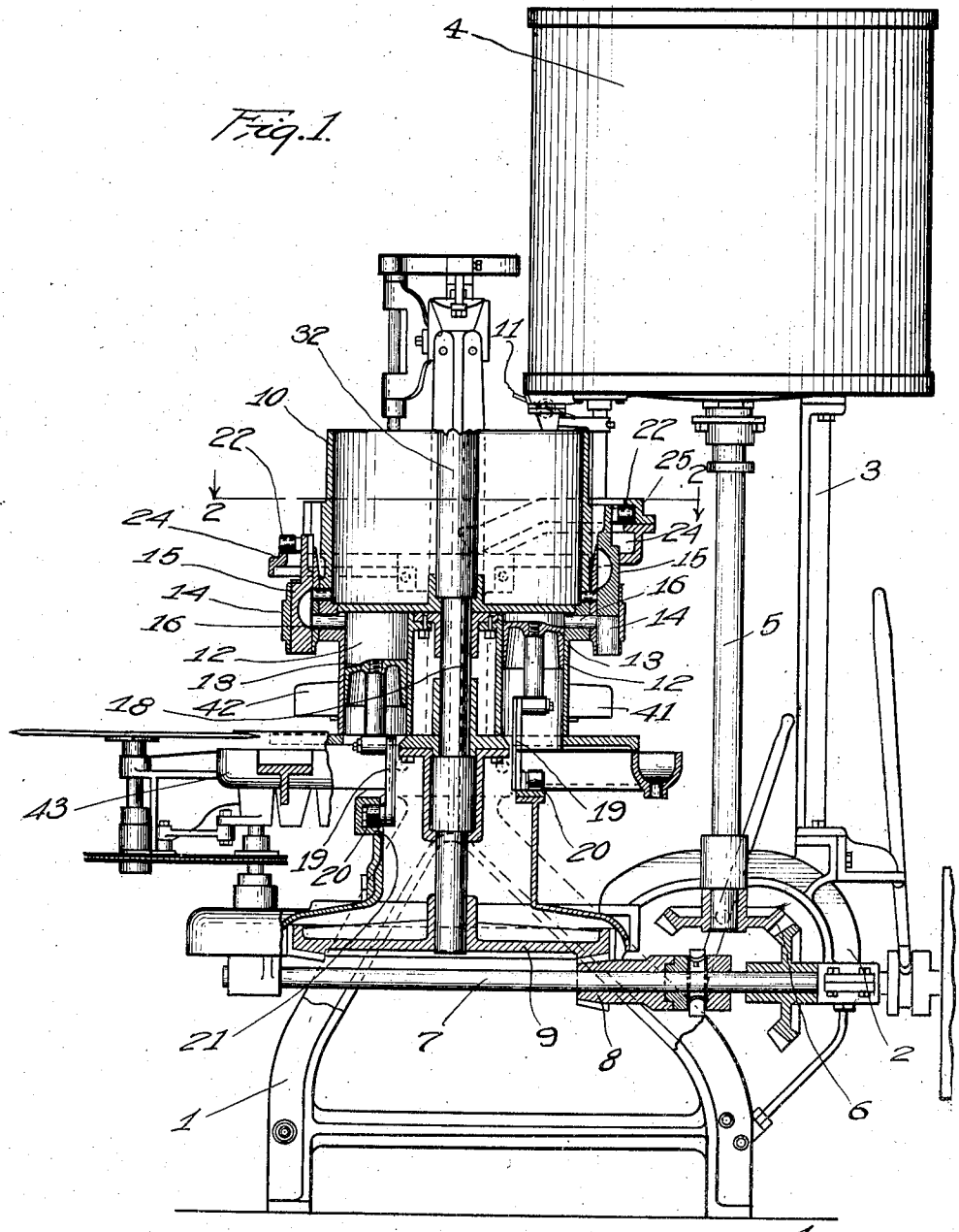
Jan. 19, 1926. 1,570,151

A. HOLMQUIST

CAN FILLING MACHINE

Filed April 26, 1920 4 Sheets-Sheet 1

Fig. 1.



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A. HOLMQUIST

CAN FILLING MACHINE

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Fig. 2.

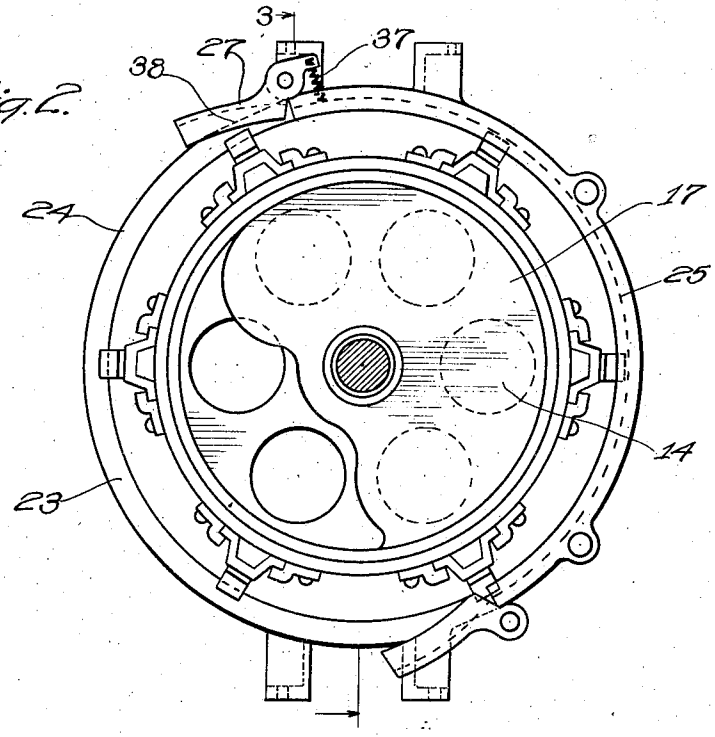
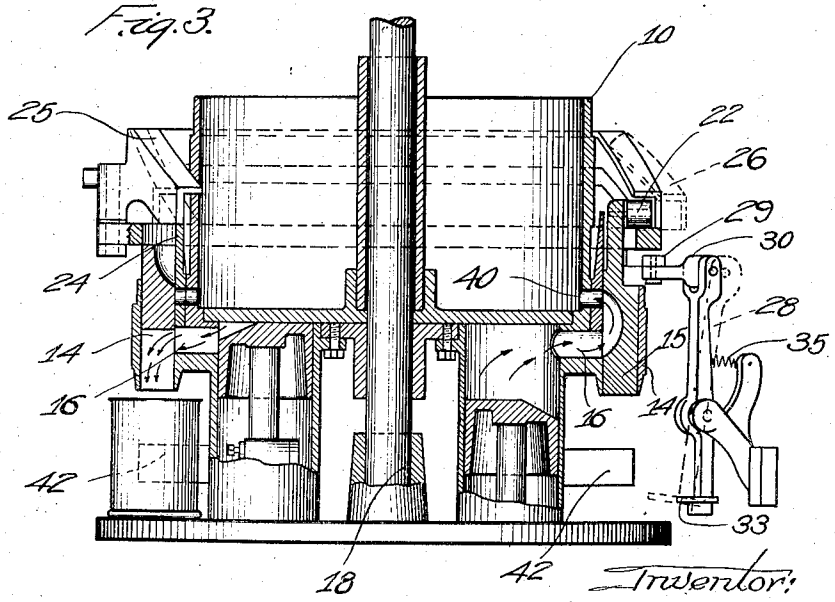


Fig. 3.



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A. HOLMQUIST

CAN FILLING MACHINE

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Fig. 4.

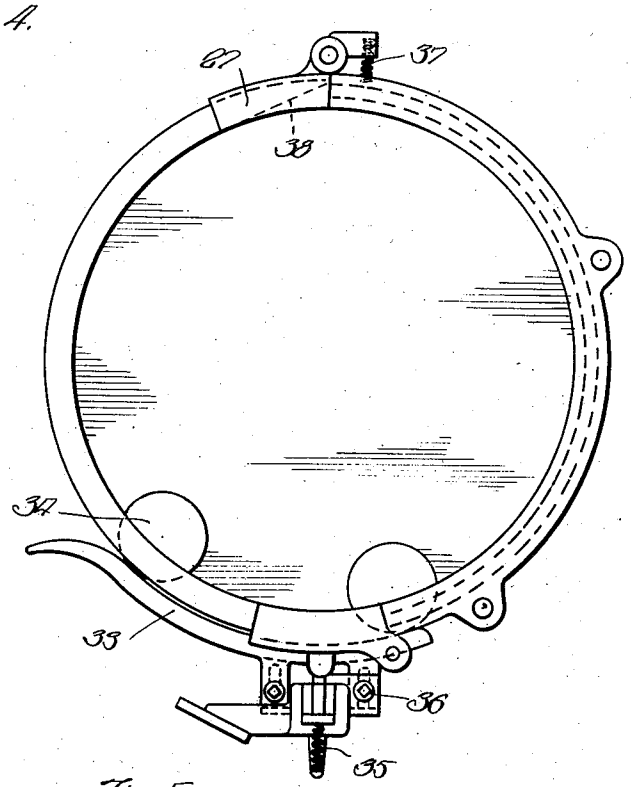
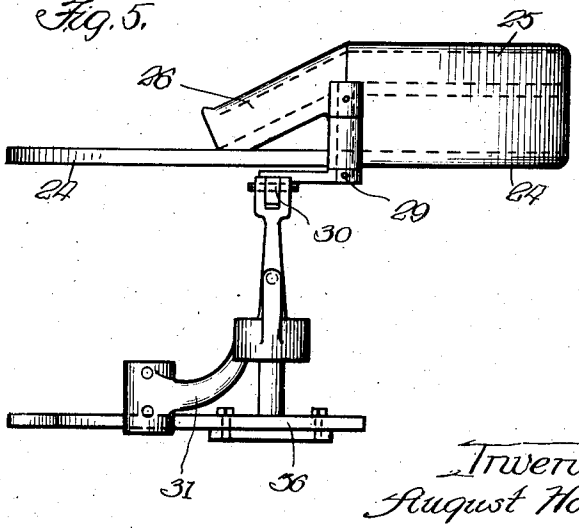


Fig. 5.



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CAN FILLING MACHINE

Filed April 26, 1920 4 Sheets-Sheet 4

Fig. 7.

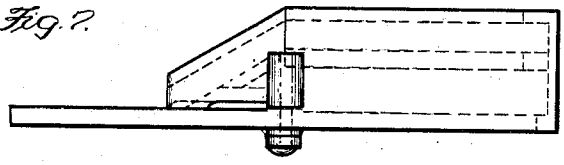


Fig. 8.

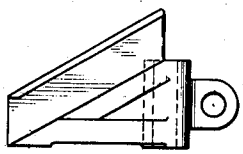


Fig. 6.

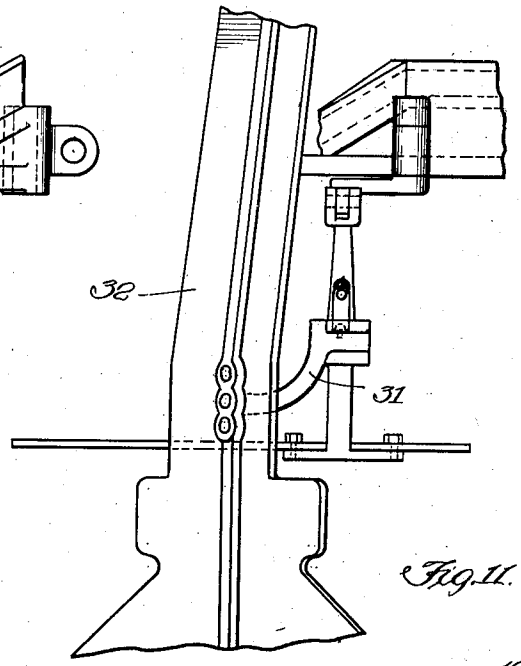


Fig. 12.

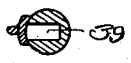


Fig. 11.

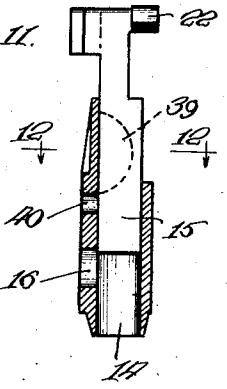


Fig. 9.

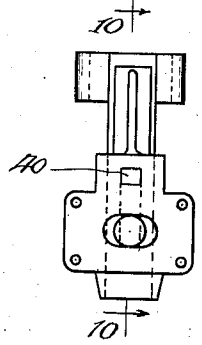
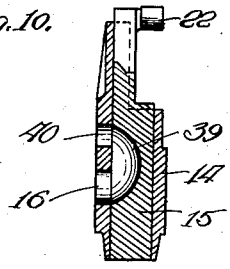


Fig. 10.



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Patented Jan. 19, 1926.

1,570,151

UNITED STATES PATENT OFFICE.

AUGUST HOLMQUIST, OF HOOPESTON, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SPRAGUE-SELLS CORPORATION, OF HOOPESTON, ILLINOIS.

CAN-FILLING MACHINE.

Application filed April 26, 1920. Serial No. 376,565.

To all whom it may concern:

Be it known that I, AUGUST HOLMQUIST, a citizen of the United States, residing at Hoopeston, in the county of Vermilion and State of Illinois, have invented new and useful Improvements in Can-Filling Machines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to can filling machines, having particular relation to machines of the character designated wherein substantially all of the operations are automatic including the can-supply means, the measuring means, and the can-filling means, and it has for its object to provide means in combination with a machine of this character whereby material will not be supplied from the can-filling means unless an empty can properly co-operates therewith, thus preventing the spilling and consequent waste of material when the latter circumstance does not obtain.

For a better understanding of my invention, reference may be had to the accompanying drawings in which:

Fig. 1 is an elevational view, partially in section, of a machine embodying my invention;

Fig. 2 is a plan sectional view of my machine taken on the line 2—2 of Fig. 1, only the supply vat and particular portions of the can-filling means being shown, and the parts above the line 2—2 being removed;

Fig. 3 is an enlarged elevational sectional view of the can-filling control mechanism and supply vat taken on the line 3—3 of Fig. 2;

Figs. 4 and 5 are plan and elevational views, respectively, of a supply tank and a plunger-operating track;

Fig. 6 is an elevational view illustrating the manner in which the can-control trigger is supported in my machine;

Figs. 7 and 8 are elevational, detail views of one of the switches used in connection with the plunger operating track;

Fig. 9 is an elevational view of a filling nozzle and a plunger viewed from the side that fits to the supply tank;

Fig. 10 is an elevational sectional view taken on the line 10—10 of Fig. 9 showing the measuring means and the supply vat connected by a by-pass;

Fig. 11 is a view similar to Fig. 10 showing the plunger in its uppermost position and the discharge port from the measuring means open; and,

Fig. 12 is a plan sectional view taken on the line 12—12 of Fig. 11.

In machines of the character above designated it has heretofore been a matter of considerable difficulty to prevent the spilling and consequent waste of material when the automatic can-supply and can-filling mechanisms did not properly synchronize. Particularly is this waste noticeable in machines which are entirely automatic in operation.

In machines of the latter character a supply vat is usually provided whence material is supplied to a plurality of measuring devices, these latter being capable of any desired adjustment. Furthermore, the machines are so constructed and so operated that the material which has been measured is automatically discharged from such devices into empty cans which are automatically supplied to the machine, and which, of course, must closely co-operate with the can-filling means communicating with the measuring devices.

It frequently happens that, through some mischance, cans are not supplied in the proper relation to the filling means. I am not aware, however, that any attempt has heretofore been made whereby upon the failure of the can-supply, the can-filling means is automatically closed. The reason for this is more or less obvious inasmuch as the discharge of the material from the automatic measuring means is positive and tends to take place irrespective of the can supply. If it were attempted, therefore, to stop this discharge the entire structure of the measuring means would have to be re-organized. As above indicated such re-organization, in this type of machine, has not been heretofore attempted.

The primary object of my invention, therefore, is to provide means in combination with an automatic can-filling machine

whereby the material which is normally supplied to cans will not be wasted upon the failure of said can supply. I so arrange these means that a re-organization of the entire machine is not necessary, and, therefore, radically reduces the cost of producing such an automatic "no-can, no-fill" machine.

In order to attain this last object I provide means, controlled by the can supply, whereby the material in the measuring means, which upon discharge therefrom would normally be supplied to a co-operating can, is returned to the supply vat whence it came, if a can does not co-operate with the filling means.

Other objects of my invention will be more clearly understood after a description of a machine embodying my improvement and will, therefore, be set forth after my machine has been described and its operation explained.

Referring now to the drawings:

A base standard 1 furnishes the primary support for a can filling machine. A secondary support 2 and an upwardly extended column member 3 serve to support a cooker vat 4. Extending into the vat 4 and journalled in a portion of the support 2, is a shaft 5 which is rotated through intermeshing gears 6, and serves to agitate the material in the cooker 4. A shaft 7 to which is secured one of the gears 6 also carries a gear 8 which intermeshes with a gear wheel 9.

A supply vat 10 is so associated with the cooker 4 that it may be filled with material through a valve 11. To the bottom of the tank 10 are attached a plurality of measuring cylinders 12 having pistons 13 reciprocating therewithin. On the outside wall of the vat or tank 10 are mounted an equal number of discharge nozzles 14 in which are positioned plungers 15, the discharge nozzles 14 communicating with the measuring cylinders 12 through discharge ports 16. In the bottom of the tank 10 is a non-rotating cut-off plate 17 which, as shown in Fig. 2, has a portion cut away leaving an irregular opening whereby one or more of the measuring cylinders may be in direct communication with the tank 10, said measuring cylinders being successively placed in communication with the latter by the rotation thereof.

The tank 10 with the above described associated equipment is mounted on a center shaft 18 which is keyed to the gear wheel 9, whereby the tank and its equipment may be rotated. As this rotation takes place the pistons 13—13 are reciprocated through connecting rods 19—19 carrying rollers 20—20 which engage an inclined stationary cam 21. As the measuring cylinders 12 are passing the opening in the cut-off plate 14, the pistons 13 are at the lowest point of the stationary cam 21 and the material in the tank 10 flows into the cylinders 12. The cam 21 is adjustable whereby the stroke of the pistons 13 and consequently the amount of material measured into the cylinders 12, may be adjusted.

The plungers 15 are provided at their upper ends with rollers 22 which are adapted to engage a plunger operating trackway 23, the latter comprising a plurality of courses 24 and 25, a switching device 26 which may be termed the up-stroke switch and a switching device 27 which may be designated the down-stroke switch.

A switch operating lever 28 is attached to, and adapted to operate, the switch member 26 through a bell crank 29 and a link 30. A supporting bracket 31 is attached to a vertically extending member 32 which is maintained stationary and may be secured to the body of the machine in any desired manner.

An arcuate member 33 is positioned at the lower end of the lever or trigger 28 and is adapted, upon engagement with a cam 34, to be forced outwardly thereby against the tension of the spring 35 and to thereby determine the position of the switch 26. It will be noted that this arcuate member 33 may be adjusted in position with respect to the side of the tank 10 through means indicated at 36, the can contact member 33 being adapted in this manner to be adjusted for cans of any size.

It will be understood that the cans are so positioned with respect to the tank 10 that they rotate therewith and in co-operation with the companion filling nozzles 14, whereas the can operated, switch controlling means together with the two-course track remains stationary.

When the plunger roller 22 encounters the switch 26 in its closed position, after the latter has been set by predetermined conditions, said roller 22 rides up on to the upper course 25 and thereafter again descends to the lower track via the switch 27. However, if the switch 26 is open, that is, if a can is not present to receive the material expelled from the associated measuring device, the roller 22 follows the lower track course and no movement is imparted to the plunger 15. When the roller in the latter case encounters the down-stroke switch 27 it forces the latter aside because of a cam shaped surface 38 which forms the interior portion of the switch 27. Inasmuch as this switch is pushed aside against the action of a spring 37 it will be understood that as soon as the roller passes on to the normal lower track, the down-stroke switch is again set in such position as will enable the roller, when traveling on the upper track course, to descend smoothly to the lower track.

Referring now to Figs. 3, 9, 10, 11 and 12, the specific construction of the plungers and the manner in which the latter are reciprocated to co-operate with the discharge ports 16 will be explained.

As best shown in Figs. 10, 11 and 12 the plungers are provided with a concavity or a re-entrant portion 39, opening on the side of the plunger which is in proximity to the side of the supply tank 10. From a consideration of the four figures above mentioned it will be apparent that when a plunger 15 is in its lowest position (Fig. 10) the concave portion comprises a by-pass between the discharge port 16, leading from the measuring cylinder, and a port 40 at the bottom of the tank 10, it being understood that there are as many of these ports 40 as there are plungers and co-operating measuring means.

Fig. 9 illustrates the manner in which the filling spout 14 is attached to the body of the tank 10.

In Fig. 11 the plunger is shown in its uppermost position or that position in which it remains while the roller 22 rides upon the upper track course 25. In this position it will be seen that the discharge port 16 is in communication with the filling spout 14 and that the solid portion of the plunger closes the auxiliary port 40 in the tank 10.

It will be noted in the foregoing description that I have not specifically described a means for automatically supplying cans to the machine, nor have I referred specifically to the apparatus whereby the filled cans are automatically withdrawn from the rotating platform upon which they rest while they are being filled. I do not believe these descriptions to be necessary, inasmuch as the subjects-matter of such apparatus form no part of my present invention. I have, however, shown, in connection with the base portion of the tank 10, can-holding wings 41 and 42 which function to maintain the can in correct position under the filling spouts 14 during their travel with the tank 10. In Fig. 1 to the left of the wing 42 and designated by the numeral 43, I have shown an automatic mechanism for withdrawing the filled cans from under the spout 14, it being noted that at this point the discharge port 16 is closed and that the piston 13 is in its lowermost position.

Having described one embodiment of my invention the operation thereof is as follows:

Assuming the tank 10 to be filled with material which is to be supplied to the cans and it further being understood that the tank 10 with its associated equipment is rotated through suitable gearing, the measuring cylinders 12 are filled as they come from under the stationary cut-off plate 17 and are thereby placed in direct communication with the tank 10. The mechanism is so synchronized that during the time the measuring cylinders are uncovered by the cut-off plate the pistons 13 are in their lowermost positions.

As the cut-off plate again covers the tops of the measuring cylinders the pistons 13 start upwardly because of the action of the cam 21 and the piston rollers 20. The up-stroke of the pistons 13 forces the material in the measuring cylinders to pass outwardly through the discharge ports 16 and downwardly through the filling spouts 14. This action can best be understood from a consideration of Fig. 3.

It is apparent that this same sequence of events would occur irrespective of whether or not a can is positioned beneath the filling spout, if no means were provided whereby the can supply controlled the opening and closing of the filling spouts. As before pointed out, when a plunger roller 22 engages the upper track during a major portion of its travel, the associated plunger will be held in its uppermost position during this time and communication between the discharge ports 16 and the filling spouts 14 will not be interrupted. On the other hand, if the plunger roller remains on the lower track course during the same period of travel the associated plunger will remain in its lowermost position and the by-pass portion 39 formed therein will establish communication between the discharge ports 16 and the port 40 in the tank 10.

With the latter conditions existing it is apparent that the up-stroke of the piston 13 will not discharge the material in the measuring cylinder but will force it back into the supply tank 10. This operation results in substantially no waste of material because, when a can is not properly positioned beneath the filling spout 14, the material in the measuring means is returned to the supply tank whence it came.

Referring now to the various detail views of the track courses, the switches therebetween, and the can-controlled means for setting the switches, the manner in which the can supply determines the position of the plungers 15 will be described. In Figs. 3 and 4 it will be seen that the arcuate member 33 is normally tilted inwardly into the path of the cans through the tension of the switch 35. As a can engages the flaring end of the member 33 and, by the rotation of the platform upon which the can rests, moves into close contact with the inner arcuate portion of the member 33, the lever 28 is tilted against the action of the spring 35 and the switch 26 is pressed toward the tank wall 10 whereby the plunger roller 22 is constrained to move from the lower trackway course to the upper trackway course. As before pointed out this sequence of operations results in the plunger 15 assuming its uppermost position whereupon the filling

spout 14 is opened and the material, which is forced outwardly by the discharge stroke of the piston 13, is received in the can which has co-operated to set the switch 26 in the aforesaid position. As long as cans are delivered in correct co-operating position with the filling nozzles 14, the member 33 is maintained in tensional contact therewith and the switch 26 remains closed.

When no can is supplied in the above mentioned co-operative position, the spring 35 will cause the member 33 to move inwardly whereupon the lever 28 will move the switch 26 outwardly and the plunger roller 22 will continue in engagement with the lower track course during substantially its entire rotation. As above pointed out, the plungers 15 remain in their lowermost positions during the travel of the rollers 22 on the lower track course. Therefore, the by-pass portion 39 establishes communication between the port 40 and the discharge port 16 whereby, upon the positive discharge stroke of the piston 13, the material in the measuring cylinder is forced back into the tank 40 and the excessive waste heretofore occasioned by the failure of the can supply is eliminated.

While I have shown but one embodiment of my invention it is apparent that many modifications therein may occur to those skilled in the art, and I desire, therefore, that my invention be limited only by the showing of the prior art and by the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a can-filling machine, a material tank having apertures therein, measuring devices adapted to be filled therefrom, a cut-off plate to open and close said apertures, means for filling cans from said measuring devices, and means normally operating, upon the absence of a can, to permit the material in a measuring device to be forced back into said tank, while the aperture through which the material entered said device is closed by said cut-off plate.

2. In a can-filling machine, a revoluble material tank having apertures therein, a stationary cut-off plate for opening and closing said apertures, measuring devices having pistons reciprocating therein, the material from said tank being supplied to said devices and on top of said pistons when said apertures are uncovered by said plate, discharge passages for delivering the material from said measuring devices to the cans, means for moving said pistons to discharge said measured material into cans when the latter are correctly positioned, and automatic means to prevent the discharge of said material through said discharge passages into the cans upon the discharging movement of the pistons when no can is present.

3. In a can-filling machine, a revoluble material tank, a plurality of measuring devices connected thereto, vertically reciprocable pistons in said devices, means for supplying material to said devices above said pistons, discharge passages for delivering the material from said measuring devices to the cans, and automatic means operating as the tank continues its rotation for preventing the discharge of material through said discharge passages into the cans when the cans are not in position.

4. In a can-filling machine, a revolving material tank, a plurality of measuring devices connected thereto, vertically reciprocable pistons in said devices, means for supplying material to said devices above said pistons and for cutting off said supply when said devices are filled, discharge passages for delivering the material from said measuring devices to the cans and means comprising a vertically reciprocating valve having a by-pass therein for preventing the discharge of material through said discharge passages into the cans when the cans are not in position while said first named means are closed and for returning the material in said measuring device to the tank.

5. In a can-filling machine, a revolving material tank, a plurality of measuring devices connected thereto, vertically reciprocable pistons in said devices, means for supplying material to said devices above said pistons, and means for returning the material in said devices to the tank when cans are not in position.

6. In a can-filling machine, a material tank having apertures therein, measuring devices connected thereto, a cut-off device for opening and closing said apertures to fill said measuring devices, auxiliary ports in said tank, can-filling ports in said measuring devices, and means for connecting said ports at times when said apertures are closed.

7. In a can-filling machine, a material tank having apertures therein, measuring devices connected thereto, a cut-off device for opening and closing said apertures to fill said measuring devices, auxiliary ports in said tank, can-filling ports in said measuring devices, means for expelling the material from said devices into cans after said apertures have been closed, and means comprising by-passes adapted to connect said ports upon the absence of a can whereby said expelling means forces the material in the affected device back into the tank through said by-pass.

8. In a can-filling machine, a material tank having apertures therein, measuring devices connected thereto, a cut-off device for opening and closing said apertures to

fill said measuring devices, an auxiliary port in said tank, a can-filling port in said measuring device, means for expelling the material from said device into a can after said aperture has been closed, and means comprising a vertically reciprocable plunger embodying a by-pass normally connecting said ports upon the absence of a can whereby said expelling means forces the material in the affected device back into the tank through said by-pass.

9. In a can-filling machine, a supply vat measuring means, means for normally supplying material from said vat to said measuring means, can-filling means communicating with said measuring means, closure members for said can-filling means, said members embodying by-pass channels, and means governed by the can-supply for placing said by-pass channels in communication with said vat and said measuring means whereby the material in the latter may be returned to said vat while the normal supply means therebetween is closed.

10. In a can-filling machine, a supply vat, measuring means, means for normally supplying material from said vat to said measuring means, can-filling means communicating with said measuring means, closure members for said can-filling means, said members embodying by-pass channels which in one position of said member afford communication between said measuring means and said vat whereby the material may be returned to the vat, and means governed by the can-supply comprising a trigger adapted to press against said cans for placing said by-pass channels out of communication with said vat and said measuring means whereby the material in the latter may not be returned to said vat while the normal-supply means therebetween is closed.

11. In a can-filling machine comprising a revoluble supply tank, a plurality of vertically disposed cylinders underneath said tank and revoluble therewith, a stationary cut-off plate for controlling the communication between said tank and cylinders, pistons operating in said cylinders for withdrawing material from said reservoir and discharging it from said cylinders, means for conveying cans around with said cylinders to receive the material discharged therefrom, discharge passages for delivering the material from said cylinders to the cans, and automatic means operating while the tank is revolving whereby, if a can is not present to receive said material, the discharge passages will be closed.

12. A can filling machine comprising a revoluble tank, a plurality of vertically disposed cylinders underneath said tank and revoluble therewith, a stationary cut-off plate for controlling the communication between said tank and cylinders, pistons operating in said cylinders for withdrawing material from said reservoir and discharging it from said cylinders, and a two-way valve for each of said cylinders for controlling the discharge therefrom, said valve when in one position discharging the material into a receptacle, and when in the other position returning the material into the tank.

13. A can filling machine comprising a revoluble tank, a plurality of vertically disposed cylinders underneath said tank and revoluble therewith, a stationary cut-off plate for controlling the communication between said tank and cylinders, pistons operating in said cylinders for withdrawing material from said reservoir and discharging it from said cylinders, a two-way valve for each of said cylinders for controlling the discharge therefrom, said valve when in one position discharging the material into a receptacle, and when in the other position returning the material into the tank, and means for controlling said valve comprising a can-controlled member.

14. A can filling machine comprising a revoluble tank, a plurality of vertically disposed cylinders underneath said tank and revoluble therewith, a stationary cut-off plate for controlling the communication between said tank and cylinders, pistons operating in said cylinders for withdrawing material from said reservoir and discharging it from said cylinders, a two-way valve for each of said cylinders for controlling the discharge therefrom, said valve when in one position discharging the material into a receptacle, and when in the other position returning the material into the tank, and means for controlling said valve comprising a trackway having a plurality of courses and a can-controlled switch for determining which of said courses is effective.

In witness whereof, I have hereunto subscribed my name.

AUGUST HOLMQUIST.