Jan. 29, 1929. 1,700,494

B. S. HARRINGTON

FILLING MACHINE

Filed Aug. 29, 1923 4 Sheets-Sheet 1

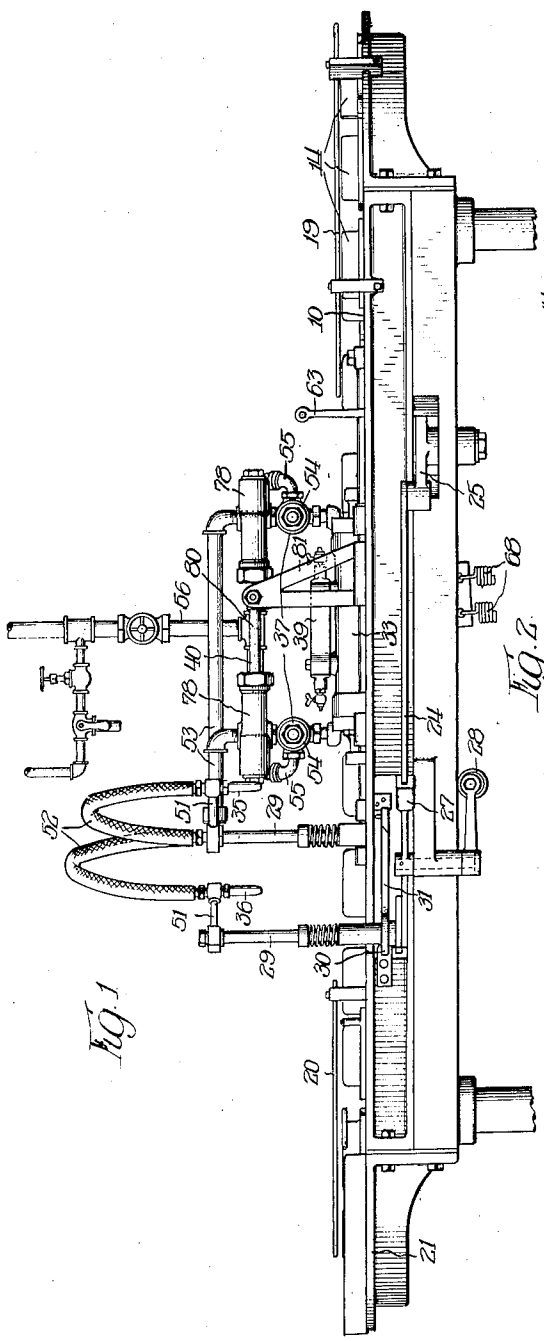


Fig. 1

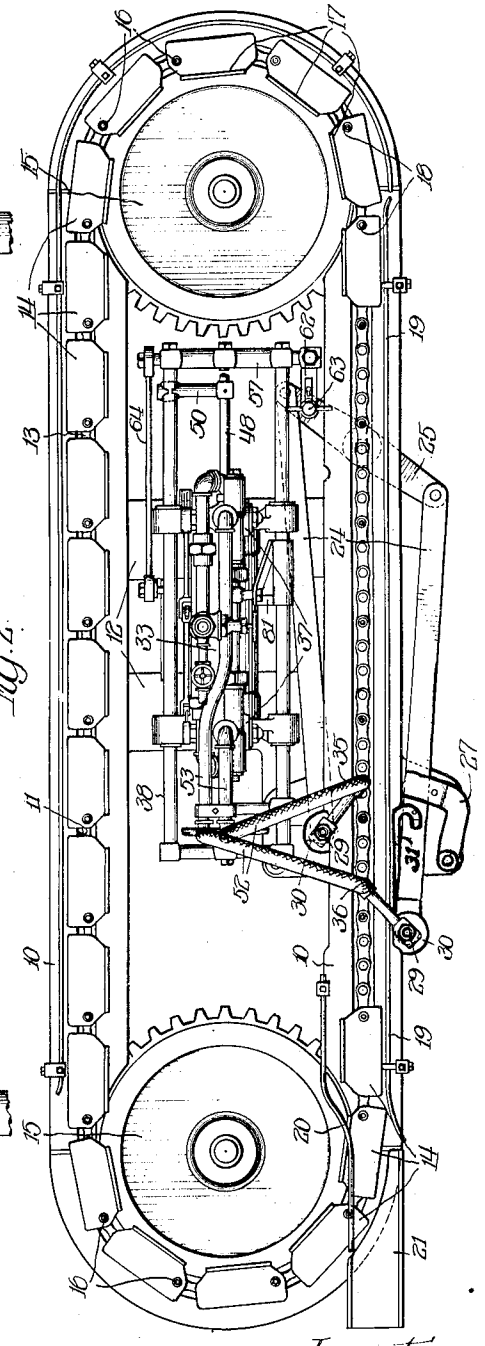


Fig. 2

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Filed Aug. 29, 1923 4 Sheets-Sheet 2

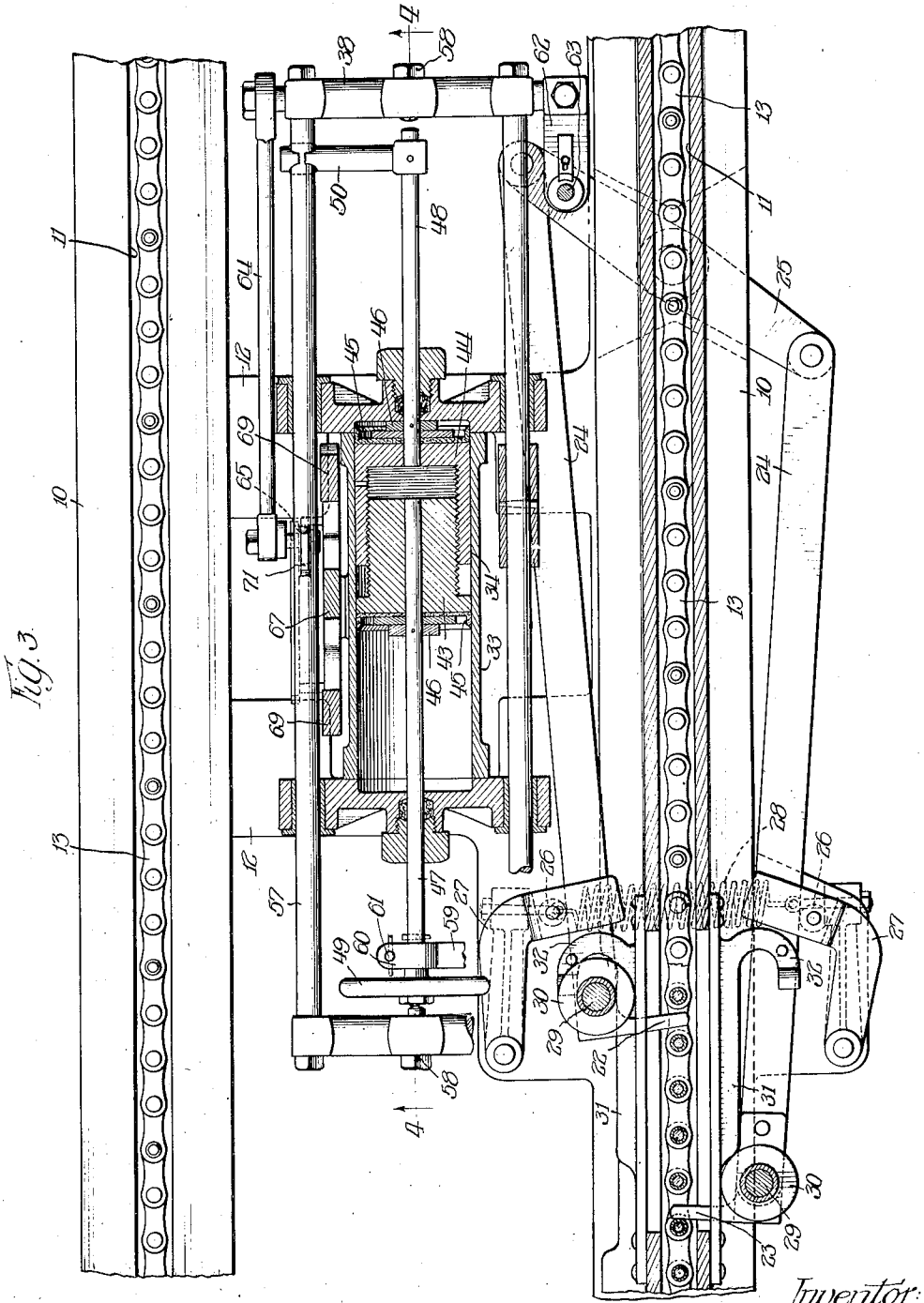


Fig. 3

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FILLING MACHINE

Filed Aug. 29, 1923 4 Sheets-Sheet 3

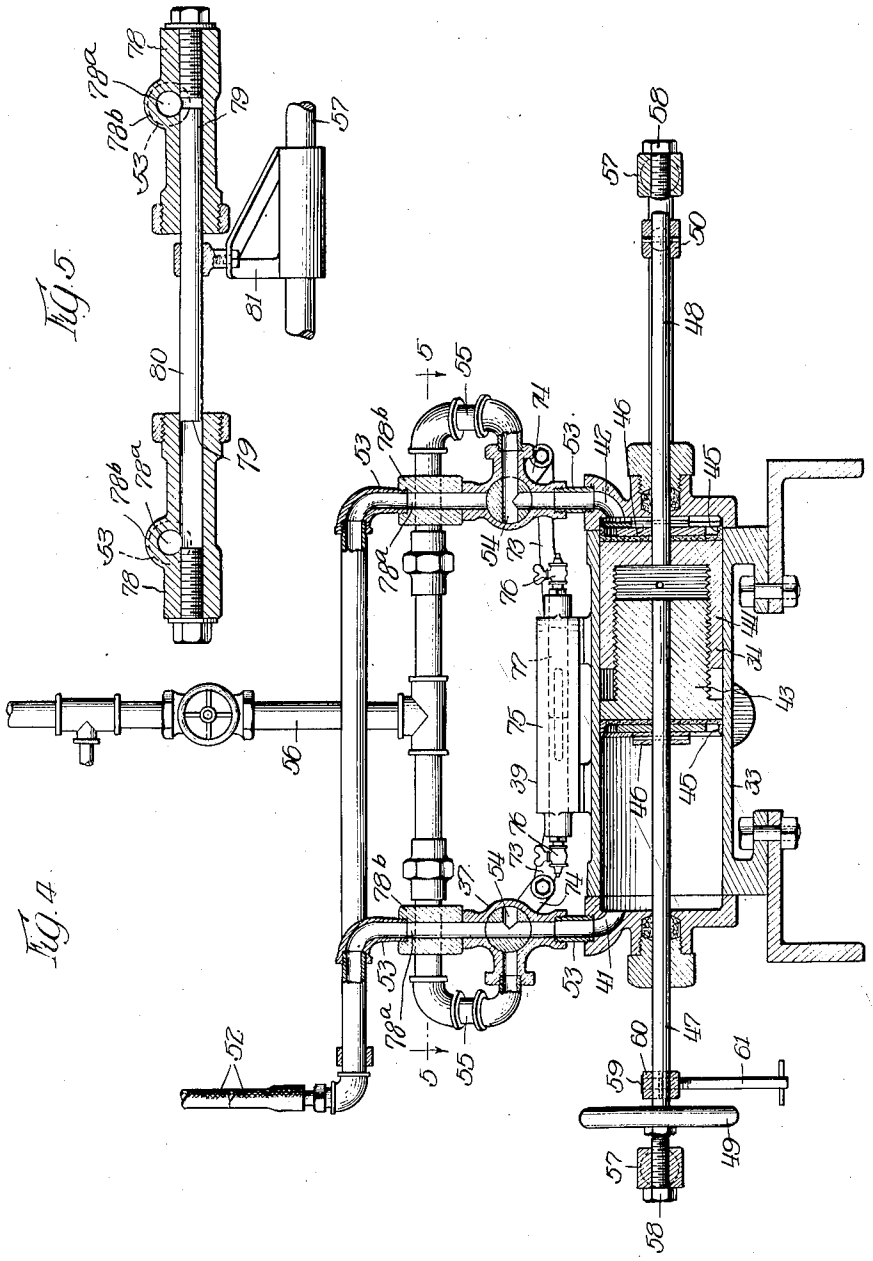


Fig. 4

Fig. 5

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FILLING MACHINE

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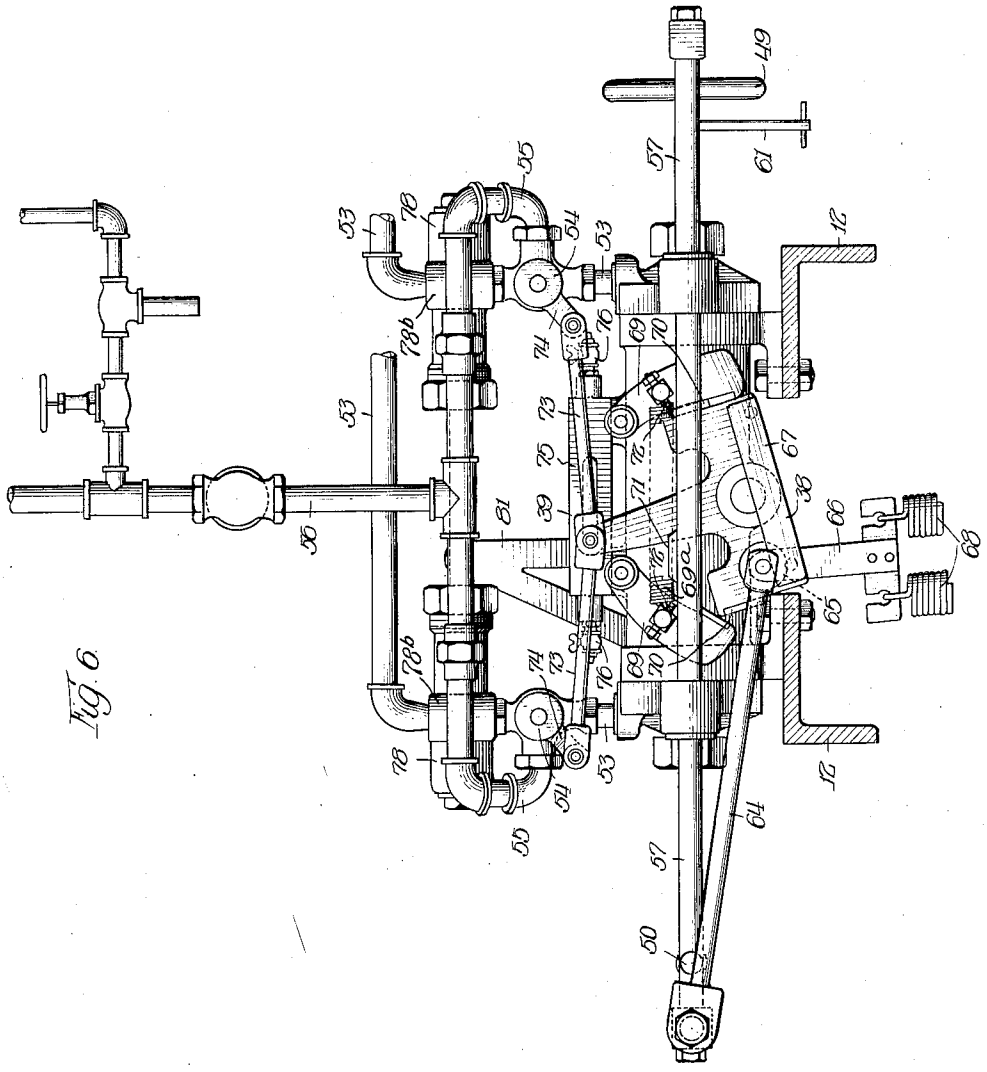


Fig. 6

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Patented Jan. 29, 1929. 1,700,494

UNITED STATES PATENT OFFICE.

BERTIE S. HARRINGTON, OF FORT WORTH, TEXAS.

FILLING MACHINE.

Application filed August 29, 1923. Serial No. 659,874.

The invention is concerned with dispensing mechanisms, and has to do particularly with machines for filling cartons or other receptacles with measured unitary quantities of substances in a fluid or semi-fluid condition, such as lards, oil, butter, peanut butter, jellies and the like.

One object of the invention is the provision of a filling machine which functions automatically in a novel highly efficient manner to measure out equal quantities of the substance being dispensed, discharge the measured quantities into cartons or other receptacles, and replace the filled cartons with empty ones to be filled.

Another object is the provision of a filling machine which is operated entirely by the pressure of the substance being dispensed.

A further object is the provision of a filling machine which functions to fill the cartons or other receptacles while the same are being moved relative to the machine.

A still further object is the provision of a filling machine which has incorporated therein suction means for effectively preventing any after-drip from the discharge nozzles upon the closing of the same.

While the foregoing statements are indicative of the nature of the invention, other objects and advantages not herein specifically referred to will be appreciated upon a full comprehension of the novel features presented in the construction, arrangement and manner of operation of the present filling machine.

In order that the invention may be readily understood, an exemplifying embodiment of the same is set forth in the accompanying drawing and in the following description based thereon. Obviously the invention is susceptible of embodiment in other and varied constructional forms without departure from the essence of the invention and without sacrifice of its material advantages; wherein it is to be understood that the drawings and description are to be considered in an illustrative and not in any unnecessarily limiting sense.

In the drawings:

Fig. 1 is a front elevation of a filling machine constructed in accordance with the invention;

Fig. 2 is a plan view of the machine;

Fig. 3 is an enlarged fragmentary plan view of the machine with the dispensing cylinder and one side of the conveyor track shown in section and with the individual receptacle carriers of the conveyor mechanism removed;

Fig. 4 is a vertical longitudinal section on the line 4—4 of Fig. 3, showing the dispensing cylinder mechanism and certain of its associated connections;

Fig. 5 is a horizontal longitudinal section on the line 5—5 of Fig. 4; and

Fig. 6 is a rear elevation of the dispensing mechanism.

It will be observed, upon a detailed inspection of the several views in the drawings, that the filling machine comprises a supporting structure, a receptacle-handling mechanism and a dispensing mechanism.

The supporting structure of the machine is preferably a horizontally disposed frame 10 which is provided, adjacent its outer periphery, with an upwardly opening channel 11 on which the receptacle-handling mechanism is mounted, and, across its open central portion, with spaced cross-beams 12 on which the dispensing mechanism is mounted.

The receptacle-handling mechanism of the machine is an endless conveyor which consists of a link chain 13 and a plurality of receptacle carriers 14. The chain 13 lies in the channel 11 of the frame 10 and passes about two horizontally disposed sprocket wheels 15 which are freely journaled in the frame adjacent the rounded ends of the same. At regular intervals of about four links along the chain, pins 16 project upwardly from the chain to engage with and move the carriers 14 which rest upon and travel along the track provided by the edges of the channel 11.

The carriers 14 are small substantially rectangular plates provided with guide portions depending from their under surfaces into the channel 11, receptacle-positioning flanges 17 extending upwardly along their inner sides, and apertures 18 adjacent their rear ends through which the pins 16 project to serve as receptacle-positioning stops in cooperation with the flanges 17. The outer sides of the carriers have no receptacle-positioning means, but an outside guide rail 19 is provided on the frame about the greater portion of the periphery of the same to serve that purpose. At one end of the frame 10, the guide rail 19 terminates and is supplanted

by a short inside guide rail 20. The carriers 14 may pass freely under the short guide rail 20 as they are moved about the periphery of the sprocket wheel at that end of the frame, but the filled cartons seated on the carriers will be deflected laterally therefrom onto a suitable stationary platform 21.

The endless conveyor is moved about the periphery of the frame 10 in a clock-wise direction by means of two operating fingers 22 and 23 which reciprocate along the sides of the chain 13 and alternately move from opposite sides into and out of engagement with links of the same. The fingers 22 and 23 move in slots in the sides of the channel 11 and are rigidly carried on the ends of relatively long rods 24 which are pivoted to the ends of a medially pivoted link 25 mounted on the frame 10. The ends of the rods 24 carrying the fingers 22 and 23 are pressed inwardly toward the chain 13 throughout their movement by small rollers 26 which engage with the outer edges of the rods 24 and are journaled in the free ends of pivotally mounted arms 27 connected under tension by a spring 28. The fingers 22 and 23 have secured thereto upwardly extending standards 29 on which are journaled downwardly spring-pressed rollers 30. The rollers 30, when in their lowered positions on the standards, engage inwardly with cam rails 31 on the frame 10, and, when in their raised positions, miss the cam rails and travel in overlapped relation to the same. The rollers 30 travel above and inwardly from the cam rails 31 when the fingers are advancing in engagement with the chain, and travel on the cam rails when the fingers are returning out of engagement with the chain. In order to trip the rollers 30 from the cam rails when the fingers are ready to advance in engagement with the chain, the cam rails are provided at corresponding ends with hooks 32 which are shaped to deflect the rollers upwardly out of peripheral engagement with the cam rails, and, in order to return the rollers to the cam rails when the fingers are ready to return out of engagement with the chain, the cam rails terminate just short of the fully advanced positions of the rollers whereby the rollers are permitted to spring downwardly into horizontal alignment with the cam rails. It will be appreciated from this construction that, when the link 25 is oscillated to operate the conveying mechanism, either the finger 22 with its associated standard will advance in engagement with the chain while the finger 23 with its associated standard is returning out of engagement with the chain, or the finger 23 will advance while the finger 22 is returning, whereby a substantially continuous one-way travel of the chain results through its temporary connections with the fingers. In Fig. 3 it will be seen that the roller 30 of the finger 22 has just been deflected upwardly by its associated hook 32 whereby to bring the finger 22 into driving engagement with the chain, and that the roller 30 of the finger 23 has just been sprung downwardly into alignment with the cam rail 31 whereby to cause the finger 23 to withdraw from its previous driving engagement with the chain upon further movement of the link 25.

The dispensing mechanism of the machine includes a dispensing cylinder 33, an expansible piston 34, two movable discharge nozzles 35 and 36, valve mechanism 37 for controlling the flow of substance through the nozzles, power transmitting means 38 timed with the movement of the piston for operating the valve mechanism at the completion of each piston stroke, means 39 for pneumatically cushioning the operation of the valve mechanism, and suction means 40 for preventing any after-drip of the substance from the ends of the nozzles upon closing of the same.

The dispensing cylinder 33 is rigidly secured to the cross-beams 12 of the frame 10, and is provided at its ends with ports 41 and 42 which are adapted to serve alternately as inlets and outlets to the cylinder for a supply under pressure of substance to be dispensed.

The piston 34 is adapted to reciprocate in the cylinder 33 between the ports 41 and 42, and is composed of two interfitting halves 43 and 44 which are relatively rotatable in threaded telescopic engagement with each other. It will be understood that, when the piston halves are screwed closer together, the displacement of the piston in the cylinder is increased, and, when the piston halves are screwed further apart, the displacement is decreased. The end faces of the piston are provided with cupped flexible disks 45 to prevent any leakage of the substance in the cylinder past the piston, and are also provided with end stops 46 to abut the inner heads of the cylinder at the ends of the piston stroke in order to prevent crushing of the disks 45. Two piston rods 47 and 48 are fixedly secured to the piston halves 43 and 44 respectively, and project axially from the end faces of the piston through suitable stuffing boxes in the heads of the cylinder. The rod 47 is provided at its exterior end with a hand wheel 49 for turning the piston half 43, and the rod 48 is provided at its exterior end with a radially disposed lever 50 for holding the piston half 44 against rotation when the half 43 is being turned. The manner in which the piston rods function to operate the valve mechanism 37 and the conveyor mechanism will be hereinafter described.

The two movable discharge nozzles 35 and 36 are carried in vertical positions by two supporting arms 51 which extend over the conveyor mechanism from the tops of the standards 29. The nozzles are connected by

flexible tubes 52 to two pipes 53 which in turn are connected to the ports 41 and 42 of the cylinder through the valve mechanism 37 and suction means 40.

The valve mechanism 37 consists of two three-way valves 54 which are positioned in the pipes 53 at points just above the cylinders 33. The valves 54 also communicate with pipes 55 through which a supply under pressure of substance to be dispensed is adapted to flow from a common supply pipe 56. When the valves 54 are in the positions illustrated in Fig. 4, the supply pipe 56 is obviously placed in communication with the right hand end of the cylinder 33 through the port 42 which then functions as an inlet, and the left hand end of the cylinder 33 is placed in communication with the discharge nozzle 35 through the port 41 which then acts as an outlet. It will be appreciated that, when the positions of the valves 54 are reversed, the left hand end of the cylinder 33 will be placed in communication with the supply pipe 56 through the port 41 which then functions as an inlet, and the right hand end of the cylinder 33 will be placed in communication with the discharge nozzle 36 through the port 42 which then functions as an outlet. The valves 54 are coupled to operate in synchronism by means which will hereinafter be described.

The power transmitting means 38 consists of a horizontally disposed rectangular frame 57 which encompasses the dispensing cylinder and is mounted in suitable bearings on the sides of the same for reciprocation longitudinally of the machine. The frame 57 lies in the plane of movement of the piston rods 47 and 48, and is provided with co-acting set screws 58 in its end members in axial alignment with the piston rods for taking the end thrust of the piston rods as the piston 34 is shifted from one end of the dispensing cylinder to the other by the pressure of the substance flowing thereinto from either of the ports 41 and 42. The frame 57 is reciprocated by being shifted in either direction by the end of the leading piston rod 47 or 48, and the purpose of the set screws 58 is to permit of an adjustment in the position of the frame 57 relative to the leading face of the piston at the instant that the piston reaches the end of its stroke in either direction.

It will be noted that the inside dimension of the frame 57 between the thrust surfaces of the set screws 58 exceeds slightly the aggregate length of the piston 34 and piston rods 47 and 48. This is for the purpose of permitting an expansion or contraction of the piston 34 in varying the unitary quantities of substance being dispensed without interference from the frame 57.

The lever 50, which was previously referred to as the means for holding the piston half 44 against rotation when the piston half 43 is being turned, has a transverse bore in its free end which loosely encompasses one of the side members of the frame 57. A clamp 59 coacts in a somewhat similar manner with the opposite end of the other side member of the frame, and is provided with an adjustable collar portion 60 which passes around the piston rod 47 adjacent the hand wheel 49 and serves to lock the rod against rotation upon a downwardly extending wing screw 61 being tightened.

A bracket 62 is pivoted to and extends from one corner of the frame 57, and is coupled at its free end to the oscillating link 25 of the conveying mechanism by a removable pin 63 which passes through the link adjacent one end of the same. This arrangement permits the conveying mechanism to be disconnected from the remainder of the machine by merely withdrawing the pin 63.

A connecting rod 64 is pivotally connected at one of its ends to that corner of the frame 57 which is transversely opposite the bracket 62. The free end of the rod 64 has journaled thereon a small roller 65, and also carries a depending spring bracket 66 which is pivotally mounted on the spindle of the roller. The roller 65, actuated by the movement of the frame 57 travels with a compound movement back and forth and up and down on a tilting track formed on a member 67 which is pivoted near the center of the track to the side of the cylinder 33; and the spring bracket 66 is connected to the upper ends of preferably two strong coil springs 68 which have their lower ends fixedly anchored. The springs 68 serve, by exerting a strong downward pressure on the roller 65 throughout its movement, to tilt the member 67 rapidly as soon as the roller passes the pivotal axis of the member and the then elevated end of the member is unlatched from one of two pivoted catches 69. The catches 69, which are pivotally mounted above the member 67, are inwardly spring-pressed toward the member by a spring 69^a, and are sprung outwardly out of locking engagement with co-acting lugs 70 on the ends of the member 67 by means of a cam 71 on the adjacent side of the reciprocating frame 57, which cam engages with adjustable stop pins 72 on the catches 69 and releases either end of the cam 67 at the instant that the corresponding leading end face of the piston 34 reaches the end of its stroke. The member 67 is coupled to the valves 54 by means of links 73 which extend between short lever arms 74 on the valves and the upper end of a projection on the member disposed perpendicularly to the track of the same. This form of trip gear, it will be appreciated, operates to reverse the valves 54 with great rapidity at the instant that the piston 34 reaches either end of its stroke.

The means 39 for pneumatically cushioning the operation of the rapidly operating valve mechanism consists of a small air cylinder 75 which is mounted on the dispensing cylinder

33, pet cocks 76 in the ends of the air cylinder, a double-faced piston 77 within the bore of the air cylinder, and a coupling link which passes from the piston 77 to the upper end of the projection on the member 67 through a slot in the side of the air cylinder. The pet cocks 76 regulate the sizes of the orifices in the ends of the air cylinder, and set up in the cylinder a temporary compression which effectively cushions the movement of the valves. The amount of the compression may of course be regulated by adjustment of the pet cocks 76.

The means 40 for preventing after-drip of the substance from the nozzles upon closing of the same includes two small axially aligned suction cylinders 78 which are in open communication with the two discharge pipes 53 at points 78^a in hollow enlargements 78^b in the sides of the cylinders just above the valves 54. A rod extends into the bores of the cylinders 78, and the ends of the rod constitute in effect pistons 79 in the cylinders, while the intermediate portion of the rod constitutes in effect a common piston rod 80 between the pistons. An upright bracket 81 is rigidly secured to one of the side members of the reciprocating frame 57 and is connected at its upper end to the common piston rod 80 whereby to operate the pistons in the suction cylinders upon operation of the main piston 34 in the dispensing cylinder 33. As a result of this arrangement, the substance standing in either discharge nozzle 35 or 36, when the valve associated therewith is closed, is drawn upwardly in the nozzle to fill the associated suction cylinder, and, when the associated valve is again opened to discharge through that nozzle, the contents of the suction cylinder previously taken from the discharge nozzle are returned thereto.

The operation of the machine may be summarized as follows:

Commencing with the various parts of the machine in the positions illustrated in the drawings—in which positions the left hand end of the dispensing cylinder 33 is occupied with the substance to be dispensed, and the ports 41 and 42 in the ends of the cylinder are placed in communication respectively with the discharge nozzle 35 and the supply pipe 56—the substance under pressure in the supply pipe 56 will flow into the dispensing cylinder through the port 42 and will cause the piston 34 in the dispensing cylinder to travel toward the opposite port 41. As the piston 34 is moved, the substance in the left hand end of the dispensing cylinder is ejected therefrom through the port 41 and the discharge nozzle 35, and the then leading piston rod 47 engages the thrust surface of the set screw 58 in the left hand end of the frame 57 and moves the frame toward the left with the piston. As the frame 57 is moved, the finger 22—which had just moved inwardly into driving engagement with one of the links of the chain 13—is caused to move toward the left, and the moving discharge nozzle 35 supported on the standard of the finger discharges the substance from the left hand end of the dispensing cylinder into an open carton positioned on that particular one of the moving carriers 14 which is directly below the moving nozzle. During the discharge of the nozzle 35, the inactive nozzle 36 is disconnected from the chain 13 and is moving in the opposite direction in a path slightly to one side of that of the discharging nozzle 35 whereby to assume a position wherein it will be ready to discharge into an empty carton on the next carrier upon the completion of the current discharge.

When the piston 34 reaches the end of its stroke, the cam 71 on the side of the frame 57 trips the catch 69 toward which it was moving and permits the member 67 to oscillate rapidly whereby to reverse the valves 54.

As soon as the valves 54 are reversed, the ports 41 and 42 in the ends of the dispensing cylinder are placed in communication respectively with the supply pipe 56 and the dispensing nozzle 36, and the substance which had been flowing into the now filled right hand end of the dispensing cylinder will be discharged through the nozzle 36 as the piston 34 is caused to travel to the right under the pressure of the substance entering the left hand end of the dispensing cylinder from the supply pipe 56. The piston rod 48 acts on the frame 57 in the same general manner as the piston rod 47 had previously done to move the discharging nozzle 36 and a carton on the next succeeding carrier 14 in vertically aligned relation, and to reverse the valves 45 by the trip gear at the completion of the piston stroke.

The cycle above described is automatic in every respect, derives its power for operation solely from the pressure of the substance being dispensed, and will continue indefinitely as long as the supply of substance under pressure is present in the pipe 56 and the pipe is not shut off. It will be understood of course that the suction cutoff device and the pneumatic cushioning device operate in synchronism with the operation of the dispensing and conveying mechanisms.

The unitary quantities of substance being dispensed may be increased or decreased by merely turning the hand wheel 49 in either direction, and this may be done if desired while the machine is in operation.

Probably the most salient features of the machine are its rapid operation ranging from 10 to 80 discharges per minute, its accuracy of measurement, and its automatic operation without power from an independent source.

I claim:

1. In a dispensing apparatus, movable receptacle carriers, two alternately discharging

nozzles movable with the carriers while discharging, a cylinder provided with ports adjacent its opposite ends adapted to serve alternately as inlets and outlets to the cylinder for a supply under pressure of substance to be dispensed, conduits connecting the nozzles and the ports, valve mechanism for reversing the functions of the ports, a piston adapted to move between the ports in the cylinder under the pressure of the substance entering the cylinder from first one port and then the other, a device movable with the piston exteriorly of the cylinder, and a connection between the device and the valve mechanism serving to operate the valve mechanism at the end of each piston stroke.

2. In a dispensing apparatus, movable receptacle carriers, two alternately discharging nozzles movable with the carriers while discharging, a cylinder provided with ports adjacent its opposite ends adapted to serve alternately as inlets and outlets to the cylinder for a supply under pressure of substance to be dispensed, conduits connecting the nozzles and the ports, valve mechanism for reversing the functions of the ports, an expansible piston adapted to move between the ports in the cylinder under the pressure of the substance entering the cylinder from first one port and then the other, a device movable exteriorly of the cylinder during the major portion of the piston travel in a fixed position relative to the leading face of the piston, and a connection between the device and the valve mechanism serving to operate the valve mechanism at the end of each piston stroke regardless of the piston adjustment.

3. In a dispensing apparatus, movable receptacle carriers, two alternately discharging nozzles movable with the carriers while discharging, a cylinder provided with ports adjacent its opposite ends adapted to serve alternately as inlets and outlets to the cylinder for a supply under pressure of substance to be dispensed, conduits connecting the nozzles and the ports, valve mechanism for reversing the functions of the ports, an expansible piston adapted to move between the ports in the cylinder under the pressure of the substance entering the cylinder from first one port and then the other, a frame mounted for reciprocating movement exteriorly of the cylinder, a slack connection between the frame and the piston causing the frame to move in either direction in a fixed relation to the leading piston face during a major portion of the piston travel, and a connection between the frame and the valve mechanism serving to operate the valve mechanism at the end of each piston stroke regardless of the piston adjustment.

4. In a dispensing apparatus, movable receptacle carriers, two alternately discharging nozzles movable with the carriers while discharging, a cylinder provided with ports adjacent its opposite ends adapted to serve alternately as inlets and outlets to the cylinder for a supply under pressure of substance to be dispensed, conduits connecting the nozzles and the ports, valve mechanism for reversing the functions of the ports, an expansible piston adapted to move between the ports in the cylinder under the pressure of the substance entering the cylinder from first one port and then the other, a frame mounted for reciprocating movement exteriorly of the cylinder, a slack connection between the frame and the piston causing the frame to move in either direction in a fixed relation to the leading piston face during a major portion of the piston travel, a connection between the frame and the valve mechanism serving to operate the valve mechanism at the end of each piston stroke regardless of the piston adjustment, and a connection between the frame and the conveying mechanism for operating the latter.

5. In a dispensing apparatus, movable receptacle carriers, two alternately discharging nozzles movable with the carriers while discharging, a measuring vessel provided with ports adapted to serve alternately as inlets and outlets to the vessel for a supply under pressure of substance to be dispensed, conduits connecting the nozzles and the ports, valve mechanism for controlling the functions of said ports, a member in the measuring vessel reciprocated between said ports by the pressure of the substance flowing into and out of the same, conveying mechanism for handling unfilled and filled receptacles, and power transmitting means operatively associated with said reciprocated member and operatively coupled with the valve mechanism and the conveying mechanism whereby to drive both of the said mechanisms by the use of the substance alone.

6. In a dispensing apparatus, a nozzle, a valve for controlling the flow of substance through the nozzle, a cylinder in communication with the nozzle, a piston adapted to reciprocate in the cylinder, and a connection between the piston and the valve, whereby upon the closing of the valve the piston will draw a portion of the contents of the nozzle into the cylinder and upon the opening of the valve will expel the contents of the cylinder back into the nozzle.

7. In a dispensing apparatus, two alternately discharging nozzles, coupled valves for controlling the flow of substance through the nozzles, and coupled devices connected with the valves and in communication with the nozzles for moving the substance at the discharging ends of the nozzles back up into the nozzles upon the closing of the valves.

8. In a dispensing apparatus, two alternately discharging nozzles, coupled valves for controlling the flow of substance through the nozzles, coupled suction devices connected with the valves and in communication with

the nozzles between the discharging ends of the same and the valves for drawing the substance at the discharging ends of the nozzles back up into the nozzles upon the closing of the valves.

9. In a dispensing apparatus, two alternately discharging nozzles, coupled valves for controlling the flow of substance through the nozzles, axially aligned cylinders in communication with the nozzles, pistons adapted to reciprocate in the cylinders on a common piston rod, and a connection between the piston rod and the coupled valves, whereby upon the closing of each valve its associated piston will draw a portion of the contents of its nozzle into its cylinder and upon the opening of each valve its associated piston will expel the contents of its cylinder back into its nozzle.

10. In a dispensing apparatus, movable receptacle carriers, two alternately discharging nozzles movable with the carriers while discharging, coupled valves for controlling the flow of substance through the nozzles, mechanism for rapidly operating the valves, an air cylinder having adjustable air passages in the ends of the same, a double-faced piston adapted to reciprocate in the cylinder, and a connection between the coupled valves and the piston through a slot in one side of the cylinder whereby the piston will be shifted longitudinally of the cylinder upon movement of the valves.

11. In a dispensing apparatus, a measuring cylinder, a two-part expansible piston adapted to move between the ends of the cylinder, means operable exteriorly of the cylinder for adjusting the length of the piston, movable receptacle carriers, and two alternately discharging nozzles communicating with the ends of the cylinder and movable with the carriers while discharging.

12. In a dispensing apparatus, a measuring cylinder, a two-part expansible piston adapted to move between the ends of the cylinder, a hand wheel operable exteriorly of the cylinder for adjusting the length of the piston while the apparatus is in operation, means for locking the hand wheel in adjusted position, movable receptacle carriers, and two alternately discharging nozzles communicating with the ends of the cylinder and movable with the carriers while discharging.

13. In a dispensing apparatus, two nozzles, a device for measuring the substance to be dispensed, two conduits leading from the device to said nozzles, means for causing the nozzles to discharge in alternation without substantial interruption between the discharges therefrom, means for moving the nozzles, a plurality of receptacle carriers, and means for moving the carriers in single order below and along with first one nozzle while it is discharging and then the other nozzle while it is discharging, whereby to have each nozzel discharge over every second carrier.

14. In a dispensing apparatus, a plurality of receptacle carriers, means for moving the carriers in single order, two nozzles, a device for measuring the substance to be dispensed, two conduits leading from the device to said nozzles, means for causing the nozzles to discharge in alternation without substantial interruption between the discharges therefrom, and means for moving first one nozzle along with one of the carriers while discharging and then the other nozzle along with the following carrier while discharging, whereby to have each nozzle discharge over every second carrier.

15. In a dispensing apparatus, a plurality of receptacle carriers, means for moving the carriers in single order, a device for measuring the substance to be dispensed, two nozzles, means for causing the nozzles to discharge in alternation without substantial interruption between the discharges therefrom, means for moving the nozzles in generally rectilinear paths which extend over the carriers while the nozzles are discharging and to opposite sides of the carriers while not discharging, and flexible conduits between the measuring device and the nozzles.

16. In a dispensing apparatus, a movable receptacle carrier, an intermittently discharging nozzle movable with the carrier while discharging, a valve for controlling the flow of substance through the nozzle, a member, means for moving the member, trip mechanism operatively connected with the member for rapidly operating the valve at a greater speed than the member, an air cylinder having a restricted air passage adjacent one end of the same, a piston adapted to reciprocate in the cylinder, and a connection between the valve and the piston whereby the piston will be shifted longitudinally of the cylinder upon movement of the valve.

17. In a dispensing apparatus, a movable receptacle carrier, an intermittently discharging nozzle movable with the carrier while discharging, a valve for controlling the flow of substance through the nozzle, a member, means for moving the member, trip mechanism operatively connected with the member for rapidly operating the valve at a greater speed than the member, an air cylinder having adjustable air passages in the ends of the same, a double faced piston adapted to reciprocate in the cylinder, and a connection between the valve and the piston through a slot in one side of the cylinder whereby the piston will be shifted longitudinally of the cylinder upon movement of the valve.

In testimony whereof I have hereunto signed my name.

BERTIE S. HARRINGTON.