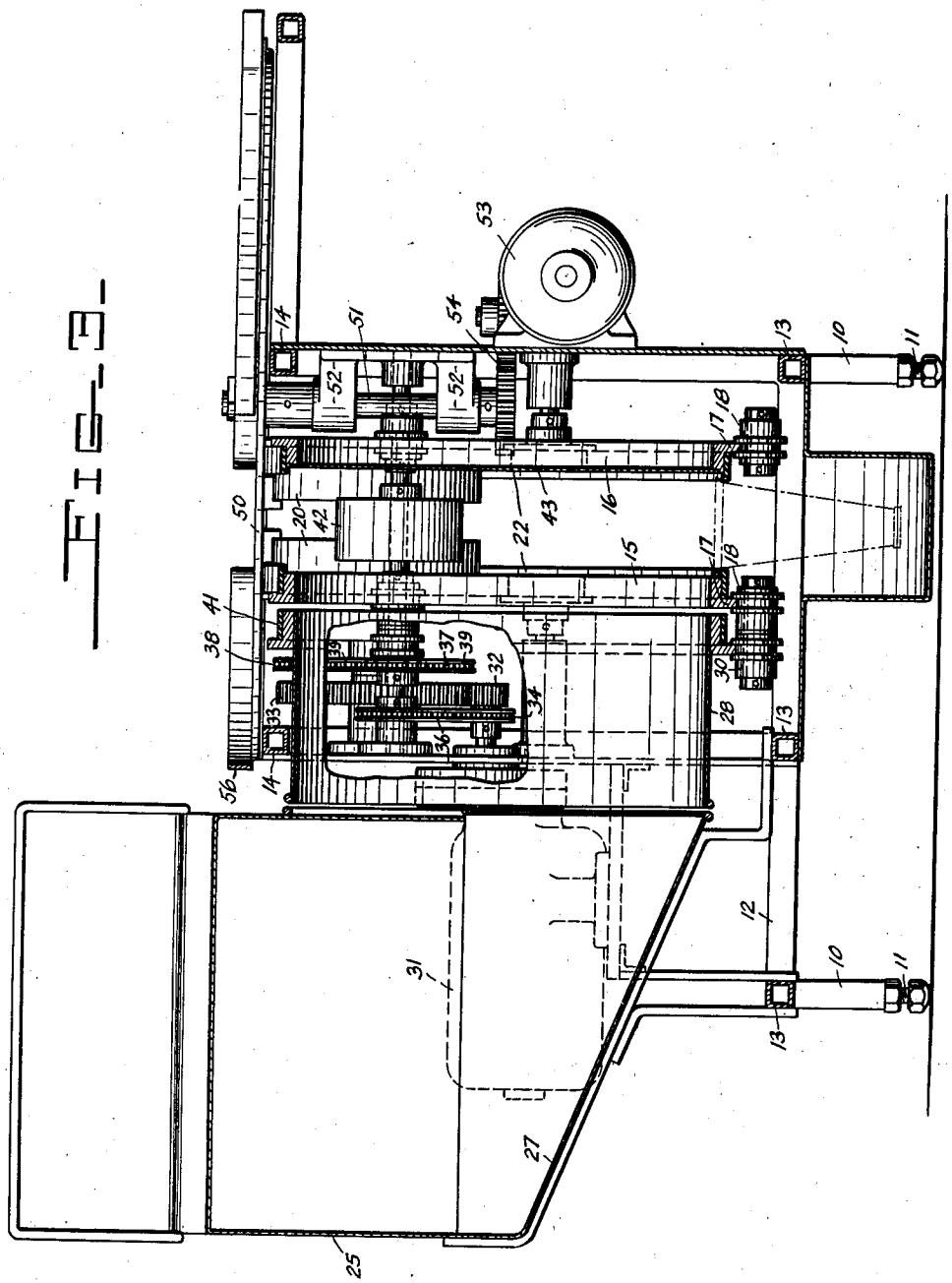
Original Filed Nov. 23, 1938 3 Sheets-Sheet 3

FIG. 3.



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UNITED STATES PATENT OFFICE

2,268,897

CONTAINER HANDLING MACHINE

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Substituted for abandoned application Serial No. 242,036, November 23, 1938. This application October 9, 1939, Serial No. 298,623

11 Claims. (Cl. 198—30)

This invention relates to a device or a machine for receiving tapered bottles or containers in a commingled state, and automatically arranging the bottles in a predetermined position.

At the present time, bottles or containers formed of paper are being used extensively for the retail of milk and other beverages. One form of paper bottle used extensively is of circular contour and tapers inwardly from the bottom to the top of the bottle. These bottles are shipped to the dairies in cartons or boxes which contain one hundred or more bottles.

In the bottling process, the bottles are transferred to and from the bottle filling machine by a conveyor. The conveyor and machine are synchronized and function to automatically fill and cap the bottles. It is therefore essential that the bottles be initially placed on the conveyor in upright or filling position. When paper bottles are used, this necessitates the operator opening the carton and removing the bottles therefrom manually and placing them on the conveyor in upright position. At the present time, the bottle filling apparatus operates at comparatively high speed, and accordingly the entire attention of one or more operators is required in removing the paper bottles from the cartons and placing them on the conveyor.

The object of the present invention is a machine into which the bottles may be quickly and conveniently dumped or discharged from the cartons, and which functions automatically, without further attention from the operator, to select the bottles from the commingled mass and deliver them to the conveyor in upright position ready to be filled by the filling machine.

The invention has as a further object a machine of the type referred to which is of particularly economical construction and occupies a minimum amount of floor space and which functions efficiently to arrange the bottles in filling position.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

This application is a substitute for my prior application Serial Number 242,036, filed November 23, 1938, which inadvertently became abandoned.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a top plan view of a machine embodying my invention.

Figure 2 is a view taken substantially on line 2—2, Figure 1.

Figure 3 is a view taken on substantially line 3—3, Figure 1.

Figure 4 is a fragmentary, sectional view of the overload switch mechanism.

The machine consists generally of a suitable frame in which two pairs of circular members, such as pulleys, are journalled on horizontally extending axes. The pulleys of each pair are arranged coaxially in spaced apart relationship, and the axes of the pairs extend in parallel spaced apart relationship. An endless belt is trained over corresponding pulleys of each pair which are arranged in alinement, whereby the belts travel in spaced apart parallel relationship. The axial spacing between the pulleys and the spacing between the belts is such as to permit the smaller ends of the containers to pass between the confronting edges of the belts, and the larger ends of the containers to be engaged thereby, whereby the containers as they are discharged between the belts on the lower run thereof are conveyed with their smaller ends extending downwardly, and as the lower runs of the belts pass over the second pair of pulleys the containers are shifted to upright position, at which time they are transferred from the belts to a container receiving member in the nature of a rotatable turn-table.

As here shown, the major portion of the frame is formed of square tubing consisting of four upright corner posts 10 provided at the bottom with conventional leveling devices 11.

The frame further includes a pair of lower rails 12 extending transversely of the machine and a plurality of lengthwise extending lower rails 13, and a pair of top rails 14 extending parallel with the lower rails 13.

15, 16 designate a pair of circular or annular members or pulleys formed with radially extending flanges 17 which are arranged on rollers 18, there being three of such rollers for each circular member which form a means by which the circular members are rotatably journalled in the frame, and the rollers 18 are so positioned that the members 15, 16 are arranged coaxially and in spaced apart relationship. A second pair of circular members 20 are secured on a shaft 21 journalled in the frame, which extends parallel to the axis of the members 15, 16, and to one side thereof.

The members 15, 16 are arranged in alinement with the members 20 respectively, and an endless belt 22 is trained over each of the members or pulleys 15, 16, and over the corresponding member

20. That is, the members 15, 16 and 20 constitute pulleys over which the belts 22 are trained, the arrangement being such that the lower run of the belts inclines upwardly from the members 15, 16, and is trained over idler pulleys 23 and thence over the members 20. The upper run of the belts inclines downwardly from the members 20 to the members 15, 16.

The spacing between the annular members 15, 16, and accordingly the belts, is such as to permit the smaller ends of the containers C to pass between the belts, and the larger ends to be engaged by the belts.

The containers are shipped in cartons which are opened at one side and placed on a receiving hopper 25, as indicated by dotted outline 26, Figure 2. The hopper 25 is provided with an inclined bottom 27 to effect discharge of the containers into a drum 28 rotatably mounted in the frame on rollers 30 similar to the rollers 18. The drum 28 is of substantially the same diameter as the members 15, 16, and is arranged coaxial therewith and in proximity to the member 15. The circular member 15 is of annular formation and accordingly, the containers are permitted to pass through the drum 28 and member 15, whereupon the smaller ends of the containers pass between the belts 22, as indicated in Figure 3.

In operation, the members 15, 16 are rotated in one direction and preferably the drum 28 rotated in the opposite direction to effect a tumbling action of the containers in the commingled state and thus serving to agitate the containers until the small end of each one passes between the belts 22.

A motor 31 is employed to effect rotation of the shaft 21 and accordingly members 20. A pinion 32 is secured to the motor shaft and meshes with a spur gear 33 secured to the shaft 21. The motor shaft is also provided with a sprocket 34 which is operatively connected with a sprocket secured to a jack shaft 35 by chain 36 arranged adjacent the periphery of the members 15, 16. A second sprocket 37 is secured to the shaft 35 and is operatively connected to a sprocket 38 loosely mounted upon the shaft 21 by a chain 39. The sprocket 38 has associated with it a pulley 40, and a belt 41 is trained over the pulley 40 and the drum 28. With this arrangement, the members 15, 16 and 20 are rotated in a counterclockwise direction, Figure 2. The drum 28 is rotated in a clockwise direction. A cylindrical member 42 is mounted upon the shaft 35 and arranged intermediate the members 15, 16. This cylindrical member is also operated in a clockwise direction and functions to dislodge any containers that may become jammed between the members 15, 16, and return them to the mass of containers being agitated within the drum and the members 15, 16. The member 16 is provided with a disk 43 to prevent the containers from moving endwise through the member 16.

It will be observed from the description of the apparatus thus far that the containers are conveyed in inverted position between the members 15, 16 by the belts 22. That is, the smaller ends of the containers depend between the belts 22, and the larger ends of the containers are engaged by the belts. In this position, the containers are conveyed about the periphery of the members 20, and the machine is provided with means operable to transfer the containers from the belts 22 to a container receiving member. This means constitutes a plate or, as here shown, a pair of plates 45 supported by a cross piece 46 of the frame. The outer ends of the plates 45 are arranged in juxtaposition to the upper run of the belts 22 as they leave the pulleys 20 and are formed with reduced portions 47 extending below the belts on the inner sides of the members 20. The plates 45 incline upwardly and rearwardly, see Figure 2, and accordingly function to effect transfer of the containers from the belts 22. That is, the bottom of the containers engage the plates 45 and as they move up the inclined surface thereof, they are transferred from between the belts. The plates 45 may extend rearwardly to form a container receiving table or support. However, I prefer to deliver the containers to a movable support or table.

As here shown, the containers pass from the plates 45 to a table 50 which is mounted on the upper end of a shaft 51 journalled on a vertical axis in the bearings 52 carried by the frame. The shaft 51 is rotated by a motor 53 through suitable gearing 54. The table 50 extends horizontally above the upper run of the belts 22 with its periphery adjoining the inner ends of the plates 45, whereby the containers are discharged onto the table from said plates. One purpose of the table 50 is to provide for the accumulation of containers discharged thereon in the upright position. It is intended that this machine shall be arranged to discharge the containers on the conveyor running to the bottle filling machine. Accordingly, there may be times when this machine will discharge containers at a rate exceeding the operation of the conveyor, in which case the table 50 provides for the accumulation of containers without stopping the machine.

The table 50 is encircled by a guard rail 56 which is formed with an inlet opening adjacent the plates 45, and with substantially radially extending guides 57 extending parallel to the plates 45, and the guard rail 56 is also interrupted to form a discharge opening 58, the discharge opening in this instance being arranged substantially 270° from the inlet opening. The table 50 is rotated continuously by the separate motor 53 in a counterclockwise direction Figure 1, whereby the containers assembled on the table are moved toward the discharge opening 58 in juxtaposition to which the conveyor of the bottle filling machine is arranged. In order to guide the containers through the discharge opening 58, a partition 59 extends inwardly from the guard rail 56 adjacent the discharge opening toward the center of the table. The outer end of the partition 59 is pivotally mounted on the guard rail at 60, and the inner end of the partition is provided with an arm 61 having an elongated slot to receive the upper end of the shaft 51 on which is mounted a star wheel or cam 62. The arm 61 is provided with a pin 63 to engage the periphery of the cam 62, whereby upon rotation of the table the partition 59 is oscillated about the pivot 60. The purpose of this structure is to effect continuous agitation of the containers on the table 50 in the vicinity of the discharge outlet in order to prevent the containers from becoming jammed or clogged in this vicinity. The cam 62 is encircled by a cylindrical flange 64 to prevent the containers from coming in contact with the cam and to aid in guiding the containers to the rearward portion of the table.

As previously stated, the table 50 revolves in a counterclockwise direction Figure 1, whereby approximately seventy-five percent of the area of the table is available for the accumulation of the

containers, the remaining twenty-five percent, or the ninety degree sector between the inlet and discharge openings of the guard rail **56**, is partitioned off by a guide member **65** which extends inwardly from the periphery of the table adjacent the inlet opening. The inner end of the guide **65** terminates sufficiently near the flange **64** to prevent containers from passing to the left Figure 1, and the inner end of the guide **65** is secured to a bracket **66** extending inwardly from the guard rail, the remaining portion of the guide **65** being free to yield laterally. The bracket **66** is provided with a switch **68** pivoted at **69**. This switch may be of any suitable structure, as here shown being of the mercury type including a tube **70** having terminals connected to the wires **71** which form the feed circuit for the motor **31** which effects rotation of the members **15**, **16**, **20**, and drum **28**. The arrangement is such that should there be an over-accumulation of containers on the table **50**, the accumulated containers will move the yielding guide **65** to the left Figure 1, effecting operation of the switch **68** to the off position, and the machine will cease operation. However, the table **50** is rotated continuously and the accumulated containers will be eventually discharged through the outlet **58** to the filling machine conveyor. As soon as the accumulation of containers has decreased, the guide **65** will be permitted to spring to the right Figure 1, and the switch **68** will close causing the machine to again operate.

It will be observed that it is only necessary for the operator to open one side of the carton of containers and place the carton on the hopper **25** so that the containers are discharged in the hopper and the drum **28**. The machine then functions entirely automatically to successively arrange the containers in upright position upon the table **50** and to discharge the containers through the outlet **58**.

What I claim is:

1. A device for receiving tapered containers in a commingled mass and arranging the containers in upright position comprising a frame, a hollow drum journalled in the frame on a horizontal axis, a pair of annular members journalled in the frame, said members being arranged coaxially with said drum in juxtaposition to one end thereof, a pair of endless belts trained over said members and arranged in spaced apart relationship with their confronting edges adapted to engage the large ends of the containers, and said belts being operable to convey said containers in a predetermined position, said drum being operable to discharge the containers to said belts, and means carried by the frame and cooperable with said belts to effect transfer of the containers in upright position to a container receiving support.

2. A machine for receiving tapered containers in a commingled mass and successively arranging the containers in upright position comprising a frame, a pair of circular members journalled in the frame, a second pair of circular members journalled in the frame in spaced apart relation to said first pair, the members of each pair being arranged in coaxial spaced apart relationship and corresponding members of each pair being arranged in alinement, an endless belt trained over said corresponding members of each pair, the confronting edges of said belts being spaced apart to permit the smaller ends of the containers to pass therebetween and to engage the larger ends of the containers, a drum journalled in the frame coaxial with said first pair of cylindrical members and arranged to receive said containers and discharge the same within said circular members for engagement by said belts, a container receiving member, a guide plate carried by the frame and arranged in juxtaposition to said belts adjacent said second pair of circular members and operable to effect transfer of said containers from the belts to said container receiving member, and means operable to effect rotation of said circular members and said drum.

3. A machine for receiving tapered containers in a commingled mass and successively arranging the containers in upright position comprising a frame, a pair of circular members journalled in the frame, a second pair of circular members journalled in the frame, the members of each pair being arranged coaxially in spaced apart relationship with the axis of each pair extending horizontally and in spaced apart relationship with corresponding members of each pair being arranged in alinement, an endless belt trained over said corresponding members of each pair, the confronting edges of said belts being spaced apart to permit the smaller ends of the containers to pass therebetween and to engage the larger ends of the containers, means carried by the frame in juxtaposition to said first pair of circular members for receiving the containers in the commingled state and operable to discharge the containers within said members for engagement by the lower run of said belts, a container receiving table journalled in the frame on a vertically extending axis and arranged adjacent the upper run of said belts, a guide plate carried by the frame and arranged in juxtaposition to the upper run of said belts and operable to effect transfer of said containers from the belts to said container receiving table, and means operable to effect rotation of said circular members, said drum, and the container receiving table.

4. A machine for receiving tapered containers in a commingled mass and successively arranging the containers in upright position comprising a frame, a pair of circular members journalled in the frame, a second pair of circular members journalled in the frame in spaced apart relation to said first pair, the members of each pair being arranged in coaxial spaced apart relationship and corresponding members of each pair being arranged in alinement, an endless belt trained over said corresponding members of each pair, the confronting edges of said belts being spaced apart to permit the smaller ends of the containers to pass therebetween and to engage the larger ends of the containers, means carried by the frame in juxtaposition to said first pair of circular members for receiving the containers in the commingled state and operable to discharge the containers within said members for engagement by said belts, a container receiving table journalled in the frame on a vertically extending axis and arranged adjacent the upper run of said belts, a guide plate carried by the frame and arranged in juxtaposition to the upper run of said belts and operable to effect transfer of the containers from between the belts to said container receiving table, a guard rail encircling said table and being formed with a container receiving opening adjacent said guide plate, and a container discharge opening arranged remote from said container receiving opening, a guide rail extending radially inwardly from the periphery of said table adjacent said container receiving opening, a second guide rail extending from the center of the table

to said container discharge opening, means operable upon rotation of the table to oscillate the second guide rail, and means operable to effect rotation of said circular members and said table.

5. A machine for receiving tapered containers in a commingled mass and successively arranging the containers in upright position comprising a frame, a pair of circular members journalled in the frame, a second pair of circular members journalled in the frame in spaced apart relation to said first pair, the members of each pair being arranged in coaxial spaced apart relationship and corresponding members of each pair being arranged in alinement, an endless belt trained over said corresponding members of each pair, the confronting edges of said belts being spaced apart to permit the smaller ends of the containers to pass therebetween and to engage the larger ends of the containers, means carried by the frame in juxtaposition to said first pair of circular members for receiving the containers in the commingled state and operable to discharge the containers within said members for engagement by said belts, a container receiving table journalled in the frame on a vertically extending axis and arranged adjacent the upper run of said belts, a guide plate carried by the frame and arranged in juxtaposition to the upper run of said belts and operable to effect transfer of the containers from between the belts to said container receiving table, a guard rail encircling said table and being formed with a container receiving opening adjacent said guide plate, and a container discharge opening arranged remote from said container receiving opening, a guide rail extending radially inwardly from the periphery of said table adjacent said container receiving opening, a second guide rail extending from the center of said table to said container discharge opening and being pivoted at its outer end, cam means arranged at the axis of the table and operable upon rotation of the table to oscillate the inner end of said second guide rail, and means operable to effect rotation of said circular members and said table.

6. A machine for receiving tapered containers in a commingled mass and successively arranging the containers in upright position comprising a frame, a pair of circular members journalled in the frame, a second pair of circular members journalled in the frame in spaced apart relation to said first pair, the members of each pair being arranged in coaxial spaced apart relationship and corresponding members of each pair being arranged in alinement, an endless belt trained over said corresponding members of each pair, the confronting edges of said belts being spaced apart to permit the smaller ends of the containers to pass therebetween and to engage the larger ends of the containers, means carried by the frame in juxtaposition to said first pair of circular members for receiving the containers in the commingled state and operable to discharge the containers within said members for engagement by said belts, a container receiving table journalled in the frame on a vertically extending axis and arranged adjacent the upper run of said belts, a guide plate carried by the frame and arranged in juxtaposition to the upper run of said belts and operable to effect transfer of the containers from between the belts to said container receiving table, a guard rail encircling said table and being formed with a container receiving opening adjacent said guide plate, and a container discharge opening arranged remote from said container receiving opening, a guide rail extending radially inwardly from the periphery of said table adjacent said container receiving opening, a second guide rail extending from the center of said table to said container discharge opening and being pivoted at its outer end, cam means arranged at the axis of the table and operable upon rotation of the table to oscillate the inner end of said second guide rail, said first guide rail being yieldable upon accumulation of containers upon said table, a motor operatively connected to said circular members to effect rotation of the same, a normally closed switch connected in the circuit of said motor and arranged in juxtaposition to said second guide rail and being actuated to off position upon yielding movement of said second guide rail.

7. A machine for receiving tapered containers in a commingled mass and successively arranging the containers in upright position comprising a frame, a pair of circular members journalled in the frame, a second pair of circular members journalled in the frame in spaced apart relation to said first pair, the members of each pair being arranged in coaxial spaced apart relationship and corresponding members of each pair being arranged in alinement, an endless belt trained over said corresponding members of each pair, the confronting edges of said belts being spaced apart to permit the smaller ends of the containers to pass therebetween and to engage the larger ends of the containers, means carried by the frame in juxtaposition to said first pair of circular members for receiving the containers in the commingled state and operable to discharge the containers within said members for engagement by said belts, a container receiving table journalled in the frame on a vertically extending axis and arranged adjacent the upper run of said belts, a guide plate carried by the frame and arranged in juxtaposition to the upper run of said belts and operable to effect transfer of the containers from between the belts to said container receiving table, a guard rail encircling said table and being formed with a container receiving opening adjacent said guide plate, and a container discharge opening arranged remote from said container receiving opening, a guide rail extending radially inwardly from the periphery of said table adjacent said container receiving opening, said guide rail being yieldable upon the accumulation of containers upon said table, a motor operatively connected to said circular members to effect rotation of the same, a normally closed switch connected in the circuit of said motor and arranged in juxtaposition to said guide rail and being actuated to off position upon yielding movement of said guide rail.

8. A machine for receiving tapered containers in a commingled mass and successively arranging the containers in upright position comprising a suitable frame, a pair of annular members rotatably journalled in the frame, said annular members being arranged coaxially and in spaced apart relationship to permit the containers to pass between the confronting sides thereof, a pair of belts trained over said annular members and being arranged to travel in parallel spaced apart relationship to permit the smaller ends of the containers to pass between the confronting edges of said belts and the larger ends of the containers to be engaged by said confronting edges, a drum journalled in the frame in juxta-

position to one of said annular members and being arranged coaxially therewith, said drum being open at one end to receive the containers and being open at the opposite end adjacent said annular member to discharge the containers between said belts, means operable to effect rotation of said annular members in one direction, and to effect rotation of said drum in the opposite direction, and means cooperable with said belts upon movement of the same to effect discharge of the containers therefrom in upright position upon a container receiving member.

9. A machine for arranging tapered containers comprising a suitable frame, a pair of pulleys journalled in the frame in spaced apart relation, a pair of endless belts trained over said pulleys, the confronting edges of said belts being spaced apart to permit the smaller ends of the containers to pass therebetween and to engage the larger ends of the containers, and with the upper runs of said belts extending in substantially horizontal direction, a drum journalled in the frame on a horizontal axis and being arranged to receive the containers in the commingled state and operable to discharge the containers upon the lower runs of said belts, a container receiving table journalled on the frame on a vertically extending axis with the periphery of the table arranged adjacent the upper runs of said belts, a guide plate carried by the frame and arranged in juxtaposition to the upper runs of said belts intermediate said table and one of said pulleys, and operable to effect transfer of said containers from between the belts to said container receiving table, and means operable to effect rotation of said pulleys, said drum, and the container receiving table.

10. A machine for receiving tapered containers in a commingled mass and successively arranging the containers in upright position comprising a frame, a plurality of pulleys journalled in the frame upon horizontally extending axes, a pair of belts trained over said pulleys and operating in parallel spaced apart relationship, the confronting edges of said belts being spaced apart to permit the smaller ends of the containers to pass therebetween and to engage the larger ends of the containers, the lower runs of said belts extending upwardly in angular relation and the upper runs of said belts extending in substantially horizontal relation, a drum journalled in the frame upon a horizontally extending axis and arranged to receive the containers in the commingled mass, said drum being operable upon rotation to discharge the containers between the lower runs of said belts, a container receiving table journalled in the top of the frame on a verticaly extending axis with the periphery of the table arranged adjacent the upper runs of said belts, a guide plate carried by the frame and arranged in juxtaposition to the upper runs of said belts adjacent one of said pulleys and being operable to transfer the containers from between the belts to said container receiving table, and means operable to effect rotation of said pulleys, said drum, and the container receiving table.

11. A machine for receiving tapered containers in a commingled mass and successively arranging the containers in upright position comprising a frame, a pair of annular members journalled in the frame coaxially in spaced apart relation, pulley means journalled in the frame on an axis extending parallel to the axis of said annular members and being formed with axially spaced apart cylindrical surfaces, a pair of endless belts, each of said belts being trained about one of said annular members and one of said cylindrical pulley surfaces, said belts being arranged to travel in parallel spaced apart relation and being operable to engage the large ends of the containers, the lower runs of said belts extending upwardly in angular relation from the lower portion of said annular members to said pulley means, and the upper runs of said belts extending substantially in a horizontal direction, a drum journalled in the frame coaxially with said annular members and being arranged to receive the containers in the commingled mass and being operable upon rotation to discharge said containers between the lower runs of the belts, a container receiving support on the frame in juxtaposition to the upper runs of said belts and cooperable therewith to effect discharge of said containers in upright position on said container support, and means operable to effect rotation of said annular members and rotation of said drum in the opposite direction.

JOHN F. PRICE.