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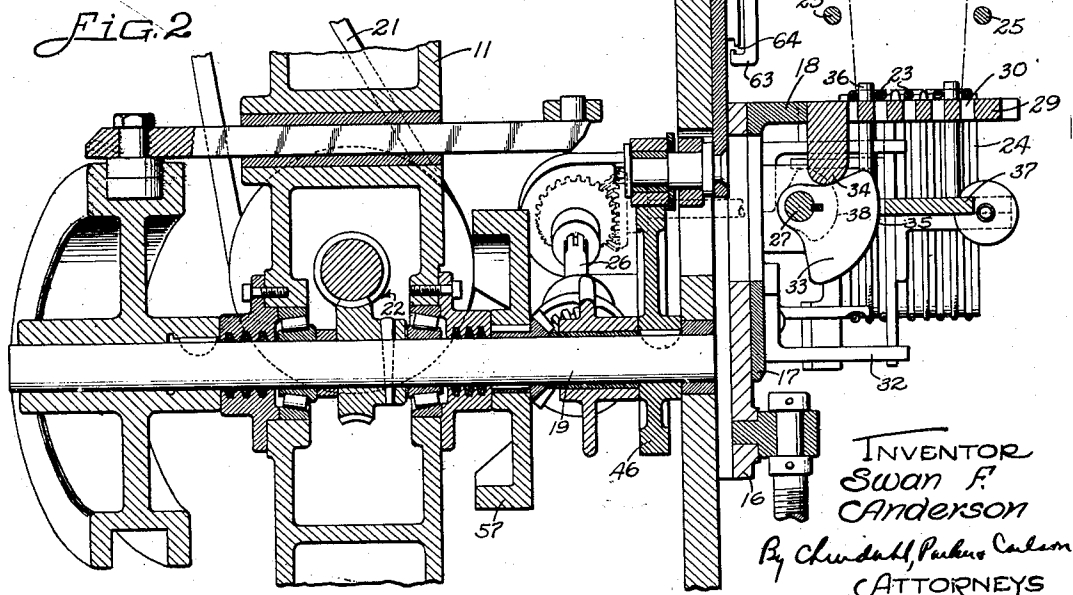
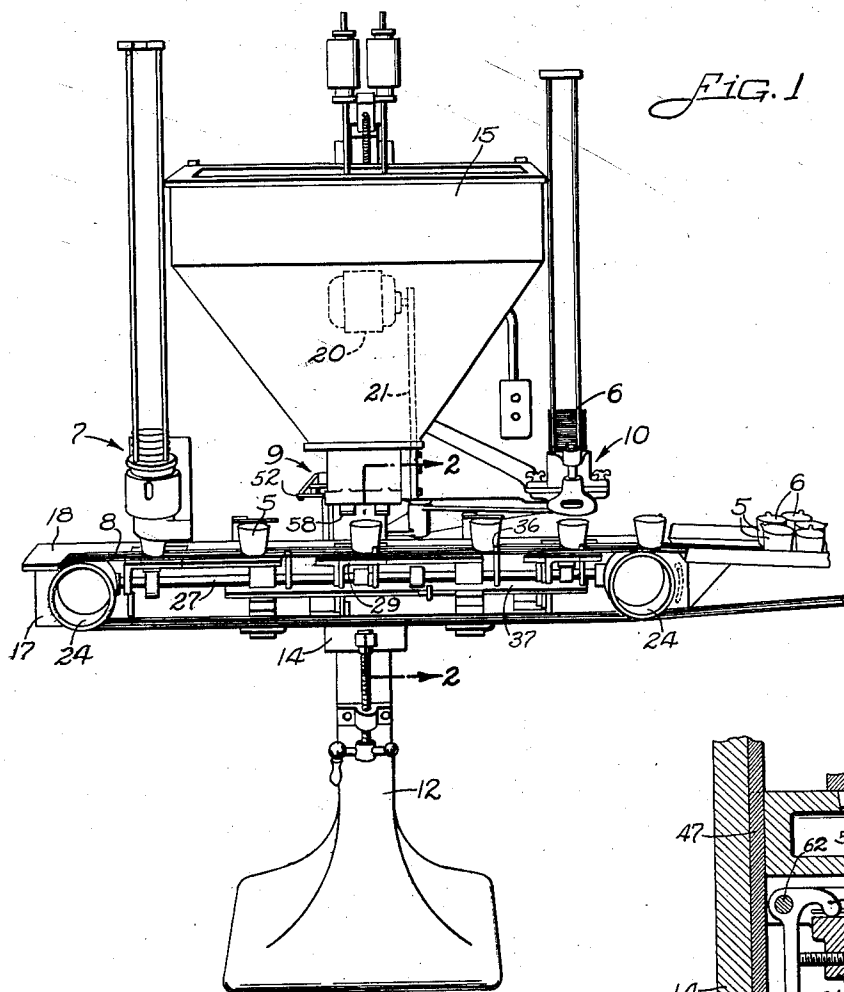
S. F. ANDERSON

2,107,274

FILLING MACHINE

Original Filed Sept. 30, 1932

2 Sheets-Sheet 1



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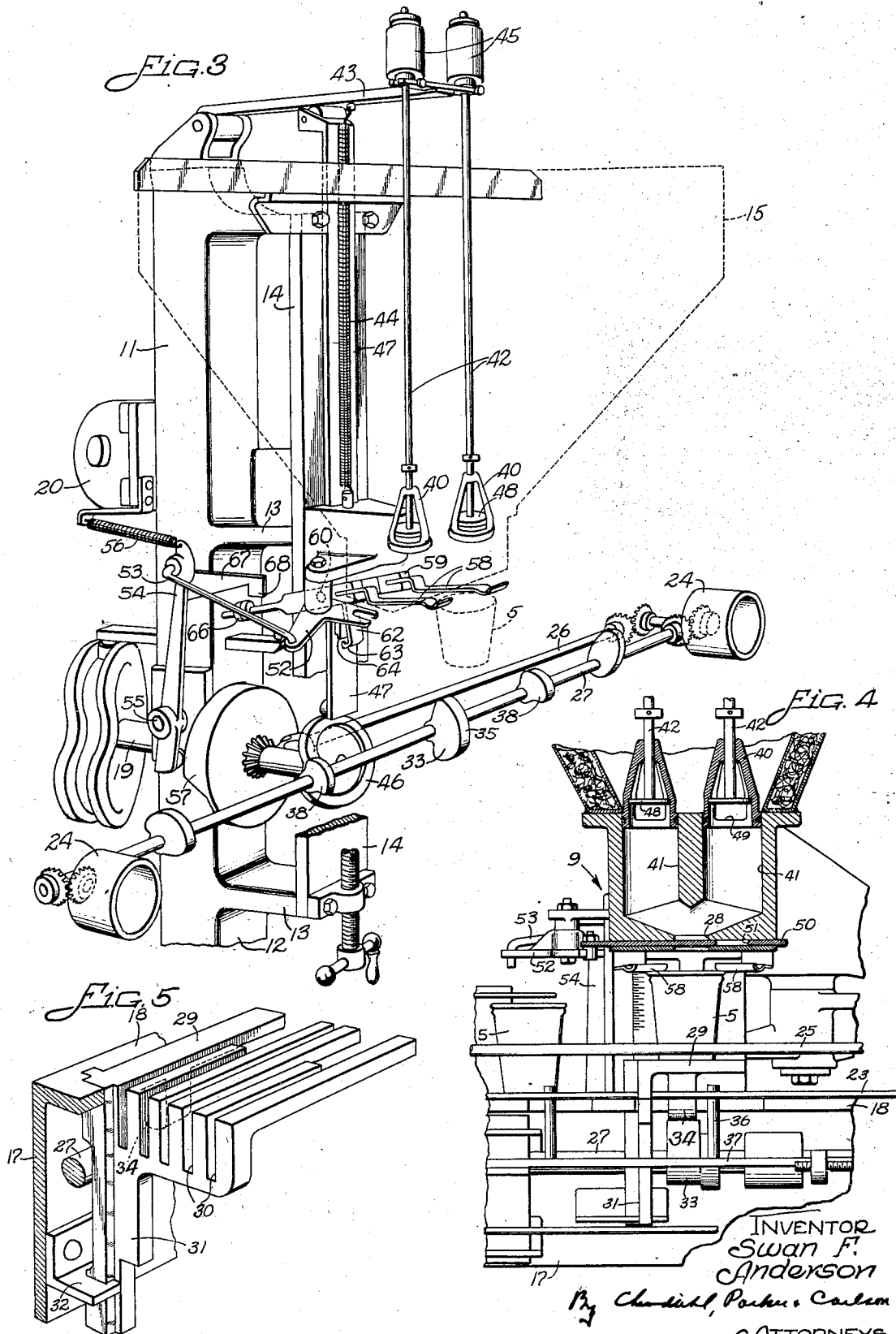
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UNITED STATES PATENT OFFICE

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FILLING MACHINE

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Original application September 30, 1932, Serial No. 635,482. Divided and this application December 3, 1934, Serial No. 755,714

8 Claims. (Cl. 226—99)

This invention relates to filling machines for dispensing measured quantities of material into containers and more particularly the invention relates to the filling mechanism disclosed in my co-pending application Serial No. 635,482, filed September 30, 1932, of which this application is a division.

One object of the invention is to provide a filler having novel means for preventing the additional discharge of a measured quantity of the material being dispensed in the event that the container for receiving the material is not correctly in filling position at the time when such discharge normally occurs.

A more detailed object is to provide a filler having mechanism arranged to be operated periodically to dispense measured quantities of material into containers moved successively into filling position and having means operating automatically to disable the dispensing means in the event that a container is not in proper filling position at the time when the dispensing mechanism would otherwise operate.

The invention also resides in the novel character of the means for detecting the presence of a correctly positioned container.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which—

Figure 1 is a front elevational view of a filling and capping machine embodying the features of the present invention.

Fig. 2 is a fragmentary sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of the main operating parts of the machine.

Fig. 4 is a fragmentary front elevational view showing a portion of the filling mechanism in section.

Fig. 5 is a fragmentary perspective view of one of the cup elevating devices.

In the form selected for purposes of illustration, the invention is embodied in an automatic machine for filling cups 5 with material such as ice cream and applying caps or disks 6 to the open ends of the filled cups. The cups commonly used have downwardly tapering body portions adapted to receive the cap snugly at the upper end. The cups to be filled are stacked in a cup dispenser 7 and released one by one onto a conveyor 8 by which they are moved to a filling mechanism 9 and thence to a capper 10.

Herein the main frame of the machine comprises a post 11 upstanding from a pedestal 12

and having forwardly projecting arms 13 secured to a vertical plate 14 from the upper end of which is supported a hopper 15 for storing a quantity of the material with which the cups are to be filled. Adjustable vertically upon ways formed by the plate 14 is a bracket 16 (Fig. 2) to which is secured a flat bar 17 disposed in a vertical plane and supporting a horizontal table 18 extending transversely of the machine beneath the cup dispenser, the filler and the capper.

The mechanisms above referred to are driven from a main drive shaft 19 which makes one revolution in each cycle of the machine during which, in the present instance, one cup is fed onto the conveyor by the dispenser 7, the second preceding cup on the conveyor is filled from the hopper 15, and the fourth preceding cup is closed by the capper 10. Herein the shaft projects rearwardly from the plate 14 and is journaled intermediate its ends in the post 11 being driven by an electric motor 20 through the medium of a belt 21 and having a worm and worm-wheel connection 22 with the shaft.

The conveyor by which the cups are advanced with a step-by-step motion from the dispenser through the filling and capping stations runs continuously during operation of the machine and comprises a series of endless belts 23 arranged in spaced parallel relation on drums 24 rotatably supported on opposite ends of the bar 17. One of the conveyor drums is driven from a shaft 26 geared to the shaft 19 and connected through a shaft 27 and appropriate gearing to the other drum. In their movement by the conveyor, the cups are held against movement laterally of the conveyor by guide bars 25 on the table.

During filling each cup is elevated from the conveyor to position its open end immediately beneath a discharge opening 28 at the lower end of the hopper 15. For this purpose, a horizontal platform 29 (Fig. 5) is located at the filling station and adapted to be raised and lowered in timed relation to the machine cycle. The platform is disposed in an opening cut out from the table 18 and comprises a rectangularly shaped block having upwardly opening parallel slots 30 to receive the belts 23 and permit the platform to be raised to the desired height above the conveyor. To guide each platform vertically, the block has a depending leg 31 guided in the table 18 and a bracket 32. The platform is raised and lowered by a cam 33 acting on a depending lug 34 on the platform. The cam has a relatively long dwell surface 35 for holding the cup raised

for a substantial portion of the cycle to allow proper time for filling.

To properly position the cup for presentation to the filler, a stop is adapted to be projected into the path of the cup on the conveyor in position to arrest the motion of the cup as it reaches filling position opposite the platform 29, thereby allowing the conveyor to carry the cup forwardly when the cup again rests on the belts 23. Herein the stop comprises a pair of fingers 36 upstanding from a bar 37 mounted for vertical movement produced by cams 38 on the shaft shaped to retract the fingers 36 beneath the conveyor before the platform allows the filled cup to again rest on the conveyor. Then after the filled cup has passed the fingers, the latter are raised by the cams.

Ice cream stored in the hopper 15 is withdrawn in measured quantities and discharged downwardly through the hopper outlet 28 by suitable dispensing means which, in the present instance, comprises two plungers 40 disposed in cylinders 41 communicating with each other at their lower ends. Each piston is mounted for a limited degree of vertical movement on the lower end of a rod 42 secured at its upper end to the free end of an arm 43 pivoted at its other end to the post 11 and constantly urged downwardly under the action of a contractile spring 44 and weights 45. Downward movement of the arm 43 is controlled and upward movement effected by a cam 46 on the shaft 19 acting on the lower end of a follower bar 47 vertically slidable on the frame plate 14 and engageable at its upper end with the arm 43.

On the end of each rod 42 is a valve disk 48 adapted, in the initial downward movement of the rod, to move relative to the plunger and become seated upon the plunger proper. In the continued downward movement of the rod, the cream within the cylinders 41 will be forced through the outlet 28 into the cup on the platform 29. When the arm 43 is next raised, the rods 42 move independently of the plungers for a short distance raising the valve members 48 from their seat thereby establishing communication between the cylinders 41 and the upper part of the hopper 15 through the medium of openings 49 in the plungers. It will be apparent that the length of the piston stroke and therefore the amount of cream dispensed in each cycle may be varied by adjusting the length of the piston rods.

Preferably the outlet 28 is controlled by a valve member in the form of a slide 50 adapted to close the outlet when positioned as shown in Fig. 4 and having an opening 51 therein adapted to be brought into register with the outlet 28 by movement of the slide to the left from said position. The slide is actuated by oscillation of a bell-crank 52 connected by a rod 53 to the upper end of a lever 54 fulcrumed at 55. A spring 56 acts on the lever to move the valve slide from closed to open position as permitted by a cam 57 on the shaft 19. The cam is shaped to coordinate the movements of the slide 50 with that of the platform 29 and the plungers 40. Thus, the valve is allowed to open under the action of the spring 56 as soon as the platform reaches its uppermost position and is closed quickly and substantially simultaneously with lowering of the platform. The cam 46 is shaped to permit lowering of the plungers 40 substantially simultaneously with the opening of the valve, the movement being reversed upon closing the valve.

Means is provided which acts automatically to prevent idle discharge of cream from through the hopper outlet in the event that there is no cup on the platform 29 or the cup is positioned incorrectly at the time when the cream dispensing mechanism normally acts. This means involves the use of a feeler member adapted to detect the presence of a cup correctly positioned on the platform 29 as the latter is raised to move a cup to filling position. Herein this member comprises two arms 58 disposed beneath the hopper outlet 28 on opposite sides thereof and spaced to be engaged by the upper edges of a cup on the platform 29. The arms are rigid with the bifurcated forward end of a lever 59 pivoted at 60 on the plate 14 and carrying an adjustable counter-balancing weight 66 which is insufficient to overcome the weight of the arms. Thus, the latter normally move downwardly.

To disable the dispensing mechanism, a latch 61 (Fig. 2) pivoted on the lever 59 at 62 has a hooked lower end 63 which, in the normal lowermost position of the feeler arms, is disposed below a lug 64 on the follower slide 47. For actuating the latch 61, the same is provided with a rearwardly extending arm 61^a adapted to engage with a bridge member 59^a carried by the forward end of the lever 59. The hook is thus moved forwardly out of blocking relation to the lug 64 as an incident to upward movement of the cup. Adjustment of the latch position may be effected by a screw 65 carried by the bridge member 59^a. It will thus be seen upon reference to Fig. 2 that when the adjusting screw 65 is screwed inwardly, for example, the bridge 59^a and the attached feelers 58 will be moved upwardly since the latch 61 is pressed against the adjacent plate 47. Similarly, when the screw 65 is moved in the opposite direction the feelers 58 will be permitted to move downwardly a corresponding amount. In this manner, an adjustment of the vertical distance between the feelers 58 and fluid outlet is had so that the feelers are thereby adapted to actuate the latch only when a container top is located a predetermined minimum distance from the fluid outlet.

It will thus be observed that if there is no cup on the platform 29 at the time when the cam 46 releases the slide 47 for downward movement, the lug 64 will engage the hook 63 and further downward movement of the pistons 40 will be prevented. No cream will be discharged from the hopper outlet. When a cup is correctly positioned on the platform, it will engage the arms 58 and raise the latter as the platform 29 rises. The hook 63 will thus be withdrawn from blocking position and a quantity of cream will be dispensed in the regular way.

Provision is also made for preventing opening of the outlet valve when the dispensing mechanism is disabled as above described. To this end, the lever 54 has an extension 67 having a shoulder 68 adapted for engagement with the weight 66 when the latter is in raised position. Normally, when a cup is in filling position during the operation of the dispensing mechanism, the weight 66 is lowered out of blocking relation to the shoulder 68 so that the valve slide 50 is free for movement under the action of its actuating spring 56. In the event that the arms 58 are not raised, the lever 54 is blocked preventing opening of the outlet valve.

I claim as my invention:

1. Mechanism for filling a succession of cups with material combining a hopper, a cylinder

communicating at one end with the lower end of said hopper and having an outlet opening at the other end, a plunger movable in said cylinder to discharge material through said opening, a conveyor operable to advance said cups one by one to a position beneath said opening, means operable in timed relation to the movement of said conveyor to raise the successive cups toward said opening, spring means tending to move said plunger toward said outlet, power driven means operable in timed relation to the upward movement of each cup to permit lowering of said plunger, latch means normally tending to assume active position and when in such position to lock said plunger in raised position, and a feeler disposed in the path of each cup presented to said outlet and acting upon movement by the cup to render said latch means ineffectual.

2. Mechanism for filling a succession of cups with material combining a hopper adapted to contain said material and having an outlet at its lower end, a conveyor operable to advance said cups one by one to a position beneath said outlet, means operable in timed relation to the movement of said conveyor to raise the successive cups toward said outlet during filling, a valve controlling said outlet, a spring tending to urge said valve toward open position, power driven means operable in timed relation to the upward movement of each cup to permit opening of said valve by the spring and then to close the valve, a latch adapted when in active position to prevent opening of said valve by said spring, and a feeler disposed in the path of each cup presented to said outlet and tending to assume a position holding said latch active, said feeler, upon upward movement of a cup, acting to withdraw said latch to inactive position.

3. In a machine of the character described, a filler mechanism comprising, in combination, a material dispensing device having an outlet opening at its lower end, a power driven conveyor operable to advance containers successively to a position beneath said opening and then to raise the containers toward said opening, a feeler disposed beneath said opening to be engaged by each container when elevated to said opening, a valve controlling said outlet, means constantly tending to actuate said valve to open position, power driven means operating in timed relation to the upward movement of each container to permit the operation of said valve actuating means to open said valve, and means actuated by said feeler and acting to render said power driving means ineffectual except after actuation of said feeler by said container.

4. In a machine of the character described, a filler mechanism comprising, in combination, means for supplying a material to be packaged and having a discharge outlet at its lower end, a power driven conveyor operable to advance containers successively to a position beneath said opening and then to raise the containers toward said opening, a pair of vertically movable feeler arms disposed on opposite sides of said outlet beneath the latter and in positions to engage the upper edge of the container on opposite sides of said opening in the upward movement of the container, means operating periodically to cause a quantity of material to flow through said outlet, and means controlled by said feeler arms and

operating to prevent effective operation of said last mentioned means when the arms are disposed in their lowermost positions.

5. Mechanism for filling a succession of cups with material combining means adapted to supply said material and having an outlet at its lower end, a conveyor operable to advance said cups one by one to a position beneath said outlet, means operable in timed relation to the movement of said conveyor to raise the successive cups toward said outlet during filling, mechanism operable periodically to discharge a measured quantity of material through said outlet, power driven means operable in timed relation to the upward movement of each cup to actuate said mechanism, a latch adapted when in active position to prevent operation of said dispensing mechanism by said power driven means, and a feeler disposed in the path of each cup presented to said outlet and timed to assume a position holding said latch active, said feeler acting, upon upward movement thereof by a cup, to withdraw said latch to inactive position.

6. A filler having, in combination, a discharge orifice, means operable sequentially to open and close said orifice to discharge successive quantities of material from said orifice into successive containers positioned to receive the discharged material including an actuating member and yieldable means for moving said member in a direction to discharge said material, a feeler operating to detect the presence of said container in filling position, and means actuated by said feeler and operating to block said member against effective operation in the absence of a container in said position.

7. A filler having, in combination, a discharge orifice, means operable to discharge a measured quantity of material through said orifice into a container positioned to receive the material, and means operating to detect the presence of a container in filling position and to disable said first mentioned means in the absence of a container in said position, said detecting means including two arms disposed on opposite sides of the container for engagement with opposite edges thereof, said arms being movable with the container as an incident to the movement thereof to filling position.

8. In a machine of the character described, a filler mechanism comprising, in combination, a dispensing device having an outlet opening at its lower end, a conveyer beneath said dispensing device for presenting a series of containers successively to a position beneath said opening and within a predetermined distance thereof, a valve controlling the opening and closing of said outlet, power driven means operating periodically in timed relation to the movements of said containers by said conveyer to open and close said valve, detector means for normally rendering said power driven means ineffective to open said valve and responsive to the presence of the top of a container within a predetermined minimum distance from said outlet for conditioning said power driven means to open said valve, and means for adjusting said detector means to vary the minimum distance between the top of a container and the outlet at which said detector means is actuable to condition said power driven means in the manner defined.

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