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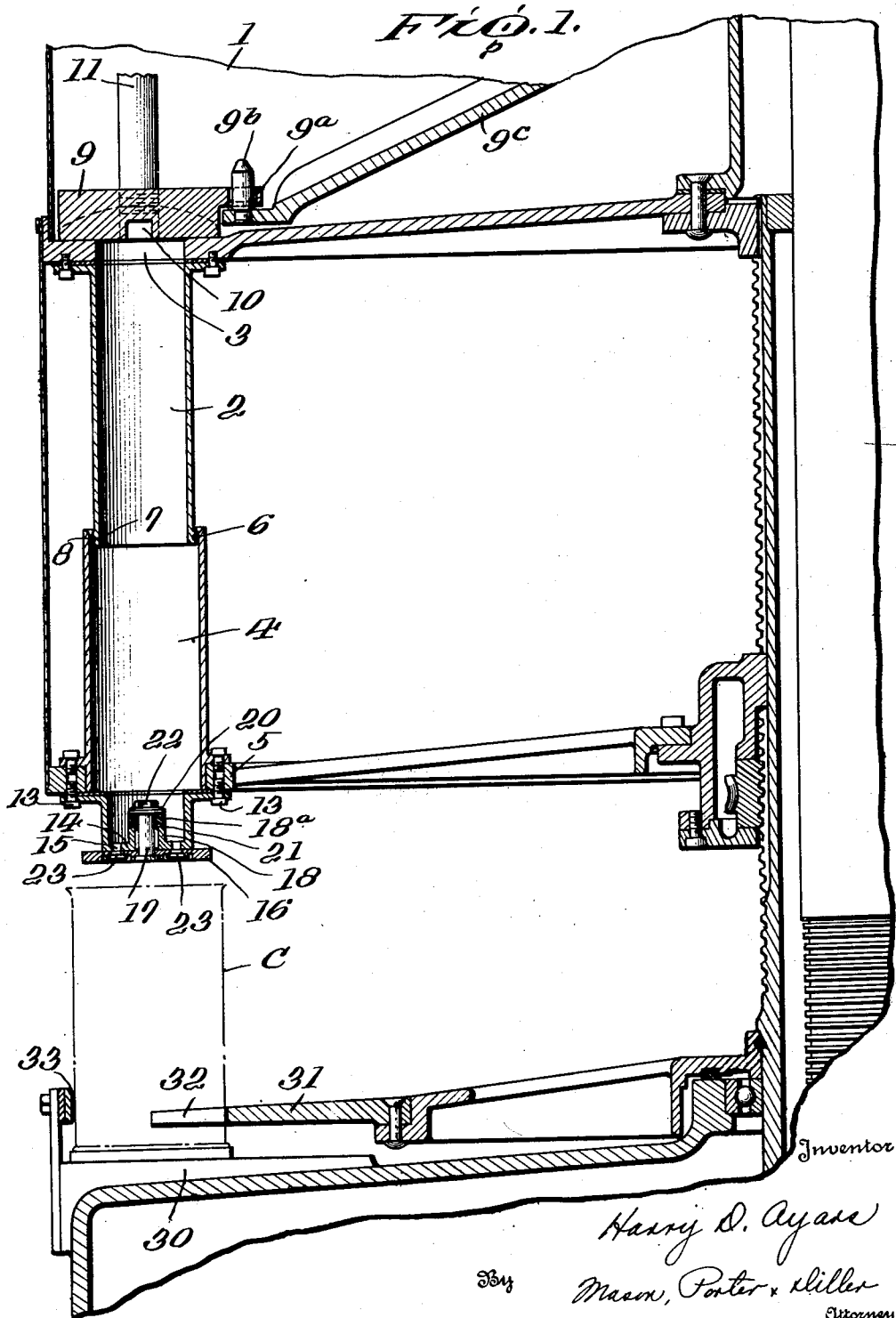
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2,362,793

MACHINE FOR FILLING CANS

Filed Jan. 4, 1943

7 Sheets-Sheet 1



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MACHINE FOR FILLING CANS

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FIG. 2.

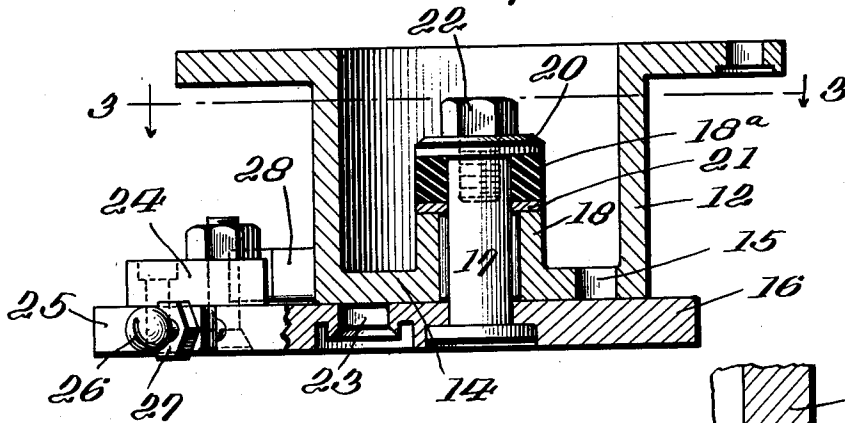


FIG. 1a

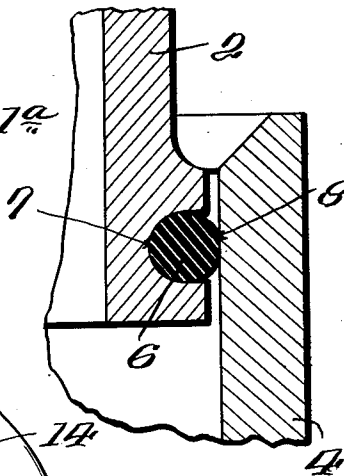
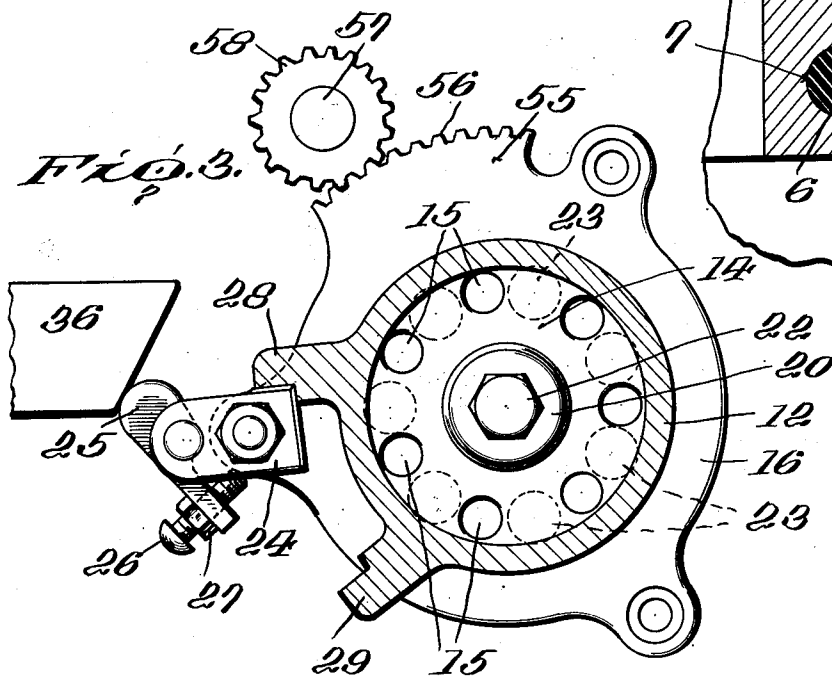


FIG. 3.



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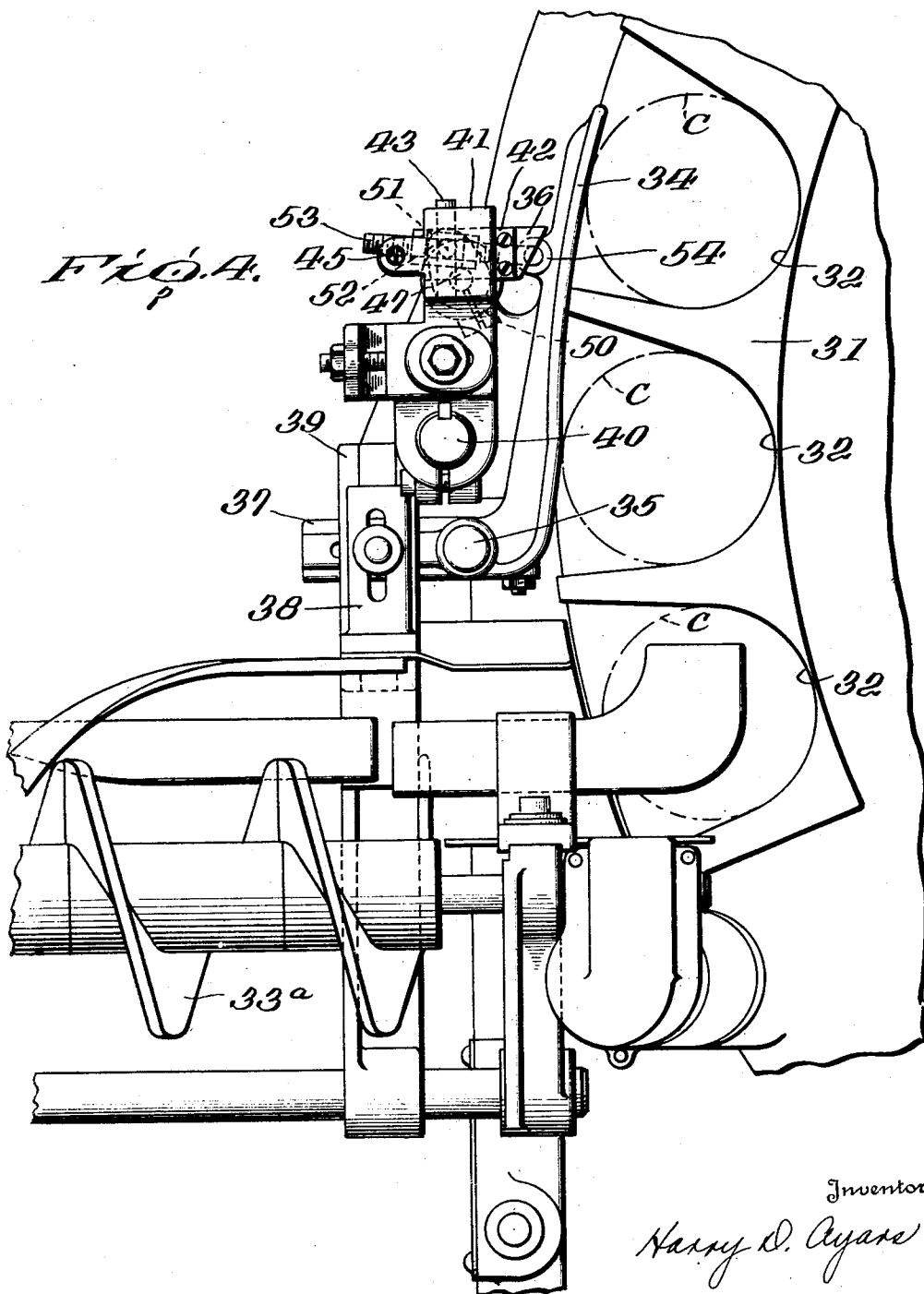
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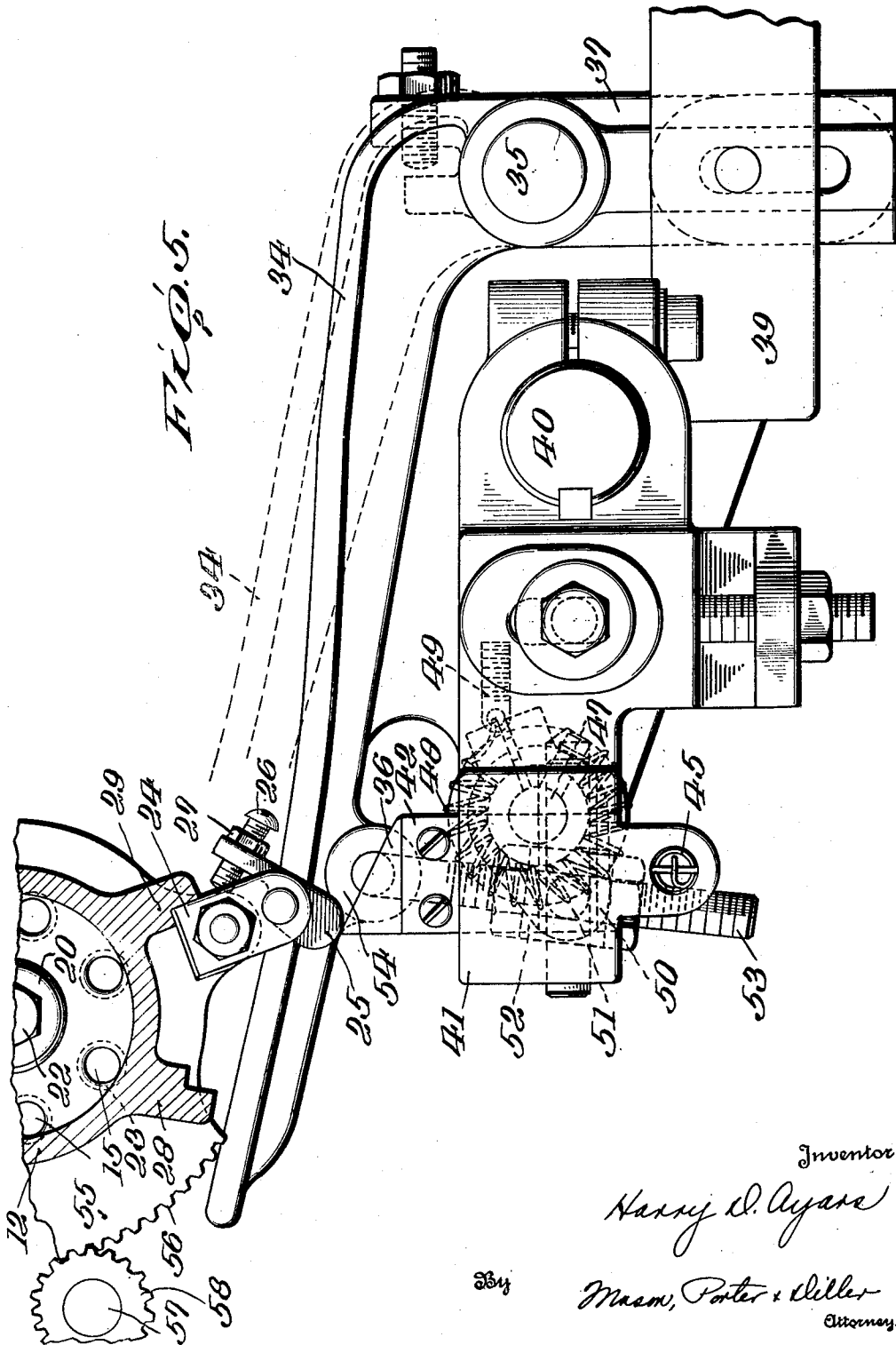
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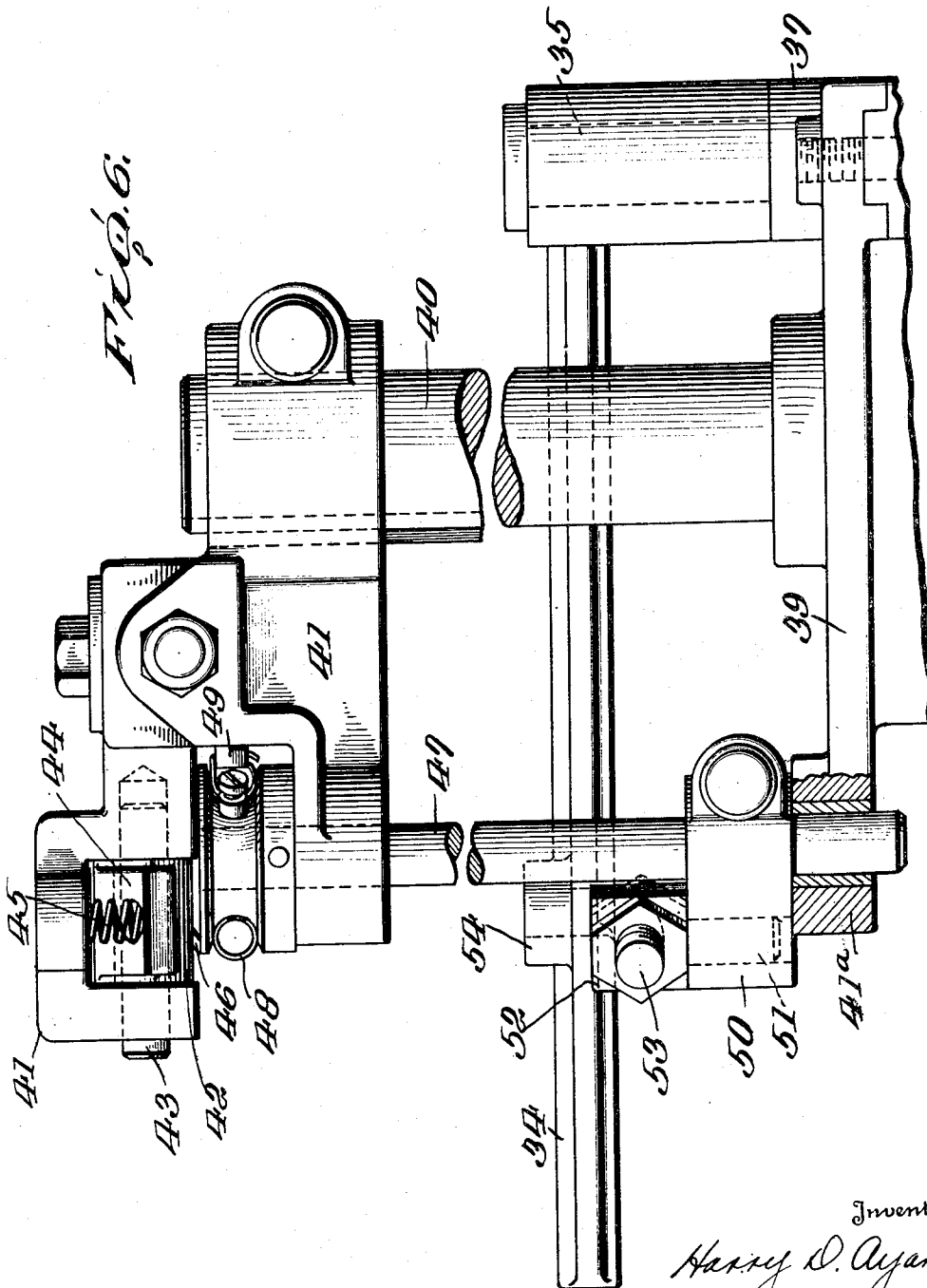
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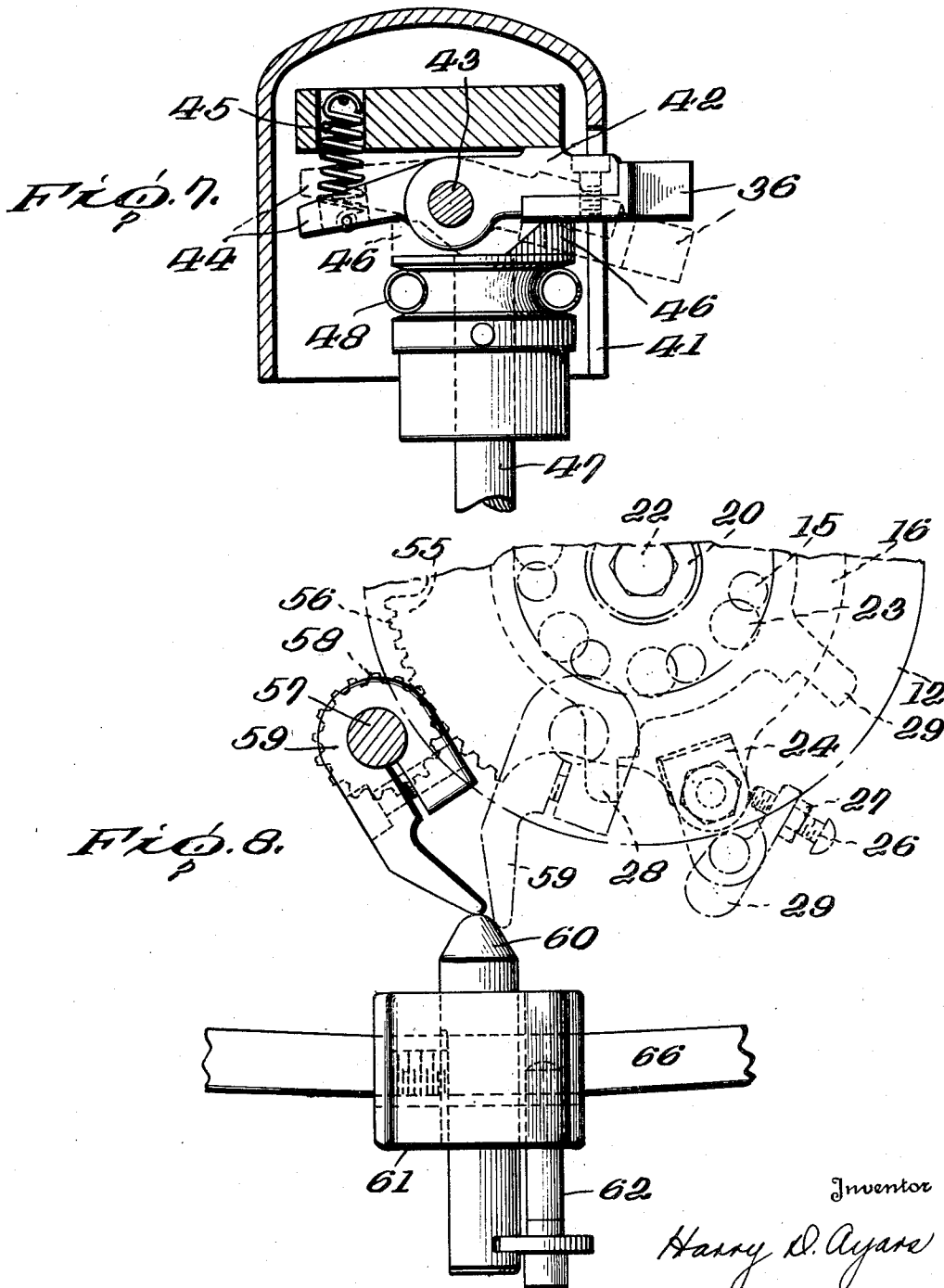
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MACHINE FOR FILLING CANS

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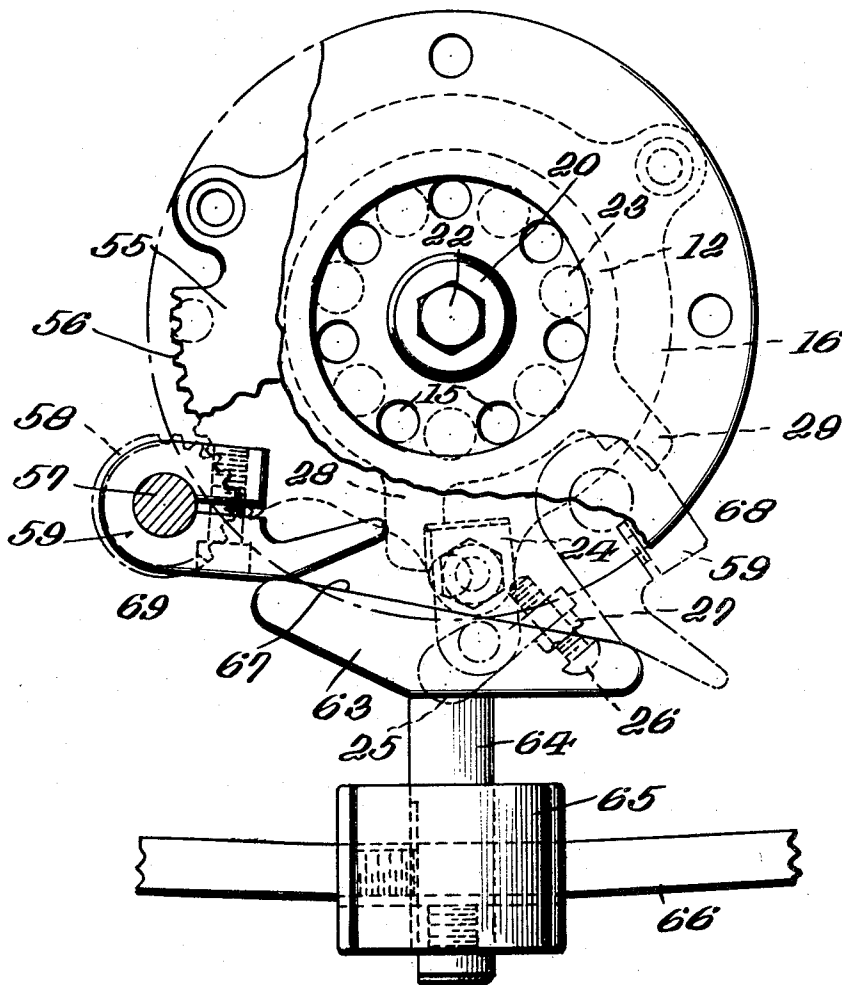
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FIG. 9.



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UNITED STATES PATENT OFFICE

2,362,793

MACHINE FOR FILLING CANS

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Application January 4, 1943, Serial No. 471,272

5 Claims. (Cl. 226—98)

The invention relates to new and useful improvements in a machine for filling cans, and more particularly to a machine provided with measuring pockets for determining the quantity of liquid product discharged into a can.

An object of the invention is to provide a control valve for the measuring pocket of the filling machine which is opened by the can placed beneath the measuring pocket, which control means includes a member contacting with the valve which is positioned by an actuating cam which positively insures the movements of the valve to full open position.

A further object of the invention is to provide a valve control mechanism of the above type, wherein the valve is opened through contact with a cam rail shiftable to operative position by a can placed beneath the measuring pocket.

A still further object of the invention is to provide a control mechanism including a rotating cam so disposed as to contact with the cam rail for shifting the same into operative position, which cam positively holds said cam rail in its operative position.

A still further object of the invention is to provide a means for returning the actuating cam to its initial set position, provided no can is placed beneath the measuring pocket to receive the liquid product, thus permitting the cam rail to shift to inoperative position.

These and other objects will in part be obvious and will in part be hereinafter more fully described.

In the drawings:

Figure 1 is a view through a portion of a can filling machine showing the measuring pocket, the can to be filled and the control valve for controlling the discharge of the liquid product from the measuring pocket into the can, the valve being shown in open position.

Fig. 1a is a detail showing the connection between the telescoping sections of the measuring pocket on an enlarged scale.

Figure 2 is an enlarged detail in vertical section of the control valve for controlling the discharge of the liquid product into the can, the valve being in closed position.

Figure 3 is a sectional view on the line 3—3 of Figure 2, also showing the cam rail which contacts with the valve for rotating the same to open position.

Figure 4 is a plan view of a portion of a filling machine and showing the means for shifting the cam rail into position for opening the valve when

there is a can placed beneath the measuring pocket to be filled.

Figure 5 is an enlarged detail of the valve control means in position for contacting with the valve for opening the same, also showing the valve moved to open position by the cam rail.

Figure 6 is a side view of the means controlled by the cam for shifting the cam rail into operative position.

Figure 7 is a detail showing the cam for shifting the cam rail, said cam rail being shown in full lines in operative position and in dotted lines in inoperative position.

Figure 8 is a view showing in plan the means for moving the valve to a partially closed position so that the final filling of the can is accomplished by dribble streams.

Figure 9 is a plan view showing more or less diagrammatically the means for closing the valve.

The can filling machine embodying the improvements includes a filling tank 1 which is mounted for rotation about a center column. Associated with the tank are closely spaced measuring pockets which receive the liquid product from the tank and discharge the same into the can. Each measuring pocket includes two telescoping members, the inner telescoping member 2 is secured by suitable bolts in alignment with an opening 3 leading to the tank. The other telescoping section 4 is supported by a spider 5 rotating in timing with the tank. The tank is shiftable relative to the spider for moving the telescoping sections of the measuring pocket relative to each other for varying the capacity of the measuring pocket. In order to provide a liquid tight joint for the telescoping sections of the measuring pocket, the inner telescoping section is provided with a groove in which is placed an endless packing gland, preferably of rubber.

In Figure 1a, there is shown on a large scale this packing gland at 6. The recess in the wall of the inner telescoping section is indicated at 7. The packing gland projects a slight distance from the outer wall of the inner telescoping section and makes contact with the inner wall of the outer telescoping section. The line of contact is indicated at 8 in Figure 1a. This line of contact is of some width so that the joint between the two sections is liquid tight, and it will remain so a there is little or no wear on this packing gland.

There is a cut-off plate mounted in the tank so that it remains stationary while the tank rotates. A section through the cut-off plate is indicated at 9. This cut-off plate closes the upper end of the measuring pocket and said cut-

off plate is provided with an arcuate groove 10 in its under face. A vent pipe 11 is attached to this cut-off plate 9 and is connected to this groove in the under side of the plate so that when the opening in the tank moves underneath the plate, there will be a vent connection to supply air to the pocket and provide free discharge of the liquid product from the pocket into the can. This pipe, of course, while it is in the tank, extends to a point above the maximum high level of the liquid product in the tank. This arcuate groove at the under side of the cut-off plate, of course, terminates short of the ends of the plate, so that no liquid product can pass into the groove and thus be discharged into the measuring pocket. The cut-off plate is preferably mounted so that it floats and is held in position to cut-off the flow of the liquid product into the measuring pocket by its weight.

Secured to the spider 5 and the lower end of the telescoping section 4 is a valve housing 12. This valve housing is secured to the spider by suitable bolts 13, 13 so that it can be removed as a unit, if desired. The valve housing at its lower end is closed by a plate 14. There are a series of openings 15, 15 through this plate at the lower end of the valve housing. As shown in Figure 3, there are seven of these openings. The valve proper is indicated at 16 and is formed from a plate which makes very tight movable contact with the under side of the valve housing. There is a stem 17 passing through the valve plate and through a hub 18 on the inside of the plate 14. A suitable bushing is placed in this hub so that the valve stem is free to rotate in the bushing. The stem projects above the hub. Mounted on the stem just above the upper end of the hub is an elastic collar 18a, preferably made of rubber.

A plate 20 mounted on the stem contacts with the upper side of this elastic collar, and there is a metal washer 21 between the collar and the hub so as to take the wear incident to the rotation of the valve. A bolt 22 clamps this plate 20 against the elastic collar, and this elastic collar serves as a means for holding the valve plate 16 in liquid tight contact with the under side of the valve housing. This elastic cushion does not impart any off flavor to the liquid product contacting therewith, and inasmuch as it is of the same diameter as the hub and the plate bearing thereon, a mounting for the valve is provided which can be kept clean and in sanitary condition.

The valve plate 16 is provided with seven openings which are adapted to be brought into alignment with the openings 15. One of these openings is indicated at 23 in Fig. 2 of the drawings. It is noted that the lower edge of the opening 23 is tapered outwardly and that there is a recess surrounding the extreme lower edge of this tapered surface.

Discharge openings in the valve are of the type shown in detail in my prior Patent No. 2,280,614, granted April 21, 1942.

Fixed to the valve plate 16 is an arm 24. Said arm is bolted to an ear projecting laterally in the plane of the plate. Mounted on this arm is a shiftable valve actuating member 25. Said valve actuating member is pivoted to the arm and may be shifted to different set positions by a screw 26 passing through the inner end of the valve operating member. A lock nut 27 serves to secure this screw in a set position. The valve housing is provided with integral stop arms 28

and 29. When the valve is rotated to the position shown in Figure 3, then the openings in the valve are out of alignment with the openings in the bottom of the valve housing. At this time the arm 24 is substantially in contact with the stop arm 28. When the valve is rotated so as to bring this arm 24 to a position in contact with or near contact with the stop arm 29, then the openings in the valve are brought into full alignment with the openings in the bottom of the housing.

The measuring pockets are secured to the tank and rotate with the tank. A can body C is shown in Figure 1 supported on a plate 30 and moved along said plate by a turret member 31, which moves in timing with the tank. This turret member is provided with pockets 32 and the cans are fed into the pockets and held therein by a guide rail 33. The cans and the measuring pockets all move as a unit during the filling thereof. Means are provided for opening the valve during the travel of the can and measuring pocket thereabove. This means for opening the valve is shown in detail in Figs. 4 to 7 inclusive.

As shown in Figure 4, the cans to be filled are fed by timing screw 33a in an upright position along guide rails into the pockets 32 of the turret 31 as the turret passes the can feeding means. The can in the pocket contacts with a shoe 34.

This shoe is pivoted at 35 and the can bearing against this shoe will swing the same in a counterclockwise direction, as viewed in Figs. 4 and 5. Normally this shoe is held projected over the turret pockets, as shown in dotted lines in Fig. 5, and when there are cans in the pockets they will press the shoe to the full line position where it remains as long as the pockets are filled with cans. This movement of the shoe to the full line position shown in Fig. 5 operates through a train of mechanism to position a cam rail 36 in the path of movement of the valve actuating member 25. When the valve has been shifted to full open position, the valve actuating member will pass off from the cam rail and the valve will stay in this open position until it is moved by further controlling devices to a partially closed position, and then to a fully closed position.

The shoe 34 is pivoted at 35 to a supporting plate 37, which plate 37 is adjustably attached to a frame member 38, see Fig. 4. Mounted on the frame of the machine is a bracket 39. Supported by this bracket 39 is an upright rod 40 carrying a bracket 41 at the upper end thereof. This bracket 41 supports the cam rail 36. The cam rail 36 is fixed to an arm 42 mounted on a shaft 43, which in turn is mounted for oscillation in the upper portion of the bracket 41. Also mounted on this shaft 43 is an arm 44 which shifts the arm 42. A spring 45 is connected to this arm 44 and to the upper part of the bracket 41 and normally turns the arm 42 carrying the cam rail to the dotted line position, and when this cam rail is in the dotted line position, it lies below the path of travel of the valve operating member 25. When shifted to the full line position shown in Fig. 7, then said cam rail will lie in the path of travel of this valve controlling member 25. The arm is lowered by means of the spring and it is raised by a cam 46 carried by a shaft 47. A spring 48 lies in a groove in this cam and is attached thereto so as to turn the cam in a clockwise direction, as viewed in Fig. 5. The spring at one end is attached to the cam carry-

ing member on the shaft, and at its other end it is anchored to a bolt 49.

The shaft 47 is journaled in the bracket 41 at the upper end and in a member 41a carried by the supporting bracket 39 at the lower end. Attached to this shaft is a collar 50 having a laterally projecting portion, in which a pin 51 is mounted. This pin is rigidly attached to a block 52 at its upper end. Extending through this block is a rod 53, the inner end of which is bent upwardly and extends into an eye 54 carried by the shoe 34. This block 52 lies between nuts which are threaded on the rod 53 and the rod can be shifted endwise in the block and locked in a fixed position therein. As the shoe moves outwardly through this rod, it will oscillate the shaft 47 in a counter-clockwise direction, as viewed in Fig. 5. This rotation of the cam 48 in a counter-clockwise direction raises the arm 42 and places the cam rail 36 in the path of the valve control member 25. When there is no can in a pocket to hold this shoe in position with the cam supporting the cam rail for operation on the valve controlling member, then the spring 43 will rotate the cam in a clockwise direction so as to release the cam rail and permit it to drop through the action of the spring 45 thereon. As the cam is returned, the shoe is moved inward by the rotation of the shaft 47.

From the above it will be apparent that when the pockets in the filling machine are supplied with cans, they operate in succession on this shoe 34 and shift the cam rail into position so that the valves will be open one after another and the liquid product discharged into the cans. Just as soon as the supply of cans give out or is stopped, so that there is no can placed in the turret of the filling machine, then this shoe may be swung inward and the cam rail released so that it will drop out of the path of the control member for the valve and the valve will not be opened. In other words, if there is no can to be filled, then the valve is not opened, and the liquid product will remain in the measuring pocket of the filling machine.

As the measuring pockets and the cans are travelling after the valve is open, the liquid product continues to flow into the can and the valve remains fully open, until the can is nearly filled. Means is provided for partially closing the valve, so that the final filling of the can is accomplished by a plurality of dribble streams. This partial closing of the valve for the final filling is similarly shown and described in my prior patent supra.

Briefly, the mechanism for accomplishing this result is as follows: The valve plate 16 has a rearwardly projecting portion 55 which is provided with gear teeth indicated diagrammatically at 56. Mounted on a bracket carried by the valve housing is a shaft 57 which carries a gear wheel 58 meshing with the gear teeth in the segment. When this gear wheel 58 is rotated in a counter-clockwise direction, it will move the valve from full open position toward a fully closed position. Mounted on the upper end of the shaft 57 is a control member 59. When the valve is in fully open position, this control member is in the position shown in dotted line in Fig. 8.

Mounted on a rail concentric to the axis of rotation of the filling machine is a trip lug 60. This trip lug is mounted in a bracket 61 and is adjustable in and out by means of a micrometer screw 62 which holds the stop lug in a set position. As the travelling measuring pocket reaches

this stop lug 60, the valve control member 59 will contact therewith and be rotated to the full line position shown in Fig. 8. When in this position, the valve will be moved so as to partially close the openings and reduce the flow of liquid product into the can to dribble streams, some of which shoot directly into the can and others at an angle to the surface of the product in the can. These dribble streams continue until the can is filled to the proper level, and then the control member 59 contacts with a cam member 63 which is disposed along the path of travel of the cans and the measuring pockets of the filling machine. This cam member 63 is carried by a shank 64 mounted in a supporting block 65 adjustably carried by a supporting rail 66 which is concentric to the axis of rotation of the filling machine. When the control member 59 contacts with the inclined face 67 of this control cam 63, it will be rotated from the dotted line position 68 to the full line position 69, and during this rotation of the shaft carried by the control member 59 the valve will be moved to fully closed position.

It is thought that the operation of the valve and the valve controlling mechanism will be obvious from the description which has already been given. Briefly, it may be stated that when cans to be filled are placed in the pockets of the rotating turret of the filling machine beneath the measuring pockets, they are filled with the liquid product to be discharged into the cans, the valve will be automatically moved to full open position. This opening of the valve is controlled by the can through the mechanism which has been described in detail above. If there is no can to be filled, then the valve will not be open, and no liquid will be discharged from the measuring pocket. With the valve in full open position, the can and measuring pocket pass through their path of travel, and when the can is nearly filled, the control member 59 will function through contact with the lug 60 to partially close the openings in the valve and thus reduce the flow of liquid to a dribble stream. This brings the final fill to a proper level by easy stages and prevents any spilling, due to the splash of the discharge of the liquid product into the can. The amount of liquid placed in the can is determined by the measuring pocket, which may be adjusted as to capacity so that the can will be filled to the proper level. The valve remains open so as to discharge a dribble stream, until the entire liquid product is drained from the measuring pocket. The control valve 59 then is brought into contact with the control cam 63 and the valve completely closed, and it will remain in this closed position during the filling of the measuring pocket.

After the valve is closed, the opening at the upper end of the measuring pocket moves out from beneath the cut-off plate 9 and the pocket will fill with the liquid product. After a pocket is filled, then the opening leading thereto moves under the cut-off plate 9 so that further communication between the tank and the measuring pocket is cut off and this communication remains cut off while the contents of the measuring pocket is being discharged into the can. It is during this discharge of the contents of the measuring pocket into the can that air passes through the pipe 11 and into the arcuate recess 10 so that the measuring pocket is vented to permit easy and complete emptying of the same. The measuring pocket is, of course, completely filled when it reaches the position where the empty cans are placed in the turret pockets and the controlled

mechanism described above operates to open the valve for the next cycle of filling operations.

As noted above, this cut-off plate which extends only through the arc of the cycle of rotation of the filling machine for the discharge of the pockets into the cans is mounted so that it floats but is held from movement with the tank and the measuring pockets. As shown in Figure 1, the cut-off plate has projecting ears 9a which engage over studs 9b carried by a spider 9c which is mounted on the center column of the machine so that it does not rotate. These studs keep the cut-off plate from rotating and at the same time permit the plate to be easily removed from the machine for cleaning purposes. All that is necessary is to lift the plate out of the tank. When the plate is mounted so that it is held by gravity in contact with the bottom of the tank a film of the filling product will form beneath this plate so that the tank will move very freely beneath the cut-off plate and at the same time a perfect seal is maintained between the tank and the measuring pockets at the time of the emptying of the pockets. The pocket is completely filled when it reaches the position where the cans are placed in the turret pockets and the control mechanism described above operates to open the valve for the next cycle of filling operation.

It is obvious that many changes may be made in the details of construction without departing from the spirit of the invention, as set forth in the appended claims.

I claim:

1. A machine for filling cans comprising a supporting frame, a tank rotatably mounted in said frame, a plurality of measuring pockets associated with said tank and rotating therewith, a rotatable valve at the lower end of each measuring pocket for controlling the discharge of the pocket into a can, means rotating with the measuring pockets for placing the cans to be filled beneath the pockets, an arm carried by each valve, a control cam mounted on said frame and movable into and out of the path of travel of said arms, devices operated by the cans placed for filling for moving said control cam into the path of travel of the valve arms whereby the valves are moved in succession into open position, devices associated with each valve for moving the same toward closed position, said devices including an operating arm, a second control cam mounted on the frame and contacting with said operating arms in succession for moving the valve associated therewith to partially closed position when the can is nearly filled and a third control cam contacting with said operating arms in succession for fully closing each valve after its measuring pocket is emptied.

2. A machine for filling cans comprising a supporting frame, a tank rotatably mounted in said frame, a plurality of measuring pockets associated with said tank and rotating therewith, a rotatable valve at the lower end of each measuring pocket for controlling the discharge of the pocket into a can, means rotating with the measuring pockets for placing the cans to be filled beneath the pockets, an arm carried by each valve, a control cam pivotally mounted on said frame, a spring for moving said control cam out of the path of travel of said arms, a lift cam for moving said control cam into the path of movement of said arms, devices operated by the cans placed for filling for moving the lift cam so as to raise and hold the control cam in position for contact by said arms whereby the valves are moved in succession into open position.

3. A machine for filling cans comprising a supporting frame, a tank rotatably mounted in said frame, a plurality of measuring pockets associated with said tank and rotating therewith, a rotatable valve at the lower end of each measuring pocket for controlling the discharge of the pocket into a can, means rotating with the measuring pockets for placing the cans to be filled beneath the pockets, an arm carried by each valve, a control cam pivotally mounted on said frame, a spring for moving said control cam out of the path of travel of the arms, a lift cam for moving said control cam into the path of travel of the arms, a control arm yieldingly moved into the path of travel of the cans and means operated by said control arm when moved outwardly by the cans for actuating the lift cam to raise the control cam.

4. A machine for filling cans comprising a supporting frame, a tank rotatably mounted in said frame, a plurality of measuring pockets associated with said tank and rotating therewith, a rotatable valve at the lower end of each measuring pocket for controlling the discharge of the pocket into a can, means rotating with the measuring pockets for placing the cans to be filled beneath the pockets, an arm carried by each valve, a control cam mounted on said frame and movable into and out of the path of travel of said arms, devices operated by the cans placed for filling for moving said control cam into the path of travel of the valve arms whereby the valves are moved in succession into open position, each valve having a gear segment formed integral therewith, a gear meshing with said segment, a shaft carrying said gear and an operating arm carried by said shaft, a second control cam mounted on the frame and contacting with said operating arms in succession for moving the valve associated therewith to partially closed position when the can is nearly filled and a third control cam contacting with said operating arms in succession for fully closing each valve after its measuring pocket is emptied.

5. A machine for filling cans comprising a supporting frame, a tank rotatably mounted in said frame, a plurality of measuring pockets associated with said tank and rotating therewith, a rotatable valve at the lower end of each measuring pocket for controlling the discharge of the pocket into a can, means rotating with the measuring pockets for placing the cans to be filled beneath the pockets, an arm carried by each valve, a control cam mounted on said frame and movable into and out of the path of travel of said arms, devices operated by the cans placed for filling for moving said control cam into the path of travel of the valve arms whereby the valves are moved in succession into open position, devices associated with each valve for moving the same toward closed position, said devices including an operating arm, a second control cam mounted on the frame and contacting with said operating arms in succession for moving the valve associated therewith to partially closed position when the can is nearly filled and a third control cam contacting with said operating arms in succession for fully closing each valve after its measuring pocket is emptied, said second control cam being shiftable on the frame for varying the time of partially closing the valve relative to the filling of the can.

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