

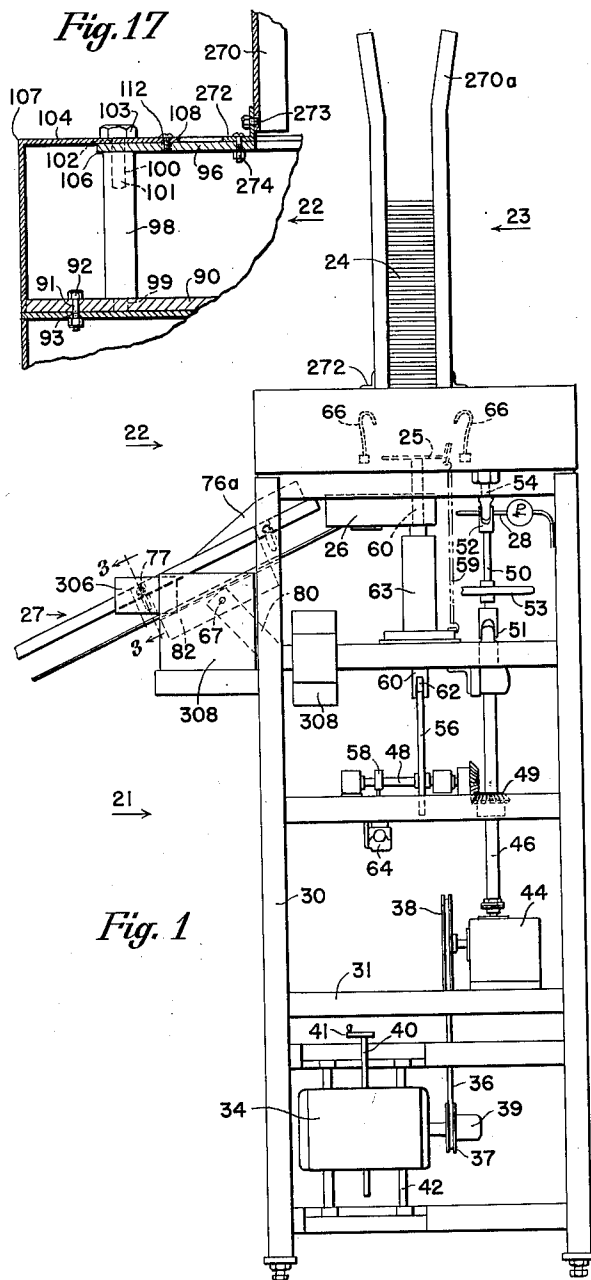
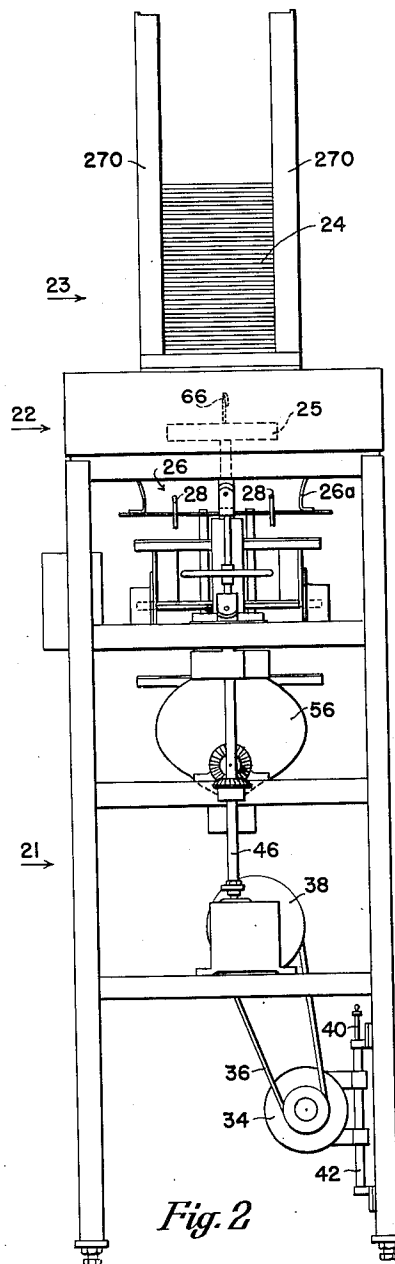
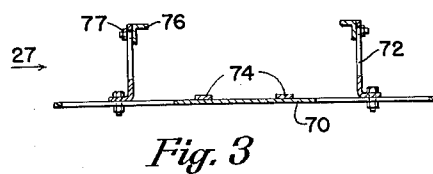
May 15, 1962

J. B. WILSON
PACKAGE DISPENSER

3,034,683

Filed March 19, 1959

6 Sheets-Sheet 1



INVENTOR.
JOHN B. WILSON
BY *Glenn & Jackson*
attorneys

May 15, 1962

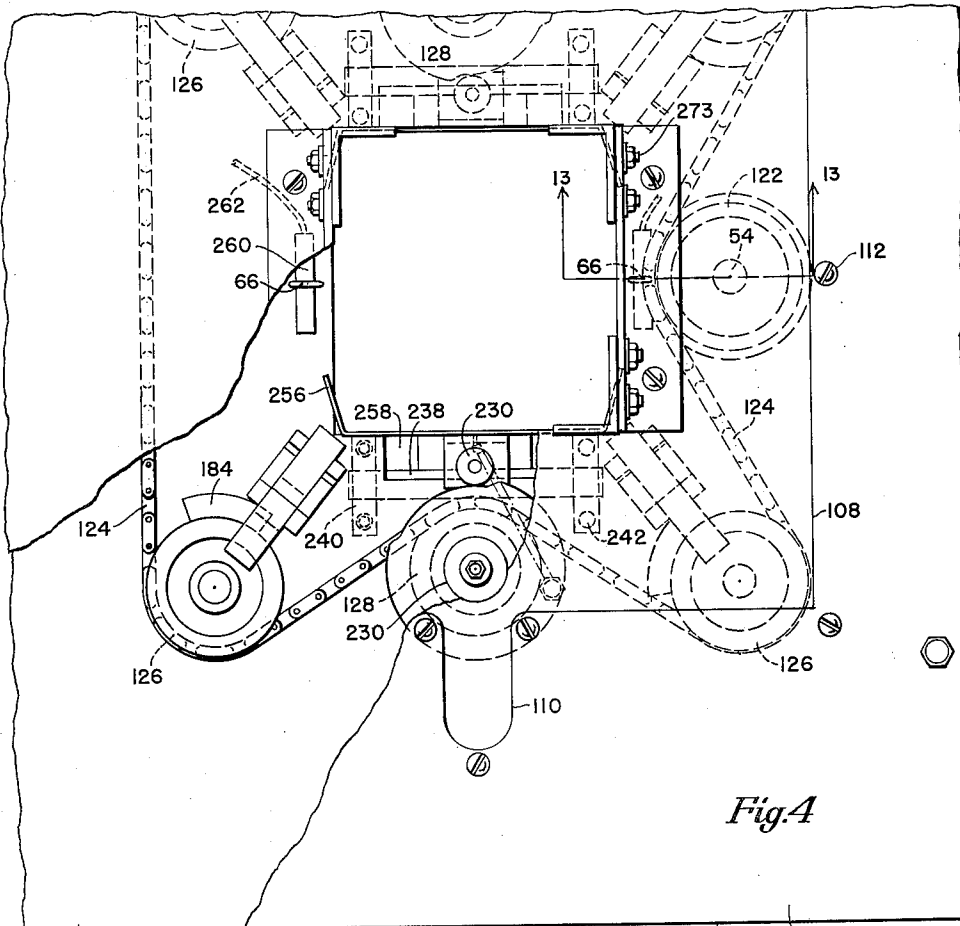
J. B. WILSON

3,034,683

PACKAGE DISPENSER

Filed March 19, 1959

6 Sheets-Sheet 2



May 15, 1962

J. B. WILSON
PACKAGE DISPENSER

3,034,683

Filed March 19, 1959

6 Sheets-Sheet 3

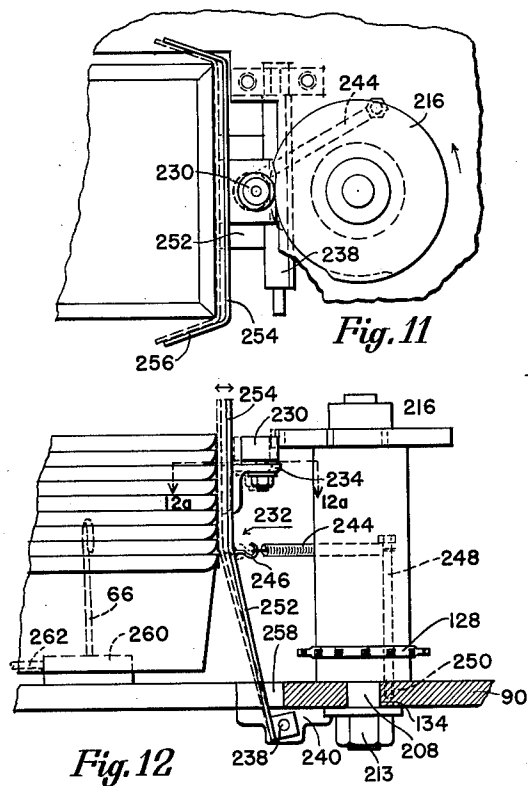


Fig. 12

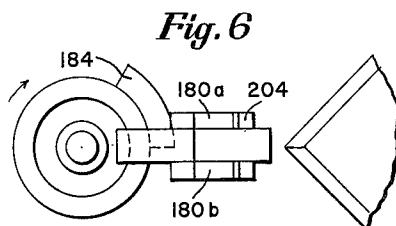


Fig. 6

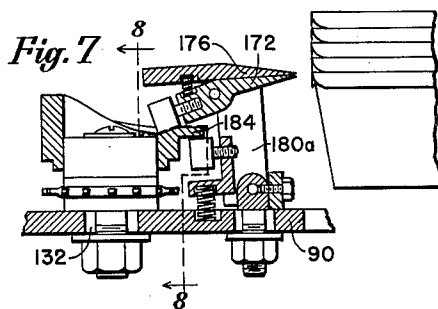


Fig. 7

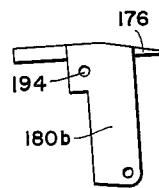


Fig. 9

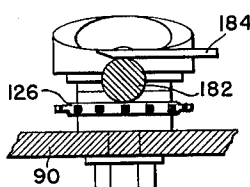


Fig. 8

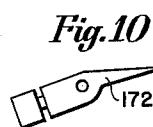


Fig. 10

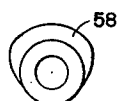


Fig. 14

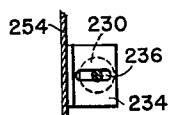


Fig. 12a

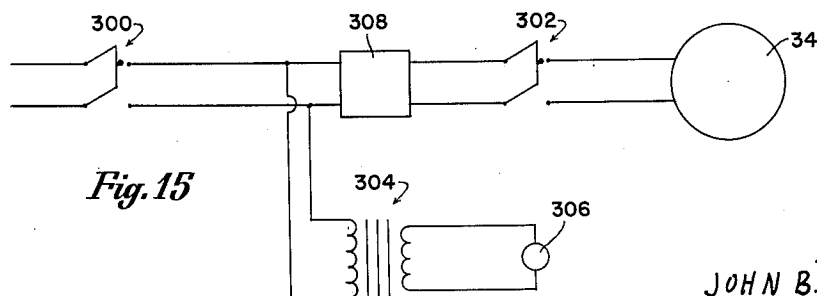


Fig. 15

INVENTOR.
JOHN B. WILSON
BY *Glenn & Jackson*
attorneys

May 15, 1962

J. B. WILSON
PACKAGE DISPENSER

3,034,683

Filed March 19, 1959

6 Sheets-Sheet 4

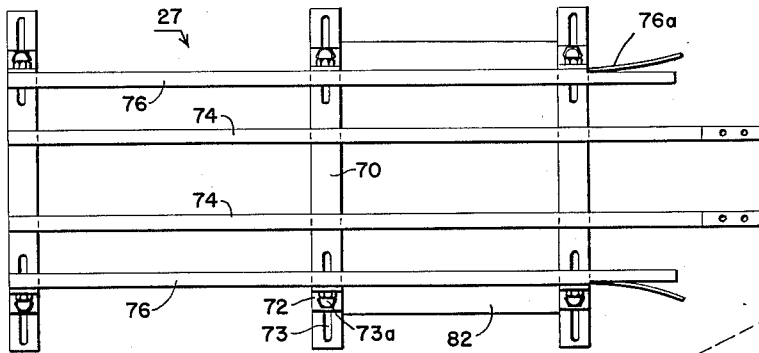


Fig. 18

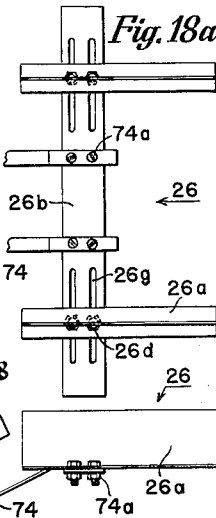


Fig. 18a

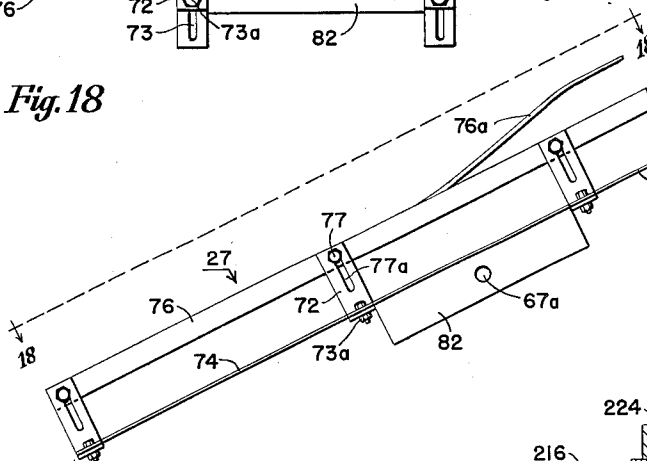


Fig. 24

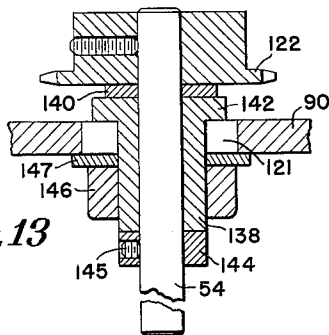


Fig. 13

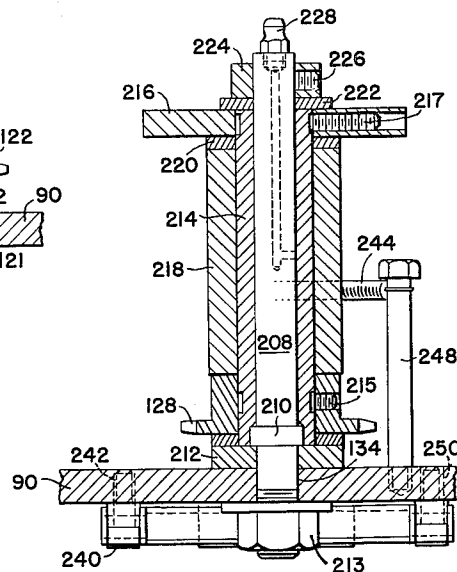


Fig. 23

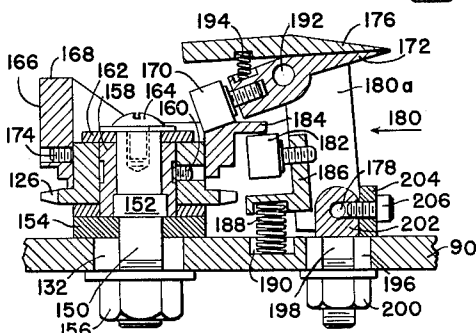


Fig. 22

INVENTOR.
JOHN B. WILSON
BY *Glenn & Jackson*
attorneys

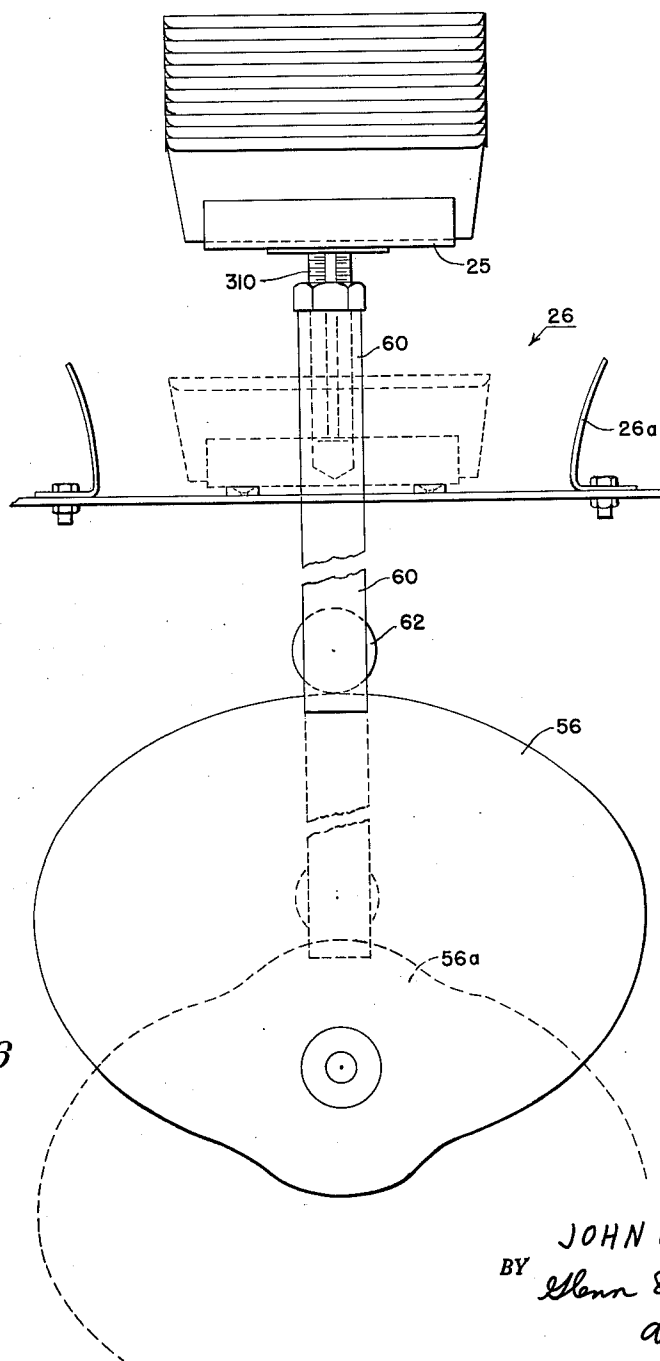
May 15, 1962

J. B. WILSON
PACKAGE DISPENSER

3,034,683

Filed March 19, 1959

6 Sheets-Sheet 5



INVENTOR.
JOHN B. WILSON
BY *Ellen & Jackson*
attorneys

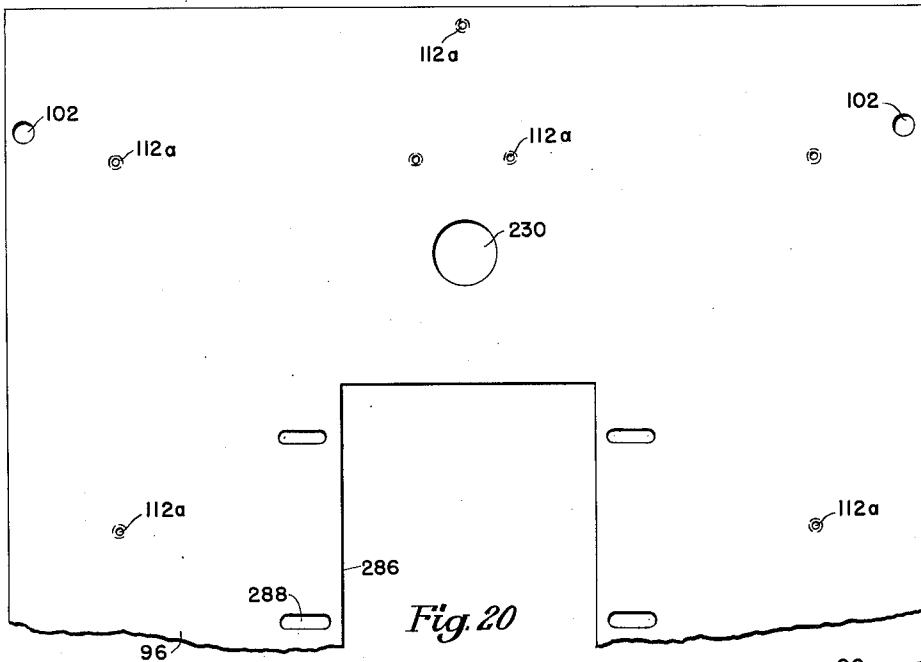
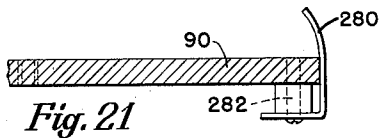
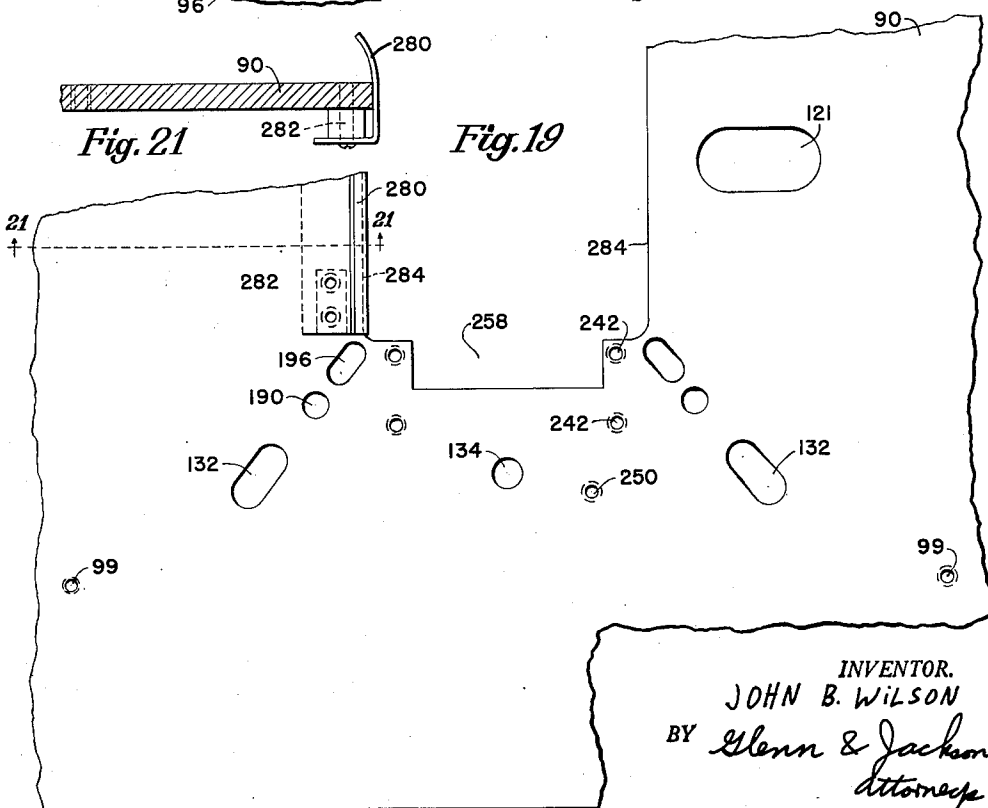
May 15, 1962

J. B. WILSON
PACKAGE DISPENSER

3,034,683

Filed March 19, 1959

6 Sheets-Sheet 6



INVENTOR.
JOHN B. WILSON
BY *Glenn & Jackson*
Attorneys

1

3,034,683

PACKAGE DISPENSER

John B. Wilson, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va., a corporation of Delaware

Filed Mar. 19, 1959, Ser. No. 800,437

22 Claims. (Cl. 221—1)

This invention is directed to a unitary machine for separating and dispensing stacked containers, which may be generally rectangular in character. Certain parts of the machine are constructed so the machine may be adjusted or reassembled to receive and dispense stacks of receptacles of widely or slightly different sizes of receptacles. The moving parts of the machine are made so that only one embodiment or design of each such moving part need be made in production. These moving parts may be variously spaced from each other by adjustment, or by assembly within a different unit to accommodate these receptacles of different sizes. Hence, a very efficient and economical receptacle dispensing machine is provided which may be used almost universally serially to dispense receptacles to loading stations or loading conveyors.

Accordingly, it is an object of this invention to provide a package dispensing machine which is readily adjusted or reassembled to receive and dispense receptacles of different sizes from stacks of such receptacles.

Another object of this invention is to provide a dispensing machine in which the moving parts of the separating unit are each made of one embodiment or design, and such parts may be variously spaced from each other by adjustment or different assembly to accommodate receptacles of different sizes.

Another object of this invention is to provide a dispensing machine having a power unit which receives a plurality of different dispensing units which operate on receptacles of different sizes.

Other objects and advantages will become apparent as the description proceeds with reference to the accompanying drawings in which:

FIGURE 1 is an elevation of a container separating and dispensing machine according to this invention.

FIGURE 2 is an elevation taken from the right side of FIGURE 1.

FIGURE 3 is a cross-section of the chute, taken along the line 3—3 of FIGURE 1.

FIGURE 4 is a top view, on enlarged scale, of the container separating unit with part of the cover removed.

FIGURE 5 is a side elevation of the unit shown in FIGURE 4, with part of the side wall removed to disclose the interior.

FIGURE 6 is a top view of a finger construction retracted from engagement with the corner of a receptacle.

FIGURE 7 is a vertical view, partly in section and partly in elevation, of the construction shown in FIGURE 6.

FIGURE 8 is a cross-section taken along line 8—8 of FIGURE 7.

FIGURE 9 is a side view of the upper finger.

FIGURE 10 is a side view of the lower finger.

FIGURE 11 is a top view of the guide or aligning means for the lower portion of the container stack.

FIGURE 12 is a side view of the mechanism shown in FIGURE 11.

FIGURE 12a is a horizontal cross-section of part of FIGURE 12, above angle 234, on enlarged scale and is taken substantially on line 12a—12a of FIGURE 12.

FIGURE 13 is a cross-section taken through the plane of shaft 54 of FIGURE 4 and is taken substantially on line 13—13 of FIGURE 4.

FIGURE 14 is an elevation of the cam for actuating the air control valve.

2

FIGURE 15 is a wiring diagram for the apparatus.

FIGURE 16 is a side view of the elevator construction and the drive therefor.

FIGURE 17 is a vertical elevation of part of FIGURE 1, on an enlarged scale.

FIGURE 18 is a top view of a portion of the chute, along the line 18—18 of FIGURE 24.

FIGURE 18a is a top view of the chute mouth 26 of FIGURE 24.

FIGURE 19 is a plan view of part of the base plate.

FIGURE 20 is a plan view of part of the top plate.

FIGURE 21 is a cross-section along the line 21—21 of FIGURE 19.

FIGURE 22 is an enlarged vertical cross-section of the finger construction.

FIGURE 23 is an enlarged cross-section of part of FIGURE 12.

FIGURE 24 is a side view of the chute and chute mouth.

This invention is adapted particularly to dispense containers of the type disclosed in the Gordon Hammond Patent 2,595,849, patented May 6, 1952. However, many of the advantages of this invention are adaptable for dispensing containers of other types, as well. This invention is an improvement over the container separating feed mechanism designated by the numeral 20 in FIGURE 1 of said patent.

Among the improvements of this invention over the feed mechanism of said patent, the following are of present interest.

The machine of this invention is provided with a unitary power unit 21. A container separating unit 22 is secured on top of the power unit, and a container stack holding unit or chute defining means 23 is secured on top of the separating unit. The construction is such that the power unit is part of a support means adapted to receive various separating units and stack holding units which are adapted to operate on receptacles of widely different sizes.

The receptacle separating units themselves may also be adjustable to operate on receptacles of slightly different sizes.

The container feed machine can be used with any type of loading station, not shown. It can be transported individually and placed adjacent any type of loading station and may be independently connected to a power source. It can automatically feed into the loading platform or conveyor in accordance with the demands of the loading station. Preferably it is driven by an individual motor, and has a chute to deliver separated containers to a loading platform or conveyor. It has automatic means to stop and start the feeding operation in accordance with the use at the loading station. The machine is automatically stopped when the loading station has been oversupplied with containers, and is automatically started when more containers are needed at the loading station.

All of the container separating mechanisms of units 22 can be mounted on base plates of uniform outer dimension which are attachable on top of the power unit 21 and are driven from a vertical shaft of the power unit. The finger constructions are individually adjustable on this base plate directly toward or away from the corners of the container stack. They can be driven by a single perimeter chain which is driven by an adjustable sprocket to permit individual adjustment of the finger constructions. All of the separating mechanisms are operated by vertical shafts which are mounted on the base plate, and which shafts can be chain driven.

The finger constructions are interchangeable within a single separating unit 22. This is, if there are four finger constructions in the unit 22, for use with the four corners of a rectangular receptacle, the four finger constructions are identical and are all interchangeable with each other,

so that a single design of finger construction is usable at each of the four corners.

Moreover, the same design of finger construction is interchangeable for use in other container separating units 22 which are adapted to operate on receptacles of widely different sizes. That is, a single finger construction design is interchangeable not only within a single separating unit, but also with respect to other separating units which operate on containers of widely different sizes. In addition, this single finger construction design is equally applicable when any separating unit is adjustable to operate on receptacles of slightly different size, without the necessity of changing the finger unit design.

Individual corner finger constructions are provided which are hinged at the bottom to move linearly inward into the corners of the containers instead of sidewise, thus to provide a more accurate action.

Movable container stack guides are provided to align and hold the lower part of the stack accurately with respect to the movable finger constructions, to insure proper contact of the fingers with the corners of the container stack.

A vertically movable elevator is provided to lower the bottom container in unison with the finger construction operation so the container is delivered in correct alignment with a chute.

The foregoing advantages of interchangeable separating units and interchangeable finger design permit reduction in cost of production and of inventories.

The power unit 21 of the machine can be selectively used with container separating units 22 adapted for use with containers of widely different sizes. Each separating unit has mechanisms which can be adjusted for use with containers of slightly different sizes.

A machine, according to this invention, is adapted for serially dispensing multisided, or rectangular, containers having corners at their upper edges, such as those disclosed in the said Hammond patent.

Referring first particularly to FIGURES 1 and 2, the machine has a power unit shown by arrows 21. This power unit may include a generally rectangular framework, which may be made of metal angles 30 and 31, or the like. If desired, the power unit 21 may be covered with outer side panels, not shown, which may be secured to the metal angle structure in any well known manner. A container or receptacle separating unit, shown by arrows 22, is releasably secured on the power unit 21. A container stack holding unit, generally indicated by the arrows 23, is releasably secured on the separating unit 22. The stack holding unit 23 is adapted to receive multisided, or rectangular, containers, such as disclosed in the Hammond patent, and these containers descend by gravity into the container separating unit 22. Here the lowermost container of the stack 24 is separated from the containers above it, and the separated container is lowered by the platform elevator plate or table 25 to the level of the mouth 26 of the chute 27. The lowered container is then expelled by blasts of air from two nozzles 28 into the mouth 26 and into the chute 27, down which it slides into the loading station, where it is generally received by a horizontal conveyor where the receptacle is loaded and covered in any desired manner.

The power unit 21 is so constructed that it is adapted to receive various separating units 22, and stack holding units 23, which units are adapted to operate on receptacles of widely different sizes. The receptacle separating units 22 may themselves also be adjustable to operate on receptacles of slightly different sizes, as will become apparent as the description proceeds.

The Power Units

The power unit 21 may be housed in a generally horizontal rectangular frame made of vertical metal angles 30 and horizontal metal angles 31, which may be welded

together at the corners, and elsewhere, to maintain the generally rectangular construction, as shown in FIGURES 1 and 2. Various plates, braces, and other support members may be secured to angles 30 and 31 properly to support the various elements hereafter to be described.

A motor 34 is connected to a variable speed V-belt and V-pulley transmission 36, in which the pulley 37 is automatically expandable within the V to vary its working diameter, and thus to vary the speed transmission to the pulley 38. The adjustment of the pulley 37 is accomplished by raising and lowering the motor 34 by means of a vertical screw member 40, which screw member may be turned by the handle 41, to cause the motor to slide up and down on the vertical motor supporting members 42. This varies the distance between the pulleys 37 and 38 and causes the belt to spread the usual spring pressed sides of the pulley 37 by the well known spring device 39 to vary the pulley diameter ratio, in a well known manner. The frequency of the cycles of receptacle discharge, etc., may be adjusted in this manner.

While the motor 34, belt 36, pulleys 37 and 38 and screw member 40 can be formed in any suitable manner, one such arrangement that can be utilized is fully illustrated on page 6 of the Reeves Pulley Company bulletin G-5812.

The pulley 38 drives the combined bevel gear and speed reducing unit 44, which rotatably drives the vertical shaft 46. The shaft 46 rotates a horizontal cam shaft 48 by means of the bevel gears 49, and also rotates the vertical shaft 50 which has two longitudinally expansible universal joints 51 and 52 at its ends. The shaft 50 also has a hand wheel 53 for manually turning the shaft 50, and the mechanisms of the machine driven thereby, for adjustment, assembly, or any other desired purposes.

The shaft 50 rotates the vertical shaft 54, which extends upwardly into the receptacle separating unit 22 to drive the separating members therein, in a manner to become apparent.

The rotating horizontal shaft 48 has an elevator operating cam 56 and an air valve operating cam 58. The cam 56, also seen in FIGURE 16, vertically reciprocates the elevator shaft 60 through the medium of a pulley 62. The elevator shaft 60 reciprocates within the bearing sleeve 63, and adjustably carries the elevator table, or plate 25. The elevator shaft and table are biased downwardly by the tension spring 59.

The cam 58 on shaft 48 opens and closes the three-way compressed air valve 64 automatically to feed compressed air to nozzles 28 and 66 at the proper times in the sequence of operations, as will become apparent.

The chute 27 may be of any suitable open top rectangular construction having a construction in general as shown in FIGURES 1-3, 18 and 24, and is horizontally and vertically expandable. Its inclination is adjustable around the fulcrum bolt construction 67. It may have transverse slotted members 70 at several places along its length which laterally and adjustably hold the vertical brackets 72 by means of slots 73 and bolts 73a. The transverse members 70 support the longitudinal floor members 74. The upward brackets 72 adjustably secure or hold the top guiding angles 76 which are held by bolt and slot constructions 77 and 77a. The chute 27 has an upwardly flaring funnel-like construction 76a at its upper end constructed by splitting angles 76 at their upper ends to provide the funnel-like construction 76a, FIGURES 1, 18 and 24, properly to receive the receptacle which is blown leftward in FIGURE 1 from the chute mouth 26. The chute may be slantingly and adjustably secured by the bolts 67 and the holes 67a which pass through the brackets 80 on the frame construction and which bolts 67 also pass through the vertical under members 82 of the chute. The mouth 26 has side flaring members 26a, which are laterally secured to the

5

horizontal cross members 26b by bolts 26d and slots 26g. The chute 27 is attached to the mouth 26 by the floor members 74 and bolts 74a, which also pass through the transverse member 26b. Hence, the sides of the chute and mouth may be laterally adjusted for different widths or lengths of receptacles. The top angles 76 may be vertically adjusted for various heights of receptacles. The chute 27 and mouth 26 may be fulcrumed about bolts 67 for proper alignment with the elevator table 25.

The Container or Receptacle Separating Units

Various container or receptacle separating units 22 may be secured on the power unit 21. These units 22 may all have the same outer dimensions and may have the same securing means for securing the bottoms of the units 22 to the unit 21. The internal arrangements of the units may be of different dimensions so they operate on receptacles of widely different sizes. Any particular unit 22, however, may also be individually adjustable to operate on receptacles of slightly different sizes, as will become apparent.

The various units 22 are built upon various rectangular base plates 90, all of which plates have outer dimensions substantially the same as the rectangular extent of the power unit 21, FIGURES 1, 2 and 17. All of the base plates may have bolt holes 91, FIGURE 17, for the reception of four corner bolts 92 which may pass through openings 93 at the top of the framework of the power unit 21. Hence, all of the various separating units 22 may be similarly secured to the power unit 21 in an interchangeable manner to form the support means for the units 22 and 23. All of the separating mechanisms within the units 22 are mounted on the base plate 90. These members are variously located with respect to each other, in different units 22, to accommodate receptacles of widely different dimensions. A top plate 96 is provided near the top of the unit 22, and is held in spaced relationship by a plurality, such as four, studs or vertical rods 98, near the corners of the units 22. These rods 98 are threadedly engaged in the base plate 90 at 99. Their upper ends are tapped at 100 threadedly to receive the bolts 101 which pass through openings 102 in the top plate 96, FIGURE 20, and in the cover plate 104, which plates are held by the heads 103 of bolts 101. The top plate 96 may be of a lesser horizontal extent than the base plate 90, and may terminate at the outer edge 106, FIGURE 17. The cover plate 104 may extend to an outer rectangular edge 107 and to an inner edge 108, FIGURES 4 and 17. The cover plate 104 is of general rectangular shape, but is outwardly notched at 110, FIGURE 4, on opposite sides of the cover plate to permit the application of a pressure gun to be described later. The edges of the cover plate 104 may be secured to the top plate 96 by round-headed screws 112, FIGURE 17, which may pass through or into the tapped holes 112a, FIGURE 20, in the plate 96.

The power unit shaft 50 drives the shaft 54, FIGURES 1 and 13, which is rotationally held, but axially fixed by the bearing, sleeve 138, which passes through the slotted opening 121, FIGURES 13 and 19, in the base plate 90. The shaft 54 is secured to sprocket wheel 122, FIGURES 4 and 13, which drives the perimeter chain 124. The chain 124 drivingly engages the four corner sprockets 126, FIGURES 4, 7 and 22, and the two stack guiding sprockets 128, FIGURES 4, 12 and 23. The sprocket 122 is laterally adjustable within the slot 121, FIGURES 13 and 19. The sprockets 126 are laterally adjustable along the slots 132. The sprockets 128 are laterally fixed in the openings 134, FIGURES 10 and 23, but these stack guiding constructions are laterally adjustable by a slot construction 236 later to be described in connection with FIGURES 11, 12 and 12a.

The sprocket wheel construction 122, FIGURE 13, may include a flanged bearing sleeve 138, the flange 142 of which rests on the plate 90. The sprocket 122 rests

6

on a bearing washer 140 above the flange 142. The lower end of the shaft 54, above the universal joint 52, FIGURE 1, is held down by the ring 144, which is secured thereto by the screw 145, FIGURE 13. The flanged sleeve 138 is adjustably held in the slotted opening 121 by means of the nut 146 and the washer 147, which co-operate with the flange 142 to hold the sprocket construction 122 in the adjusted position.

The sprocket construction 126, FIGURES 4, 6, 7, 8, and 22, is adjustably held in the slotted opening 132. The bolt 150 has an intermediate flange 152 which bears downwardly on the washer 154, which rests on the plate 90. The nut and washer construction 156 pulls the flange down on the washer 154 to pinch the plate 90 in adjusted position. The upper end of the bolt 150 is surrounded by the bearing sleeve 158 to which the sprocket wheel 126 is secured by the screw 160. A bearing washer 162 supports the sprocket 126 on the washer 154. The sprocket 126 and the sleeve 158 are held down by the washer 162 and screw 164.

The cylindrical wall of the sprocket 126 is surrounded by a cam sleeve 166 which has a vertical cam 168 on its upper edge vertically to reciprocate the roller 170 of the lower finger 172. The cam sleeve 168 is held on the sprocket 126 by the screw 174. The upper finger 176 is hingedly mounted at fulcrum 178 on a double post 180 which carries a roller 182 which is engaged by the cam 184. The post 180 has a side arm 186, which bridges and holds the two parts (180a and 180b in FIGURE 6) of the post 180 together. The arm 186 is cupped to receive a spring means 188, the lower end of which rests in the cup 190 in the plate 90. The compression spring 188 rocks the post 180 rightward, and the cam 184 rocks the post 180 leftward, in turn to rock the fingers 172 and 176 toward and away from the center of the container separating unit 22.

The lower finger 172 is located between the two branches 180a and 180b of the rod 180 and is hinged on a pin 192, which passes in and is threaded to the openings 194, FIGURE 9, at the upper ends of the rod branches 180a and 180b. A compression spring 194 is interposed between the cups in the fingers 172 and 176 to bias the lower finger 172 counterclockwise to keep the roller 170 in engagement with the cam 168.

The fulcrum pin 178 is adjustably held in the slot 196. To this end, a bolt 198 is pulled downwardly by the nut and washer 200 in opposition to the head 202 which extends between the two upward branches 180a and 180b. The fulcrum pin 178 passes through the head 202 and the bottoms of the branches 180a and 180b of the rod 180. The bolt head 202 is attached to a horizontal stop plate 204 by means of the screw 206. The plate 204 straddles the slotted opening 196 and prevents the bolt 198 from being pulled down through the slot 196 when the nut 200 is tightened.

In operation of the finger mechanism, FIGURES 6-10 and 22, rotation of the sprocket 126 causes the cam 184 to engage the roller 182 to move the fingers 172 and 176 leftward. When the cam 184 passes out of engagement with the roller 182, the fingers 172 and 176 are moved rightward by the expansion of compression spring 188. The cam 168 moves the roller 170 upward as the cam 168 rotates and thus moves the lower finger 172 downward to move the lowermost receptacle away from the remainder of the receptacle stack.

The sprocket 128, FIGURES 4, 12 and 23, is rotationally mounted about the bolt 208, which has an intermediate flange 210 bearing downwardly against the washer 212, which in turn bears down on the plate 90. The nut and washer 213 hold this construction in place by pulling down on the bolt 208 to pinch the washer 212 and the plate 90 between the flange 210 and the nut 213. The sprocket wheel 128 is keyed to the rotatable bearing sleeve 214, by screw 215. Sleeve 214 is keyed to the cam 216 by means of the screw 217. An outer spacer

7

sleeve 218 also rotates with the sprocket wheel 128 and has a washer 220 at the top. A bearing washer 222 is placed on top of the cam disk 216 and the ring 224 is secured by the screw 226 to the rod or bolt 208 to hold the assembly together. A pressure lubricant fixture 228 is provided to lubricate the interior of this cam construction, and the lubricant gun can be inserted through the opening 230 in the upper plate 96, FIGURE 20.

The cam disk 216 engages the roller 230, FIGURES 4, 12 and 12a, which is adjustably secured to the container stack guide or stack aligning means 232 by means of the angle 234 and slot 236. The stack guide 232 is rockably supported or hinged on the rock shaft 238 beneath plate 90, which shaft 238 is rockably held on the bearing members 240, FIGURES 5 and 22, which are secured on the underpart of the plate 90 by means of the screws in tapped openings 242. A tension spring 244 is secured to the guide 232 by the hook 246. The other end of the spring is secured to a post 248, FIGURE 23, threaded into the plate 90 at tapped opening 250, FIGURES 19 and 23. The spring 244 pulls the guide 232 rightward in FIGURE 12, and the cam disk 216 moves the guide 232 leftward.

The guide 232 has a narrow lower lever portion 252, FIGURES 5 and 12, and a T-shaped upper portion 254 which has wings 256, FIGURES 5 and 6, accurately to align the corners of the containers in the lower part of the stack 24 when the guide 232 is moved inward by the cam 216.

The lower lever 252 of the stack guide 232 passes through extension opening 258, FIGURES 12 and 19, in the plate 90 to engage the rocker 238.

The air blasts 66, FIGURES 1, 5 and 12, are downwardly directed and are connected to a supporting member 260 which is supported on base 90 and is connected by the pipe 262, valve 64 and to an air compressor, not shown, which may be driven by the motor 34, or may be in an individual compressed air unit, with automatic pressure control, not shown. The compressor discharges into the three-way valve 64, FIGURE 1, and this valve in turn directs the compressed air to the jets 28 and 66 at the proper times. The air jets 66 aid in directing the lowermost container downward on the elevator table 25 until the elevator table reaches the proper position, at which time the air jets 28 propel the container sidewise into the chute 27.

When a separating unit 22 is to be constructed for the reception of awidely different size of receptacle, a new base plate is made which has the openings 121, 132, 134, 190, 196, 258, 284, etc., moved, or enlarged, or reduced in size, in accordance with the horizontal dimensions of the new set of receptacles. The various mechanisms of the separating unit 22, which are shown, for example, in FIGURES 4 and 5, are assembled on the newly positioned openings 121, 132, etc., on the new base plate 90, and a chain 124 of the proper length for the new spacing is provided to engage the sprockets 122, 126 and 128. The new plate 90 is provided with slotted openings of the same character (but differently spaced) as the previously described openings. The slotted openings 121, 132, etc., some variation or adjustment in the mechanisms 122, 126 and 128 to adjust these mechanisms for operation with the new set of receptacles. These slotted openings also provide adjustment of the new unit for reception of receptacles of slightly different horizontal dimension. For example, under present marketing conditions for this type of receptacles, as many as eight different base plates 90 and top plates 96 and stack holding units 231 may be manufactured. For example, the width of the opening 284 of the base plate 90, FIGURE 19, may be increased in various steps from a minimum of four inches to a maximum of 7½ inches, and the various openings 121, 132, etc., are correspondingly varied. The main length of the opening 284, exclusive of the offset opening 258, may be increased in corresponding steps from

8

4½ inches to 10 inches. The top plate 96, and the stack holding unit are correspondingly varied. A base plate 90 having an opening with a width of 4½ inches and a length of 5½ inches, exclusive of the offset 258, for example, provides sufficient adjustment of the operating members which are carried on the sprockets 122, 126 and 128 by the slotted openings to accept three different sizes of slightly different receptacles now on the market. Thus, each particular separating unit 22 may be slightly adjusted for slightly different sizes of containers, and entirely different units 22 may be provided for widely different containers now on the market.

The power unit 21 may be adjusted to receive such different separating units 22 by moving the universal joint 52 laterally, rightward or leftward, in FIGURE 1. The extensible nature of the joints 51 and 52 permit considerable lateral displacement of the shaft 54. However, if preferred, the main parts of the power unit 21 may remain the same, but the vertical shaft 46, gear box 44, and motor 34 may be moved rightward or leftward, in FIGURE 1, during the assembly (or may be made so adjustable) and may be clamped or otherwise secured at the new location. The elevator shaft 60 remains at the substantially central position, and the difference in distance between the shaft 60 and the shaft 46 may be taken up by different lengths of shaft 48 or by sliding the eccentrics 56 and 58 on the original shaft 48, as is apparent.

Various sizes of elevator tables 25 may be substituted to accept the different sizes of containers, as is apparent from the construction shown in FIGURE 16. The threaded engagement at 310 permits the assembly of different sized tables 25. Also, the vertical distance of the table 25 may be adjusted by the thread 310.

The chute mouth 26, and the chute 27 may be horizontally adjusted at their sides to receive receptacles of horizontally different widths or lengths and the top angles 76 at the top of the sides of the chute may be moved up or down by slot and bolt construction 77 to receive receptacles of different heights.

In this manner, the machine may be assembled or adjusted to receive receptacles of different dimensions with a minimum of cost and effort.

The Stack-Holding Unit 23

The stack-holding unit includes four vertical corner angles 270, FIGURES 1, 2, 5, etc. These vertical angles 270 are adjustably secured at their lower ends to a pair of horizontal angles 272 by slot and bolt constructions 273, FIGURES 4, 5 and 17. The angles 272 are adjustably bolted to the upper plate 96 at 274, in slots 288, FIGURE 20. If desired, the upper end 270a of the channels 270 may be outwardly bent, as indicated in FIGURE 1, to permit the stack of containers 24 to be more readily inserted therein. The connections between the plate 96 and the horizontal angles 272, and the connections between the horizontal angles 272 and the vertical angles 270 may be made by slot and bolt constructions enabling these members to be adjusted to receive slightly different size of containers. For widely different sizes of containers, the mechanisms in individual units 22 and 23 are completely respaced to receive such containers if the foregoing adjustment is not sufficient.

A flanged guard 280 is bolted at 282 to the bottom of the lower plate 90, FIGURES 20 and 21, and extends upwardly into the receptacle opening 284. This guide 280 prevents any premature leftward movement of the released container as it travels downward with the elevator table 25 until the container has passed the opening 284 in the lower plate 90. An aligned opening 286 is provided in the upper plate 96 to permit the stack of receptacles to move downwardly from the stack-holding unit 23. The bolt slots 288, adjacent the opening 286 receive the bolts 274 which form the attachment of the horizontal angles 272 of the stack unit 23.

The Control of the Machine

Means are provided to make the machine responsive to an excessive accumulation of containers in the loading station. Referring particularly to FIGURES 1 and 15, a manual master switch 300 is provided at a convenient location on the machine to stop the entire machine. Another manual switch 302 is provided to stop the motor 34 when desired. A transformer 304 provides proper current voltage for the special light 306, which is placed on one side of the chute 27. An electric "eye" or relay 308 is placed on the other side of the chute 27 to receive the light beams from the light 306, which light beams are interrupted for an instant by the passage of receptacles down the chute 27. The relay 308 does not respond to such short instant interruption of the light beam when a receptacle slides down the chute 27 under normal conditions. However, if an excess of receptacles has been fed to the loading station, not shown, at the end of the chute 27, the receptacles pile up in the chute 27 so that the light beams from light 306 are interrupted continuously, for example, for more than one second of time. The relay 308 is responsive to such long interruption of one second or more of the light beams, and automatically stops the motor 34 as long as such interruption continues. When the obstruction of receptacles in the loading station is removed, the receptacles on chute 27 slide down and again permit the light beams to shine on the relay 308 to cause operation of the motor 34 and of the entire machine. The machine again dispenses containers at the selected regular intervals of time until another overload of receptacles at the loading station causes the receptacles again to pile up in the chute 27, again to stop the operation of the dispensing machine. In this manner, the machine is automatically responsive to the excess supply of receptacles to the loading station.

The sequence of operations is as follows:

(1) The elevator table 25 is in the "up" position supporting the entire stack of containers within the unit 22. The fingers 172 and 176 and the guides 212 are retracted away from the stack.

(2) The guides 232 move in and grip the lower part of the stack of containers.

(3) The finger assemblies are released by the cam 184, and the compression spring 188 moves the fingers 172 and 176 in contact with the four corners of the stack at a point approximately $\frac{1}{16}$ " above the top of the bottom container.

(4) The elevator table 25 starts its downward travel by operation of the cam 56, FIGURE 16, and at the same time the lower fingers 172 are cammed downward by the cam 168 at substantially the same rate of travel to cause the bottom container to follow the elevator table 25 in its downward travel. The jets 66 of air assist in the downward travel of the container.

(5) The elevator table reaches the bottom of its travel and then is given a slight upward movement by the small tongue 56a of the cam 56, and at this time the container is ejected leftward by the air jets 28. This slight upward movement of the container table 25 insures the sideward travel of the container.

(6) The elevator table 25 and the lower fingers 172 return to their upper position.

(7) The guide 232 and the finger assemblies 172 and 176 are retracted and the stack 24 of receptacles drops onto the elevator table 25 while it is in its up position ready for the next cycle.

(8) The cycle is repeated.

While the form of the invention now preferred has been disclosed in accordance with the requirements of the statutes, other forms may be used, all coming within the scope of the claims which follow.

What I claim is:

1. A machine for serially dispensing receptacles from a stack comprising: support means; means secured to said

support means to hold a stack of said receptacles; a fulcrum on said support means; a finger construction pivoted to said fulcrum and movable about said fulcrum toward and away from said stack to serially dispense receptacles from said stack; spring means carried by said support means and engaging said finger construction to tend to move said finger construction about said fulcrum toward said stack; a rotatable member having a cam engaging said finger construction to oppose movement of said finger construction about said fulcrum by said spring means, said cam causing said finger construction to move toward said stack when said cam is rotated through part of its path and causing said finger construction to move away from said stack when said cam is rotated through the remainder of its path; and means carried by said support means and interconnected to said rotatable member to rotate said rotatable member.

2. A machine for serially dispensing receptacles from a stack comprising: support means; means secured to said support means to hold a stack of said receptacles; a fulcrum on said support means; a finger construction pivoted to move about said fulcrum toward and away from said stack to serially dispense receptacles from said stack; an upper finger and a lower finger on said finger construction; means mounting one of said fingers for movement toward and away from said other finger; a rotatable member having a cam engageable with said finger construction to pivot said finger construction about said fulcrum and having another cam engageable with one of said fingers to move said one finger toward and away from the other finger; and means carried by said support means and interconnected to said rotatable member to rotate said rotatable member.

3. A machine according to claim 2, in which said upper and lower fingers are pivoted with respect to each other.

4. A machine according to claim 2, in which said fulcrum has means adjustably secured to said support means and is adjustable toward and away from said stack to move said finger construction toward and away from said stack.

5. A machine for serially dispensing receptacles from a vertical stack of receptacles comprising: means to hold a stack of said receptacles having upper edges; a receptacle elevator table movable up and down below said stack to engage the lowermost receptacle of said stack when said table is in its up position; stack aligning means movable against the lower part of said stack to align said stack; a finger construction movable toward and away from said stack and having upper and lower fingers carried by said finger construction with the free ends of said fingers movable into engagement between said upper edges of the two lowermost receptacles in said stack; means to move said stack aligning means against the lower part of said stack; means to move said finger construction into engagement between said upper edges of the two lowermost receptacles in said stack; means to move said elevator table down from its up position; means to spread said fingers apart to cause the lowermost receptacle to descend with said elevator table with the aid of said lower finger and to cause said upper finger to hold the remainder of said stack while said elevator table descends; and means to discharge said lowermost receptacle from said table, said means moving said table thereafter raising said table to its up position, and said means for moving said stack aligning means and said means for moving said finger construction respectively moving said aligning means and said finger construction away from said stack to allow said stack to drop on said elevator to repeat the cycle.

6. A machine according to claim 5 in which there is a fulcrum and said finger construction includes a substantially vertical post fulcrumed at its lower end to said fulcrum and carrying said upper finger at its upper end

11

with said lower finger hinged on said post below said upper finger.

7. A machine according to claim 5 in which there is a base plate and said stack aligning means includes two T-shaped guides movable against opposite sides of said stack and hinged at their lower ends to said base plate.

8. A machine according to claim 5 in which said means to move said stack aligning means includes cams which are disposed adjacent said stack aligning means and which are movable against said stack aligning means to move said stack aligning means against said stack and includes means to rotate said cams.

9. A machine according to claim 5 in which said means for moving said finger construction and said means for moving said stack aligning means include cams operatively interconnected to sprocket wheels; and a perimeter chain interconnects said sprocket wheels to drive said sprocket wheels.

10. A machine for serially dispensing receptacles from a vertical stack of receptacles comprising: means to hold a stack of said receptacles having upper edges; a horizontal base plate below said stack and having an opening for the downward passage of receptacles from said stack; a receptacle elevator table movable up and down below said opening to engage the lowermost receptacle of said stack when said table is in its up position; stack aligning means carried by said plate and movable against the lower part of said stack to align said stack; a finger construction on said plate movable toward and away from said stack and having upper and lower fingers carried by said finger construction with the free ends of said fingers movable into engagement between said upper edges of the two lowermost receptacles in said stack; means to move said stack aligning means against the lower part of said stack; means to move said finger construction into engagement between said upper edges of the two lowermost receptacles in said stack; means to move said elevator table down from its up position; means to spread said fingers apart to cause the lowermost receptacle to descend with said elevator table with the aid of said lower finger and to cause said upper finger to hold the remainder of said stack while said elevator table descends; and means to discharge said lowermost receptacle from said table, said means moving said table thereafter raising said table to its up position, and said means for moving said stack aligning means and said means for moving said finger construction respectively moving said stack aligning means and said finger construction away from said stack to allow said stack to drop on said elevator to repeat the cycle.

11. In an apparatus for serially dispensing receptacles from a stack of receptacles, the combination comprising support means, a first finger pivoted to said support means, a second finger pivoted to said first finger, means to move said second finger into engagement with said first finger, means to move said fingers to a first pivoted position relative to said support means and away from said stack of receptacles, means to pivot said fingers to a second position relative to said support means and between two receptacles of said stack, and means to pivot said second finger away from said first finger when said fingers are in said second pivoted position to move one of said receptacles away from the other.

12. The combination as set forth in claim 11 wherein said means to move said fingers to said first pivoted position includes biasing means disposed between said first finger and said support means.

13. The combination as set forth in claim 11 wherein said means to move said second finger into engagement with said first finger includes biasing means disposed between said fingers.

14. The combination as set forth in claim 11 wherein said means to pivot said fingers to said second pivoted position includes a cam engageable with said first finger and carried by said support means.

12

15. The combination as set forth in claim 11 wherein said means to pivot said second finger away from said first finger includes a cam engageable with said second finger and carried by said support means.

16. The combination as set forth in claim 11 wherein said means to pivot said fingers to said second pivoted position and said means to pivot said second finger away from said first finger includes a member rotatably carried by said support means and having a pair of cam surfaces respectively engaging said fingers.

17. In an apparatus for serially dispensing receptacles from a stack of receptacles, the combination comprising support means, a chute carried by said support means for receiving said stack of receptacles, elevator means carried by said support means and disposed below the stack of receptacles, means carried by said support means and interconnected to said elevator means to raise and lower said elevator means relative to said stack of receptacles, a movable guide member carried by said support means and being disposed adjacent the lowermost receptacles of said stack, means to move said guide member from a first position to a second position against said lowermost receptacles to align the same within said chute when said elevator means is moved away from said stack of receptacles and to move said guide member to said first position when said elevator means is in a raised position relative to said stack of receptacles to cause said stack of receptacles to fall onto said raised elevator means and be supported thereby, and means carried by said support means and movable between the lowermost two receptacles of said stack when said guide member is in said second position to cause said lowermost receptacle to descend with said elevator means.

18. The combination as set forth in claim 17 wherein said guide member is moved to said second position by cam means carried by said support means.

19. The method of serially dispensing receptacles from a stack of receptacles nested within each other and having outer peripheral edges comprising the steps of placing said receptacles in stacked relation in a chute with the lowermost receptacle resting on a movable platform disposed in a first position thereof, inserting pairs of fingers between the peripheral edges of the two lowermost receptacles, moving one finger of each pair of fingers away from its associated finger to force the lowermost receptacle downwardly while simultaneously lowering said platform away from said chute to carry the lowermost receptacle away from said stack, removing the lowermost receptacle from said lowered platform, raising said platform to its first position thereof, retracting said fingers to drop the remaining receptacles onto said platform, and thereafter repeating the above steps to dispense another receptacle from said stack.

20. The method as set forth in claim 19 wherein said step for removing said receptacle from said lowered platform includes the step of forcing said receptacle off said platform by a jet of fluid.

21. The method as set forth in claim 19 wherein said step for removing said receptacle from said lowered platform includes the step of forcing said receptacle off of said platform by a jet of fluid while simultaneously oscillating said platform in its lowered position.

22. The method of serially dispensing receptacles from a stack of receptacles nested within each other and having outer peripheral edges comprising the steps of placing said receptacles in stacked relation in a chute with the lowermost receptacle resting on a movable platform disposed in a first position thereof, moving guide means against the lowermost receptacle to align the same within said chute, inserting pairs of fingers between the peripheral edges of the two lowermost receptacles, moving one finger of each pair of fingers away from its associated finger to force the lowermost receptacle downwardly while simultaneously lowering said platform away from said chute to carry the lowermost receptacle away from

said stack, removing said lowermost receptacle from said lowered platform, raising said platform to its first position thereof, retracting said guide means and said fingers to drop the remaining stacked receptacles onto said platform, and thereafter repeating the above steps to dispense another receptacle from said stack.

References Cited in the file of this patent

UNITED STATES PATENTS

945,126	Karr	Jan. 4, 1910	10
1,330,639	Leumann	Feb. 10, 1920	
1,590,926	Cooley et al.	June 29, 1926	
1,660,247	Wooten et al.	Feb. 21, 1928	

1,663,288
1,722,048
1,967,646
1,985,697
1,990,148
2,138,662
2,433,560
2,445,958
2,561,723
2,589,600
2,946,480
2,946,481

Ulrich	Mar. 20, 1928
Hill	July 23, 1929
Williams et al.	July 24, 1934
Stecher	Dec. 25, 1934
Tevander	Feb. 5, 1935
Neumair	Nov. 29, 1938
Hurley	Dec. 30, 1947
Lindstrom	July 27, 1948
Berger	July 24, 1951
Burkholder	Mar. 18, 1952
Farber	July 26, 1960
Carew	July 26, 1960