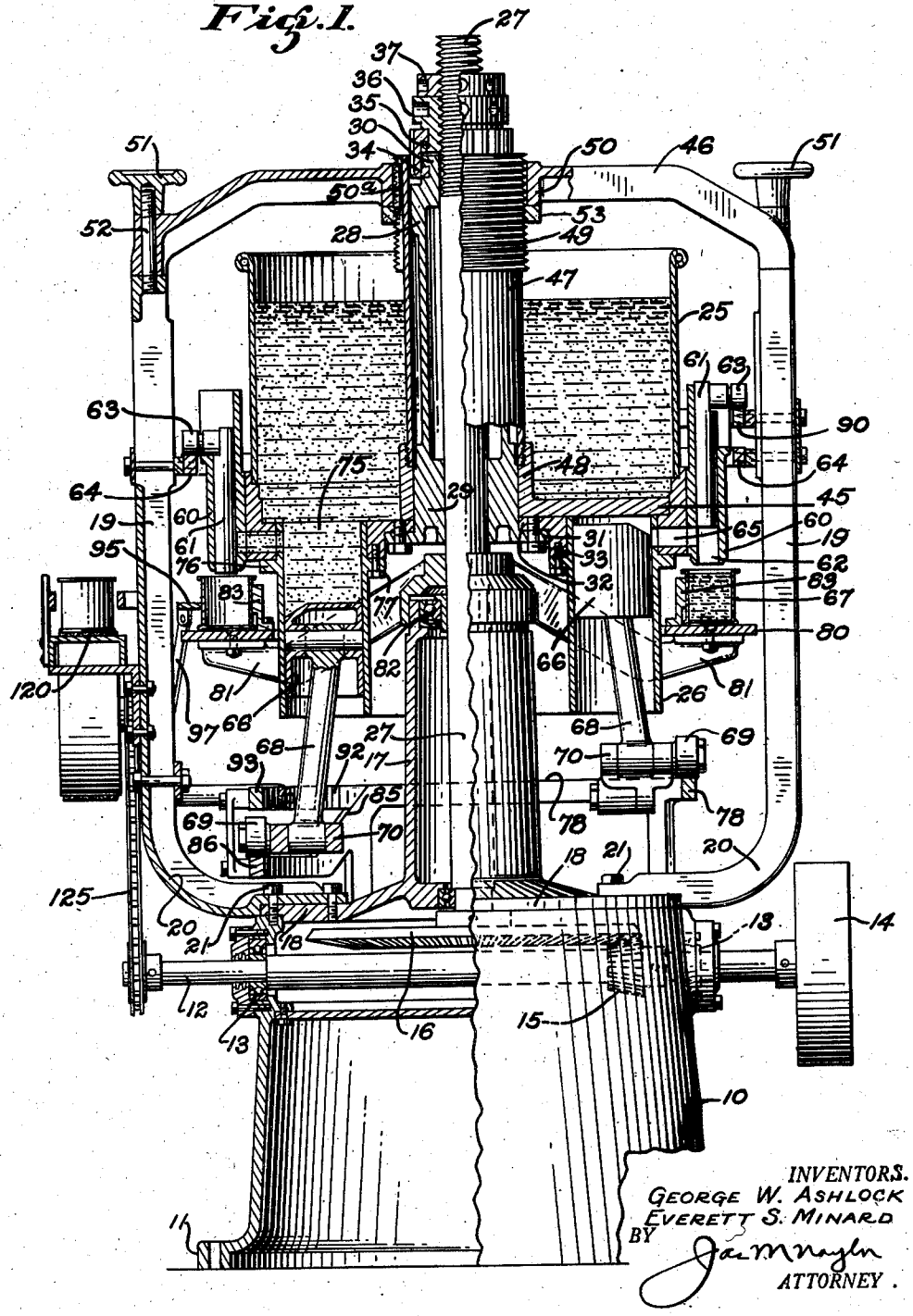
July 13, 1937. G. W. ASHLOCK ET AL 2,086,890

CAN FILLING MACHINE

Filed Aug. 21, 1935 5 Sheets-Sheet 1

Fig. 1.



INVENTORS.
GEORGE W. ASHLOCK
EVERETT S. MINARD
BY
ATTORNEY.

July 13, 1937. G. W. ASHLOCK ET AL 2,086,890

CAN FILLING MACHINE

Filed Aug. 21, 1935 5 Sheets-Sheet 2

Fig. 2.

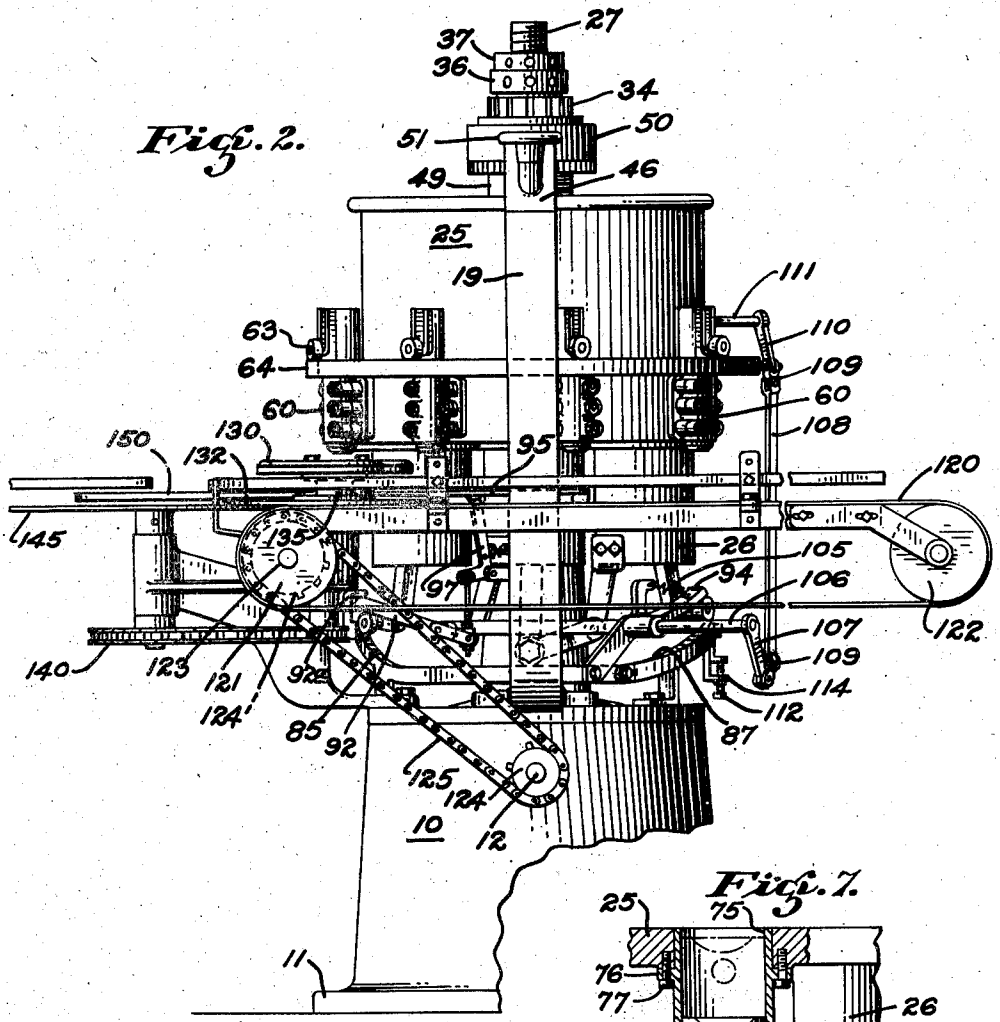


Fig. 7.

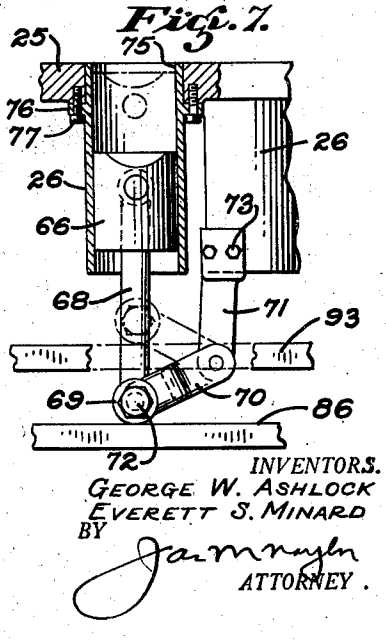
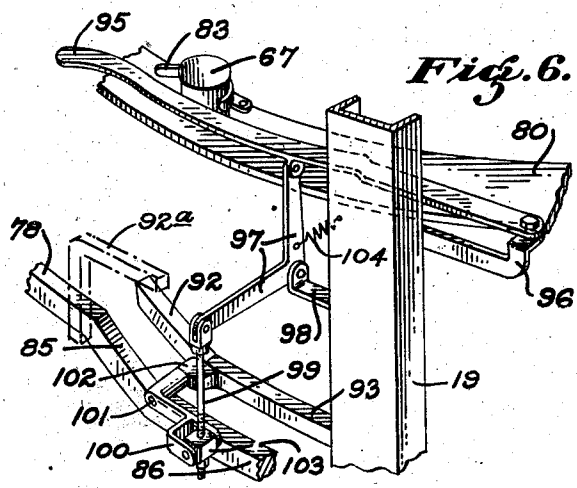


Fig. 6.



INVENTORS.
GEORGE W. ASHLOCK
EVERETT S. MINARD
BY
ATTORNEY.

July 13, 1937. G. W. ASHLOCK ET AL 2,086,890

CAN FILLING MACHINE

Filed Aug. 21, 1935 5 Sheets-Sheet 3

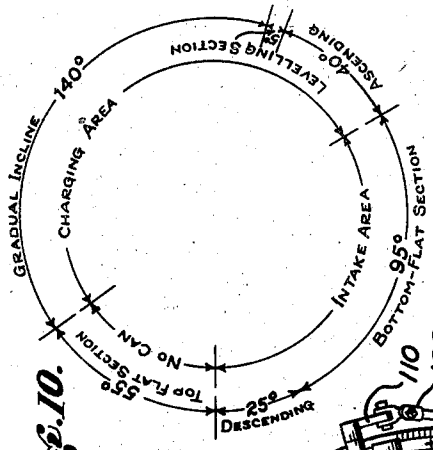


Fig. 10.

Fig. 3.

INVENTORS.
GEORGE W. ASHLOCK
EVERETT S. MINARD
BY
ATTORNEY.

July 13, 1937. G. W. ASHLOCK ET AL 2,086,890

CAN FILLING MACHINE

Filed Aug. 21, 1935 5 Sheets-Sheet 4

Fig. 4.

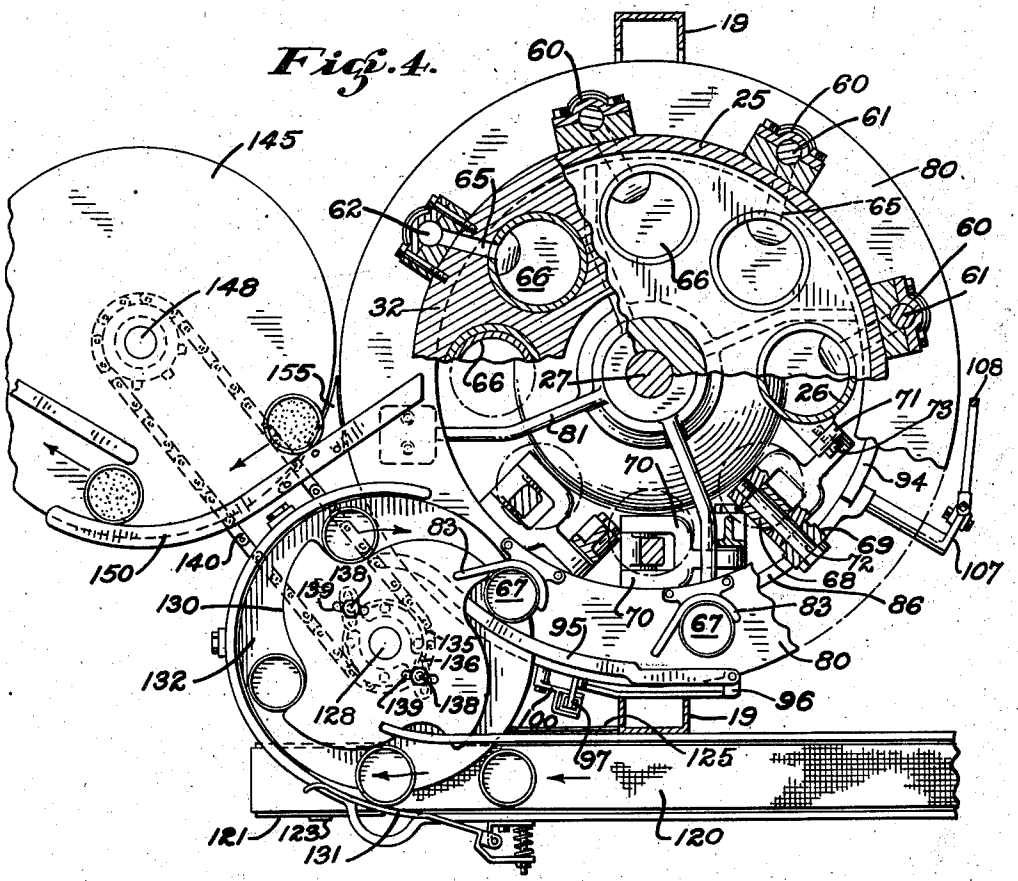
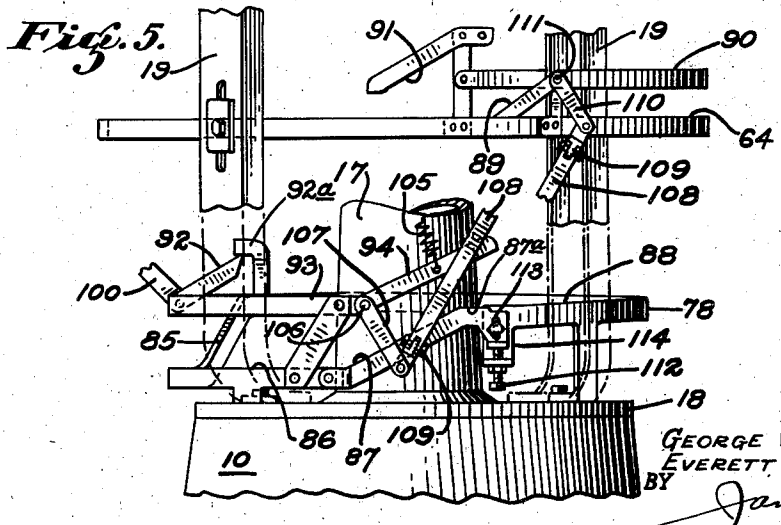


Fig. 5.



INVENTORS.
GEORGE W. ASHLOCK
EVERETT S. MINARD
BY
Jas. M. Naylor
ATTORNEY.

July 13, 1937. G. W. ASHLOCK ET AL 2,086,890

CAN FILLING MACHINE

Filed Aug. 21, 1935 5 Sheets-Sheet 5

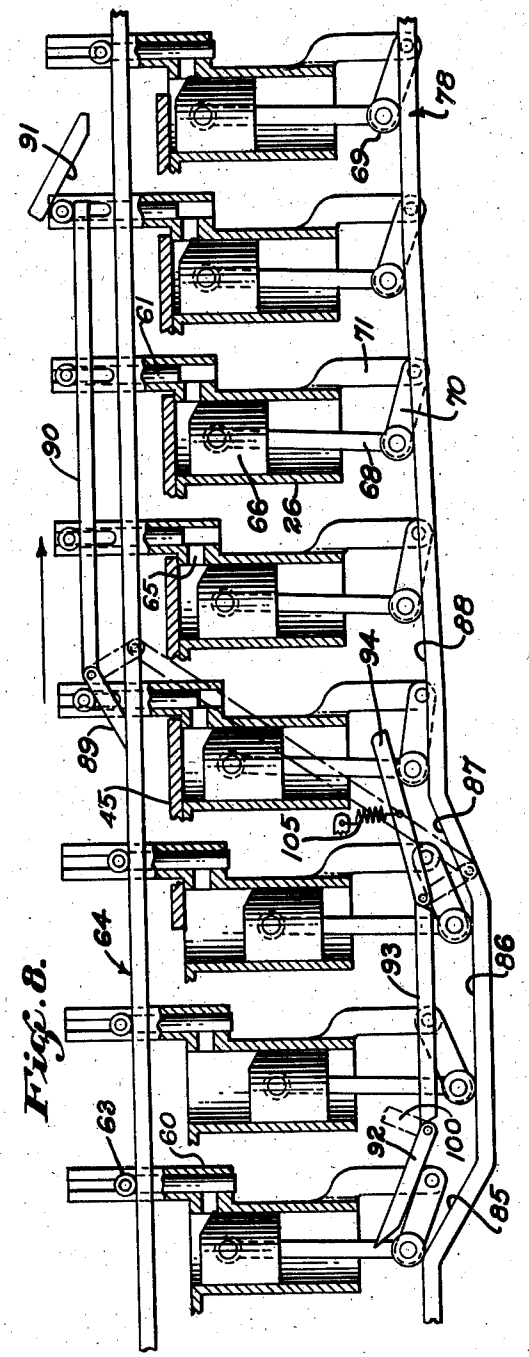


Fig. 8.

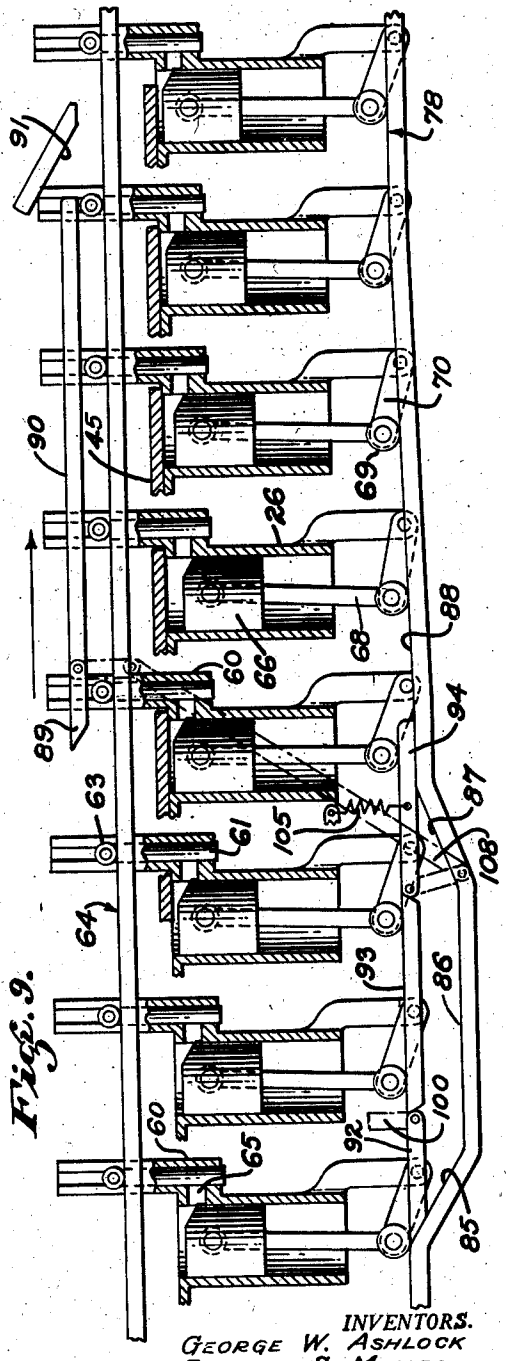


Fig. 9.

INVENTORS.
GEORGE W. ASHLOCK
EVERETT S. MINARD
BY Jas. M Naylor
ATTORNEY.

Patented July 13, 1937 2,086,890

UNITED STATES PATENT OFFICE

2,086,890

CAN FILLING MACHINE

George W. Ashlock and Everett S. Minard, Oakland, Calif., assignors to Walter King, San Francisco, Calif.

Application August 21, 1935, Serial No. 37,143

18 Claims. (Cl. 226—97)

This invention relates to a machine for filling cans.

It has for an object the provision of an apparatus by which cans may be filled at high speeds through a unique combination of parts in the operation of which none of the substance being handled will be discharged in the absence of a can or container to receive the same.

In general the can filling machine forming the subject matter of this invention comprises a revoluble tank with a plurality of cylinders disposed therebeneath and integral therewith, a stationary cut-off plate valve within the tank for establishing and breaking communication between the tank and the said cylinders. Pistons operate in the cylinders to withdraw material from the tank and to discharge it from the cylinders through suitable valves into cans or like receptacles.

One of the important features of the invention is the means provided for the control of the discharge mechanisms when no can has been fed into the apparatus, which means are purely mechanical and adapted to operate efficiently at the high operation speeds required of machines of this type. Another important feature of this invention lies in the provision of an apparatus adapted to carry out the "no can no fill" theory which can be quickly removed from the machine proper for the substitution of smaller or larger elements having the identical characteristics to accommodate receptacles of greater or lesser dimensions.

Another important object of the invention is the provision of a can filling machine which by virtue of the novel arrangement and association of parts may be quickly dismantled for cleaning purposes or for other reasons incidental to normal operation practices.

We are conversant with practically all other machines of this character which have been heretofore developed and it has been our experience that many of them make no provision whatsoever for the control of the discharge elements when no can is present. Moreover, those who have invented machines embodying means for controlling this normal function of the machines have produced devices which are either extremely complicated in construction or which require double handling of the substance. In other words, the material is withdrawn from the main tank into the element from which it would normally be discharged into a can and then returned to the tank when no can is present to receive such discharge.

Then too, it has been our observation that little or no provision has been made, by those before us in this art, for quick adaptation of the machines to the filling of cans of various sizes or for the ready dismantling of the machine for the purposes of cleaning or adjustment.

With the foregoing description and statement of objects in mind, reference is now had to the appended specification and the attached drawings for a more complete understanding of our invention.

In the drawings:—

Figure 1 is an elevational view partly in section, with certain of the parts removed for purposes of clarity.

Figure 2 is a side elevation of the machine.

Figure 3 is a top plan view with certain of the parts shown in dotted lines.

Figure 4 is a top plan view, similar to the view in Figure 3, with certain of the superposed structures partly cut away.

Figure 5 is an elevation of the cam tracks employed in our machine.

Figure 6 is a perspective view of the can operated device controlling one of the cam track switches.

Figure 7 is a side elevation of one of the pistons and the connecting linkage therefor, with the cylinder therefor shown in section.

Figure 8 is a schematic view of the discharge mechanisms, and the upper and lower cam tracks, showing the normal operation of the machine.

Figure 9 is a schematic view, similar to Figure 8, showing the action of the discharge mechanisms in the absence of a can to receive the discharge therefrom.

Figure 10 is a diagram showing the various areas into which the machine is divided by virtue of the timing of its elements with respect to the filling operations.

A pedestal 10 provides the main support for our can filling device, and has a flange 11 at its bottom edge through which suitable bolts may be inserted to rigidly secure the machine to a foundation. A main drive shaft 12 extends horizontally through the pedestal near the top thereof and is provided with suitable bearings 13. A pulley 14, keyed at one end of the shaft 12, furnishes driving connection with any conventional source of power, and through the means of a bevel gear 15 the shaft drives a gear wheel 16.

A second pedestal 17, having a bottom extension 18, is mounted on the pedestal 10 and provides support for certain mechanisms hereinafter described. An upper frame 19, formed of

channel irons 20 bent in the general shape of the capital letter "O", is bolted to the bottom extension 18 of the second pedestal 17, as at 21. This upper frame 19 provides a hanging support for certain of the hereinafter described parts.

A circular supply tank 25, having a plurality of cylinders 26 secured to the bottom thereof, is mounted on the upper end of vertical shaft 27 to the bottom end of which bevel gear 16 is keyed. (See Figure 1.)

The connection between tank 25 and shaft 27 comprises first a sleeve 28, of greater length than the depth of said tank, having a hub 29 at its lower end and a collar 30 at its upper end. Hub 29 has a flange 31 to which bottom 32 of tank 25 is bolted, as at 33. Collar 30 engages ring 34 and the latter engages flange 35 on nut 36, said nut being screwed on the threaded end of shaft 27. The loosening of nut 36, due to rotation of shaft 27, is prevented by a lock nut 37.

It will thus be seeen that supply tank 25 is supported on shaft 27 and is adapted to revolve therewith.

The said tank 25 has a substantially semi-circular stationary cut-off plate valve 45, the function of which is to make and break communication between the said tank and cylinders 26 disposed thereunder as the latter rotate together. This plate valve is supported by cross bar 46 of upper frame 19. The connection therebetween comprises sleeve 47, the lower end of which is threaded to engage the interiorly threaded hub 48 of plate valve 45, and the upper end of which extends through the boss 50 in said cross bar.

A ring 53, threaded to engage threads 49 on sleeve 47, bears against the underside of boss 50 and prevents upward movement of plate valve during the discharge stroke of pistons 66. Rotation of the plate valve 45 is prevented by a key 50A inserted between boss 50 and the sleeve 47, and thus the position of plate valve 45 is fixed to determine the opening and closing of apertures 75 in proper timing.

Plate valve 45 may be withdrawn from the supply tank 25 at any time it is desired by removing hand nuts 51 from the stud bolts 52 set in upper frame 20, which breaks the connection between the latter and cross bar 46, and then pulling cross bar 46 upwardly. Plate valve 45 and sleeve 47 may then be freely slid over sleeve 28 and ring 34.

Arranged about the periphery of supply tank 25 we provide valves generally designated by the numeral 60, there being one for each of the cylinders 26. Each of the valves has a vertically reciprocated plunger 61 therein which is adapted to open and close a discharge nozzle 62 as the roller 63 thereon moves over upper trackway 64. Passages 65 connect the cylinders 26 and valves 60.

The pistons 66 are reciprocated within cylinders 26 as rollers 69 travel over the lower cam trackway 78, and are adapted to withdraw the substance being handled from tank 25 and to effect the discharge thereof into a can 67 through passages 65 and discharge nozzles 62 by virtue of timed relationship with valves 60.

Pistons 66 have rods 68 provided with rollers 69, and the said rods are, through the medium of links 70 and brackets 71, connected to the wall of adjacent cylinders 26. It will be noted that links 70 are forked, the connection between them and rods 65 being effected by pins 72, at the outer end of which rollers 69 are secured. Brackets 71 are attached to the adjacent cylinders 26, as at 73, (See Figure 7.) One of the advantages of this particular connection for the piston rods and associated mechanisms is the fact that it reduces wear and tear within the cylinder and facilitates movement of the piston therein, due to the freedom of the piston to follow the bore of the cylinders.

A series of apertures 75 are disposed in the bottom of tank 25 and the cylinders 26 are individually secured to said bottom in registry with said apertures, shoulders 76 on said cylinders abutting said bottom and being bolted thereto, as at 77.

As illustrated in Figure 4 the valves 60 are positioned slightly ahead of the associated cylinders 26, with relation to the direction of rotation (counterclockwise), the purpose of this being to effect a proper timing between the operation of pistons in the cylinders and said discharge nozzles with respect to the cam trackways about to be described.

A can table 80 is supported on the spider 81 keyed on shaft 27, the legs of the spider extending between cylinders 26, as shown in Figure 4. This mechanism is supported by pedestal 17 and a suitable bearing 82 is provided between the hub of the spider and the top of said pedestal 17. As a result of this construction can table 80 revolves with the tank 25 and cylinders associated therewith and is adapted to support cans positioned beneath each of the discharge nozzles. Can retainers 83 are positioned on the table 80 beneath each of said discharge nozzles 62.

The function of lower cam trackway 78 is to reciprocate the pistons 66 within the cylinders 26 through the medium of rollers passing thereover, while the function of upper cam trackway 64 is to reciprocate plungers 61 in the valves 60 to permit the substance drawn into said cylinders to be discharged into the receptacles.

By referring to Figure 8 of the drawings it will be readily understood that in the normal operation of the machine, that is where a can has been introduced for each discharge nozzle, the course taken by rollers 69 is down the incline 85 to a bottom flat section 86, at which time the pistons are withdrawn in said cylinders to permit the latter to take a charge of the material. As said rollers 69 reach the bottom of the quick incline 87, the associated cylinders 26 are moved completely under cut-off plate valve 45 in the bottom of supply tank 25 breaking communication between said tank and said cylinder. Rollers 69 then ascend incline 87 and the pistons make substantially a complete discharge stroke. Simultaneously, rollers 63 on plungers 61 start up the sharp incline of switch 89 on cam trackway 64, withdrawing plungers 61 in valves 60, opening passages 65, and permitting discharge through nozzles 62. Rollers 63 then move over an area of flat trackway 90, above and parallel to track 64 during which passageways 65 remain open. As rollers 69 leave incline 87 they roll over flat surface 87[a] in trackway 78, checking the upstroke of pistons 66 momentarily, and the material theretofore discharged is given an opportunity to settle in the cans. The rollers 69 then begin the ascent of incline 88 in trackway 78, and the remainder of the material within the cylinders is discharged as the pistons complete their stroke. (See Figs. 5, 8 and 10.)

As rollers 63 on valves 60 reach the end of trackway 90 they drop by gravity and plungers 61 move back to their normal position in valves 60 to close the passageways 65. To insure this

return to normal position we provide a guard 91 pitched at a downward angle to upper cam trackway 64 and against the underside of which roller 63 is adapted to bear.

Figure 9 of the drawings illustrates the course taken by pistons 69 and rollers 63 on plungers 61 when no can has been introduced for a particular cylinder. To provide for that emergency and prevent withdrawal of the substance from tank 25 and, of course, the opening of passageways 65 we cause the rollers 69 and 63 to travel along substantially horizontal planes. For instance, we provide what may be termed a bridge for the depression in lower cam trackway, consisting in a pivotal switch 92, adapted to be dropped into the normal plane of lower cam trackway 78, a flat section 93 and a bridge piece 94 adapted to be dropped on the inclined surface of lower cam trackway. At the same time it should be noted that the inclined switch 89 on upper cam trackway 64 is pivotally connected to the top flat section 90 and is adapted to be swung upwardly, into a horizontal plane, to permit rollers 63 to move over a purely horizontal trackway and thus keep passageways 65 closed.

A stop 92a (see Figure 2) on lower trackway 78 limits the movement of switch 92 and thus insures the withdrawal of pistons 66 in cylinders 26 during normal filling operations regardless of the viscosity of the material since rollers 69 will bear against the underside of said switch 92 and be forced into the depression or concavity in said trackway.

By referring to Figures 5 and 6 of the drawings the mechanisms which control this "no can no fill" feature of the invention will be readily understood. A bar 95 pivotally connected to a bracket 96 secured to upper frame 19 is partially in the path of the cans on the table 80. When a can is in position it contacts this bar and moves it outwardly to cause the switch 92 to be urged upwardly and away from lower trackway 78 through the medium of the following linkage. Bar 95 and rod 99 are connected to a bellcrank 97, pivotally attached to frame 19 by a bracket 98. The lower end of rod 99 is attached to the free end of forked member 100. The opposite and angled end of forked member 100 is fixed on pin 101 extending through a bearing 102 integral with flat section 93, and switch 92 is fixed on said pin 101 on the opposite side of the bearing.

When no can is present, bar 95 remains in the normal path of a can through the action of spring 104 and switch 92 rests on lower cam trackway 78 as shown in Figure 9. The sweep of bar 15 is rendered adjustable for various sized and shaped cans by virtue of the fact that the connection between rod 99 and forked member 100 consists in a nut 103 having a threaded connection with rod 99, retained between the forks of member 100 by means of suitable pins. Hence when an adjustment is desired the forks are sprung to release said nut and the latter is raised or lowered on said rod and then reclamped by the forked member.

The remaining features of the "no can no fill" mechanism are actuated by the rollers 69. A spring 105 normally keeps bridge piece 94 in the position shown in Figure 8 of the drawings, that is, clear of the inclined surface of lower cam trackway and out of the path of rollers 69. In the absence of a can, however, rollers 69, having traversed the switch 92 and flat section 93, strike the bridge piece 94 and force it into its closed position as shown in Figure 9. Bridge piece 94 is secured to a stub shaft 106 which extends through the end of flat track section 93, and to the outer end of which is attached arm 107. This arm is connected to switch 89 on upper cam trackway 64 through the medium of rod 108, the universal joints 109—109, arm 110 and shaft 111 said switch being secured to the latter. Hence when rollers 69 strike bridge piece 94 and depress it, switch 89 on upper cam trackway 64 is opened and the roller 63 associated with the particular cylinder rolls over an uninterrupted trackway and the discharge passageway 65 remains closed.

The adjustability of the incline 87 in lower cam trackway 78 is illustrated to best advantage in Figure 5 of the drawings. It will be noted that the section 87 is pivotally connected to bottom flat section 86 and that its opposite end may be raised or lowered with respect to the inclined surface 88 of the lower trackway 78 by means of the screw 112. The end of section 87 is slotted as at 113, and held in engagement with the end of inclined section 88 by means of a conventional nut and bolt. Adjustment screw 112 is carried by the downward extension 114 of inclined section 88 of the trackway 78 and abuts the angled end of section 87. Thus when a finer adjustment of the angle of section 87 with respect to the rest of the cam trackway is desired, one need only loosen the connection between section 88 and the end of section 87 and turn screw 112 to raise or lower the same. It will also be noted that the angled end of incline 87 is provided with a crest or flat surface 87a. The purpose of this, as stated is to provide a levelling area, or better said, to cause pistons 66 to pause in their discharge stroke, permitting the material already in the can to settle before the material remaining in the cylinder is discharged. Moreover, it permits a finer adjustment of the discharge stroke of pistons 66 to accommodate containers of different sizes and to compensate for the difference in the viscosity of a wide range of material.

The can feed we employ in connection with our machine is, in many respects, conventional. A belt 120 turns on the pulleys 121 and 122, conveying the cans from a supply source. Pulley 121, mounted on shaft 123, is rotated by a chain 125 engaging sprockets 124—124 on shafts 123 and 12. A star wheel 130 is adapted to engage the receptacles as they are fed by the belt 120 onto disk 132 and urge them in a clockwise direction to be introduced in timed relation to the speed of can table 80, the cans bearing against the inside of bar 95 and being engaged by the retainers 83. To prevent damage to the empty cans as they are fed from belt 120, we provide a depression in the conventional guide about the periphery of disk 132, into which a can will temporarily move if crowded by the points of the star wheel 130, a spring urged finger 131, normally urging the cans into alignment, being depressible for this purpose.

Adjustment of the star wheel 130, with respect to timing and different sizes of cans is made possible through the particular connection of the said wheel on its supporting member 135. The wheel has a pair of slots 139, pitched at substantially right angles to corresponding slots in arms 136 on member 135, and a bolt 138, retained by conventional nuts, extends through the same. Thus by loosening nut 138 star wheel may be turned and reset to meet the requirements.

The supporting member 135 for the star wheel 130 is secured to disk 132 and the latter is con-

nected to shaft 128. This shaft has a driving connection with shaft 123 through the medium of spiral gears 126, and in turn rotates shaft 148, upon which discharge plate 145 is mounted, by means of chain 140 engaging suitable sprockets.

A guide 150 is mounted on the fender 155 disposed between discharge plate 145 and can table 80 and urges the filled cans onto the said plate 145, its inner end being pitched at sufficient angle to remove the cans from the retainers 83.

Figure 10 of the drawings clearly indicates the various areas into which the machine is divided when the can supply is constant. The terminology employed in connection with the inner circle defines three principal areas, the "Intake area" embracing that portion of the machine in which a particular cylinder 26 is withdrawing a charge of the substance from supply tank 25; "Charging area" denoting that portion of the circle in which the cans are being charged, and "No can" denoting that period in the rotation of the filling elements between discharge of a filled can onto plate 145 and intake of an empty tin from star wheel 130.

The outer circle in this diagram illustrates the movement of piston rollers 69 over the bottom cam track 78. For instance, the roller descends on incline 85, rolls on bottom flat section 86, as the cylinder 26 takes in a charge of substance, and ascends over incline 87 and gradual inclined section 88 of trackway 78, as the substance is discharged into the cans. Finally, roller 69 moves over a top flat section of trackway 78 between discharge of a filled can and intake of an empty one.

Our machine is rendered adjustable for cans and receptacles of different sizes and shapes through the means of the particular mounting and connections employed in connection with the revoluble filling elements, and through the provision of a lower cam track which is readily removable for substitution of one of different dimensions.

For example, when it is desired to adapt the revoluble filling elements to accommodate a larger receptacle, only the following simple steps need be taken. Ring 53 is screwed down on the threads 49 of sleeve 47, releasing plate valve 45 for upward movement. Lock nut 37 is then raised on shaft 27, permitting nut 36 to be screwed upwardly, carrying with it supply tank 25, cylinders 26 and valves 66, to the desired height, thereby increasing the filling area within cylinders 26 and the clearance between discharge nozzles 62 and table 80.

At the same time removal of the switchway and associated mechanisms in lower cam trackway and the loosening of the nuts anchoring same, permits ready removal of the cam track past pedestal 17. As already pointed out, fine adjustments of the cam track 78 may be effected through the raising or lowering of incline 87 and its crest 87^a, which in some cases may be sufficient to accommodate cans of slightly different sizes. Finally, the sweep of bar 95, with respect to cans on table 80, may be regulated through the shortening or lengthening of the connection between bellcrank 97 and forked member 100.

Upper cam trackway 64 may be raised or lowered by loosening the retaining nuts therefor, the connecting bolts moving freely in conventional slots in frame 19.

It will be appreciated that we have illustrated but a preferred form of our invention and that it may assume many forms and is subject to many modifications, as well as adaptable to accommodate cans of many sizes and shapes for which reasons we do not wish to be understood as limiting ourselves to this particular disclosure but desire protection to the fullest scope of the appended claims.

We claim:

1. A can filling machine comprising a revoluble tank having cylinders therebeneath and communicable therewith, a stationary plate in said tank adapted to make and break communication between said tank and said cylinders, pistons in said cylinders adapted to withdraw material from said tank into said cylinders and discharge it therefrom, and means co-acting with said pistons whereby they remain in their uppermost position in the absence of a receptacle to receive the discharge from said cylinders.

2. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom into a receptacle, rollers operatively connected to said pistons, a trackway for said rollers having a depression therein normally causing reciprocation of said pistons in said cylinders during the filling operation, and automatic means for bridging said depression in said trackway in the absence of a receptacle to receive the discharge from said cylinders.

3. A can filling machine comprising, a revoluble tank, cylinders therebeneath and communicable therewith, a plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected with said pistons, a trackway for said piston rollers having a depression therein normally causing reciprocation of said pistons during the filling operation, receptacle feeding means for said machine, and means actuated when said feeding means fails to deliver a receptacle to receive the discharge from said cylinders for bridging the depression in said trackway.

4. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected to said pistons, a trackway for said rollers normally causing reciprocation of said pistons during the filling operation and automatic means associated with said trackway for preventing reciprocation of said pistons in the absence of a receptacle to receive the discharge from said cylinders.

5. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a stationary cut-off plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected to said pistons, a trackway for said piston rollers having a depression therein whereby said pistons are reciprocated in said cylinders during the normal filling operation, and an automatic switchway in said

trackway to prevent said rollers from entering said depression in the absence of a receptacle to receive the discharge from said cylinders.

6. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a stationary cut-off plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected to said pistons, a valve for each of said cylinders having a plunger therein, rollers on said plungers, a trackway for said plunger rollers having a convexity therein normally causing the opening of said valves, and means operated by said piston rollers whereby said plunger rollers will be caused to pass under said convexity in the absence of a receptacle to receive the discharge from said cylinders.

7. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a stationary cut-off plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected to said pistons, a valve for each of said cylinders having a plunger therein, rollers on said plungers, a trackway for said plunger rollers having a convexity therein normally causing the opening of said valves, and means operated by said piston rollers to cause said plunger rollers to pass under said convexity in said trackway and roll in the normal plane of said trackway in the absence of a receptacle to receive the discharge from said cylinders.

8. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a stationary plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected to said pistons, a valve for each of said cylinders having a plunger therein, rollers on said plungers, a trackway for said piston rollers having a concavity therein adapted to reciprocate said pistons, a trackway for said plunger rollers having a convexity therein causing the opening of said valves, and automatic means causing said piston rollers to pass over said concavity and said plunger rollers to pass under said convexity in said trackways in the absence of a receptacle to receive the discharge from said cylinders.

9. A can filling machine comprising a revoluble tank axially mounted on a vertically disposed shaft and having apertures in the bottom thereof, a frame, a cross bar in said frame superposed above said tank, said cross bar having a boss therein loosely encompassing said shaft, a cut-off plate on the bottom of said tank adapted to open and close said apertures, a sleeve encompassing said shaft and connected to said cut-off plate, said sleeve extending through said boss, and means carried by the sleeve and engaging said boss for positively preventing rotation and upward movement of said cut-off plate.

10. A can filling machine comprising a revoluble tank axially mounted on a vertically disposed shaft and having apertures in the bottom thereof, a frame, a cross bar in said frame superposed above said tank, said cross bar having a boss therein encompassing said shaft, a cut-off plate on the bottom of said tank adapted to open and close said apertures, a sleeve encompassing said shaft and connected to said cut-off plate, said sleeve extending through said boss, and adjustable means on said sleeve coacting with said boss to prevent upward movement of said cut-off plate.

11. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a stationary plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected to said pistons, a valve for each of said cylinders having a plunger therein, rollers on said plungers, a trackway for said piston rollers having a concavity therein adapted to reciprocate said pistons, a trackway for said plunger rollers having a convexity therein causing the opening of said valves, and automatic means causing the piston rollers and plunger rollers to roll in the normal plane of their respective trackways in the absence of a receptacle to receive the discharge from said cylinders.

12. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a stationary plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected to said pistons, a valve for each of said cylinders having a plunger therein, rollers on said plungers, trackways for said piston rollers and said plunger rollers, switches in said trackways normally causing operation of said valves and said pistons, a can feed, a switch in said trackway for said piston rollers which will cause the latter to roll in the normal plane of said trackway upon the failure of said can feed to deliver a receptacle.

13. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a stationary plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected to said pistons, a valve for each of said cylinders having a plunger therein, rollers on said plungers, trackways for said piston rollers and plunger rollers having switches therein normally causing operation of said valves and said pistons, a can feed, and means actuated by the failure of said can feed to deliver a receptacle to cause said piston rollers to roll in the normal plane of said trackway.

14. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a stationary plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected to said pistons, a valve for each of said cylinders having a plunger therein, rollers on said plungers, trackways for said piston rollers and said plunger rollers having switches therein adapted to cause operation of said valves and said pistons, a can feed, and can actuated means for keeping open said switch in said trackway for said piston rollers.

15. In a can filling machine a revoluble tank axially mounted on a vertically disposed shaft, the connection between said tank and said shaft comprising, a sleeve secured to the bottom of said tank, a collar at the top of said sleeve, a member provided with an external flange at its lower end having threaded connection to said shaft, and a ring having internal flanges engaging said collar on said sleeve and said flange on said threaded member.

16. A can filling machine comprising a revoluble tank, cylinders therebeneath and communicable therewith, a plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected with said pistons, a trackway for said piston rollers causing reciprocation of said pistons during the filling operation, and means in said trackway causing the pistons to pause in their discharge stroke when the greater portion of the material has been discharged from said cylinders to permit the latter to settle within the receptacle before the remainder of the material is discharged from said cylinders.

17. A can filling machine comprising, a revoluble tank, cylinders therebeneath and communicable therewith, a plate adapted to make and break communication between said tank and said cylinders, pistons operating in said cylinders to withdraw material from said tank into said cylinders and discharge it therefrom, rollers operatively connected with said pistons, a trackway for said piston rollers causing reciprocation of said pistons during the filling operation, and a dwell portion in said trackway causing the pistons to pause in their discharge stroke when the greater portion of the material has been discharged from said cylinders to permit the latter to settle within the receptacle before the remainder of the material is discharged from said cylinders.

18. In a can filling mechanism, a rotatable unit comprising a tank to receive the material with which the cans are to be filled, said tank having a plurality of cylinders connected therewith and in communication with the tank, a can receiving table rotatable with the tank and cylinders, means for delivering cans to the table, a piston in each cylinder, a pivotally mounted rocker arm for each cylinder, a connecting rod for each piston and connected one with each rocker arm, a roller on each rocker arm, a cam track with which said rollers engage and by which a reciprocal movement is transmitted to the pistons to alternately charge and discharge the cylinders, means for directing a portion of the material being discharged into the cans, and means for rendering the cam track inoperative if cans are not delivered to the table.

GEORGE W. ASHLOCK.
EVERETT S. MINARD.