C. H. AYARS.

CAN FILLING MACHINE.

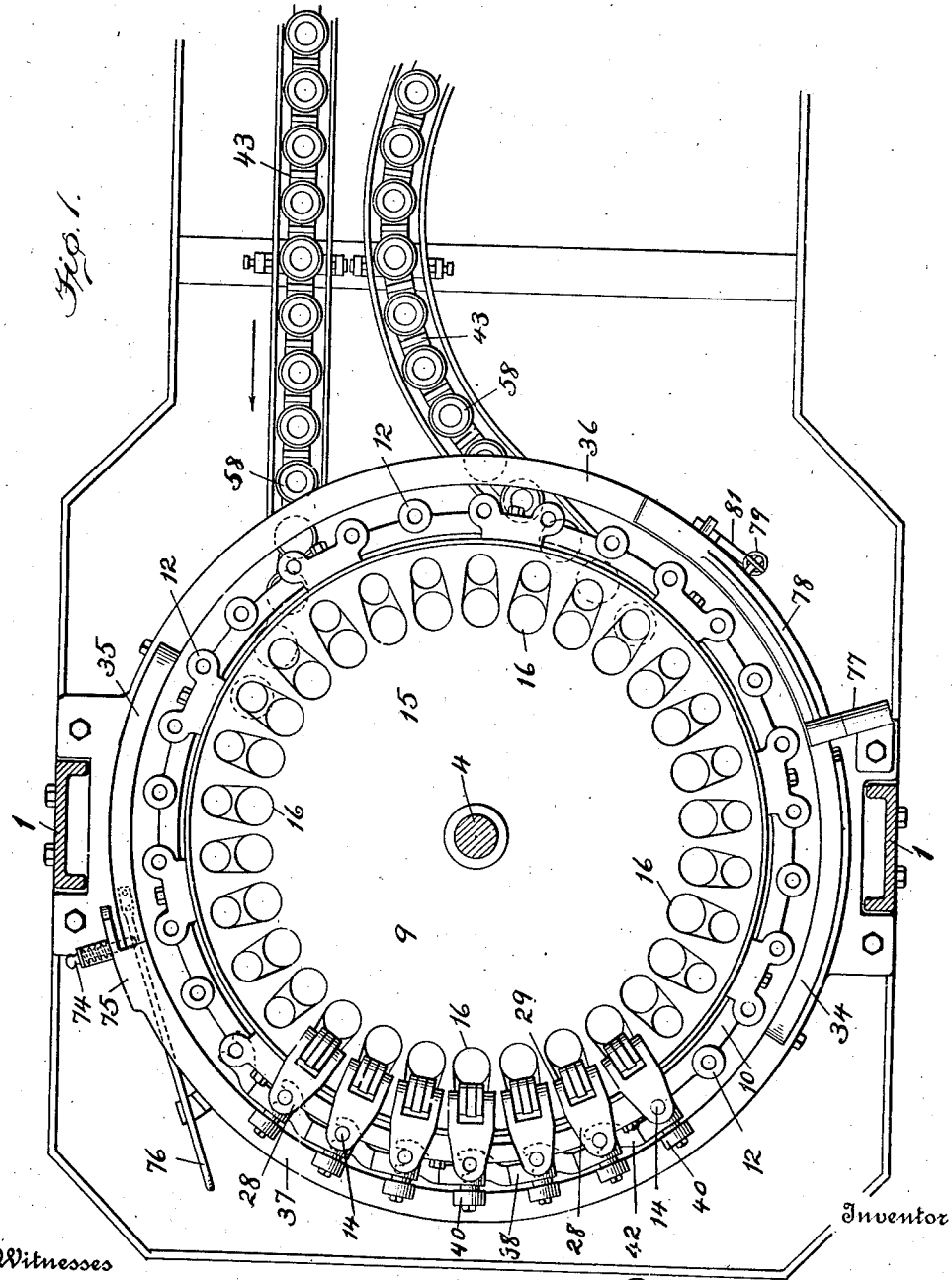
APPLICATION FILED APR. 24, 1912.

1,073,067.

Patented Sept. 9, 1913.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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4 SHEETS—SHEET 2.

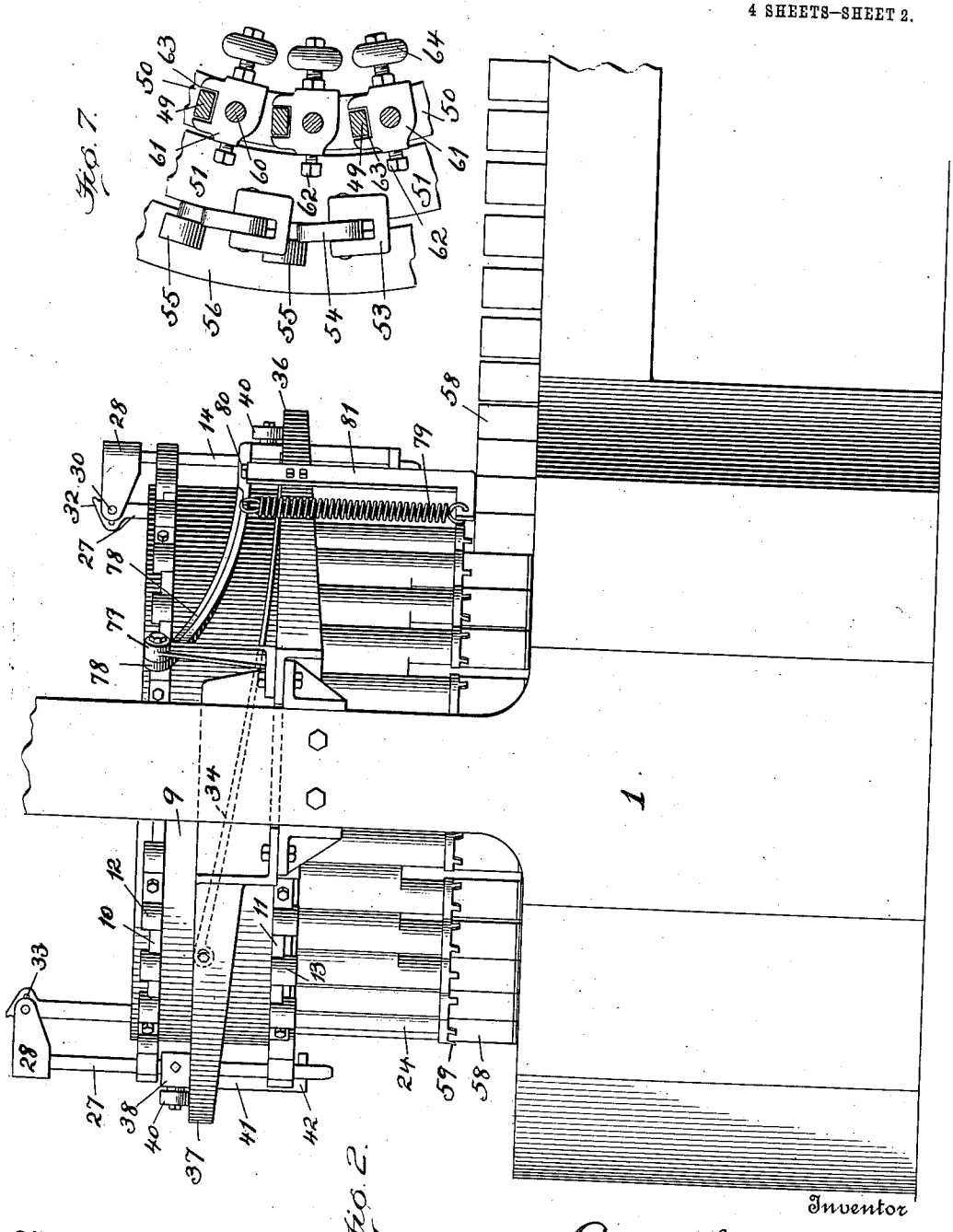

Fig. 2.

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4 SHEETS—SHEET 3.

Fig. 3.

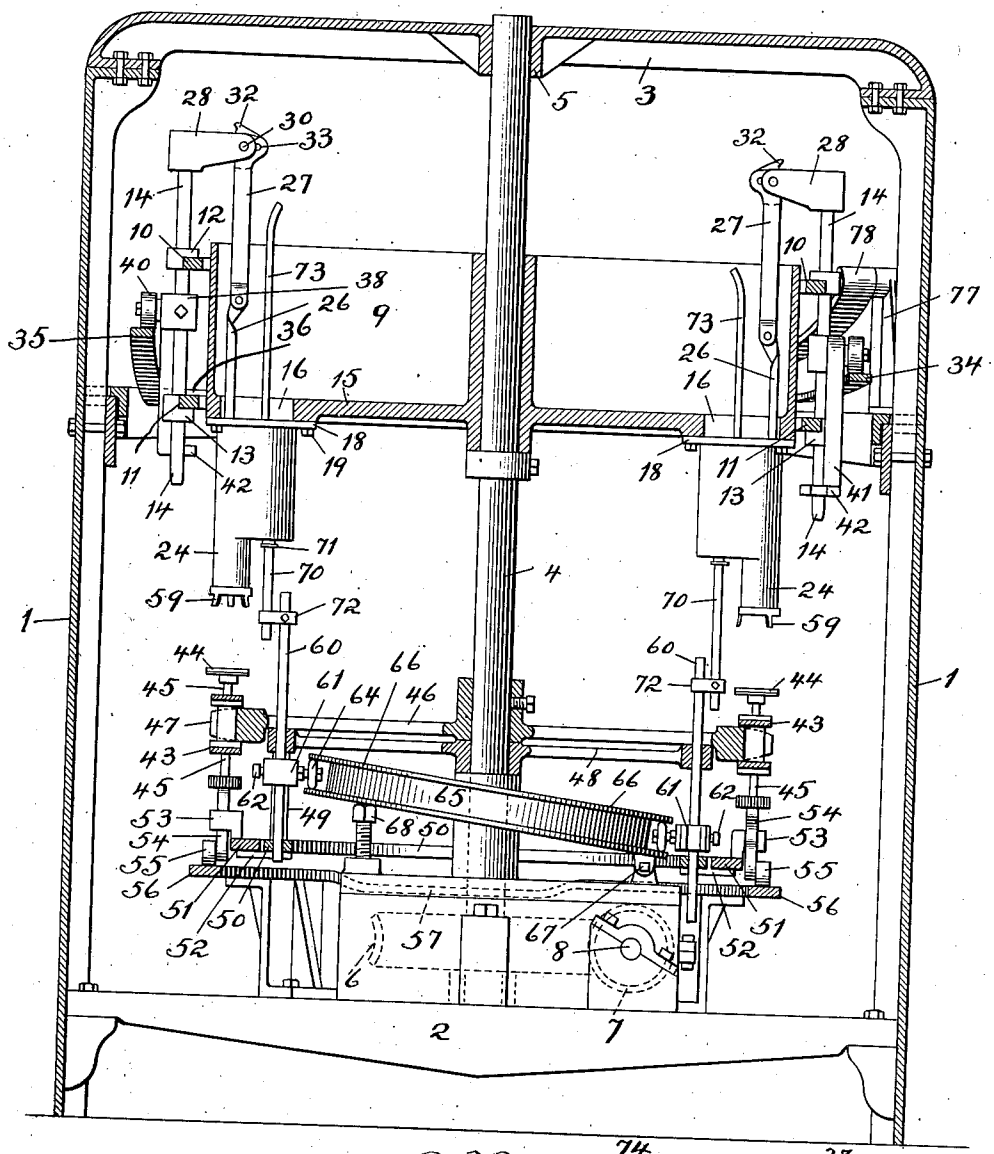
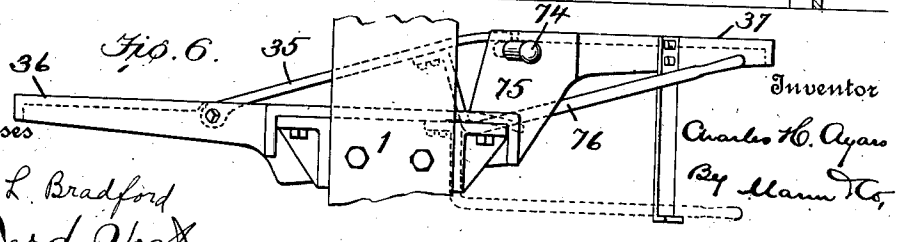


Fig. 6.



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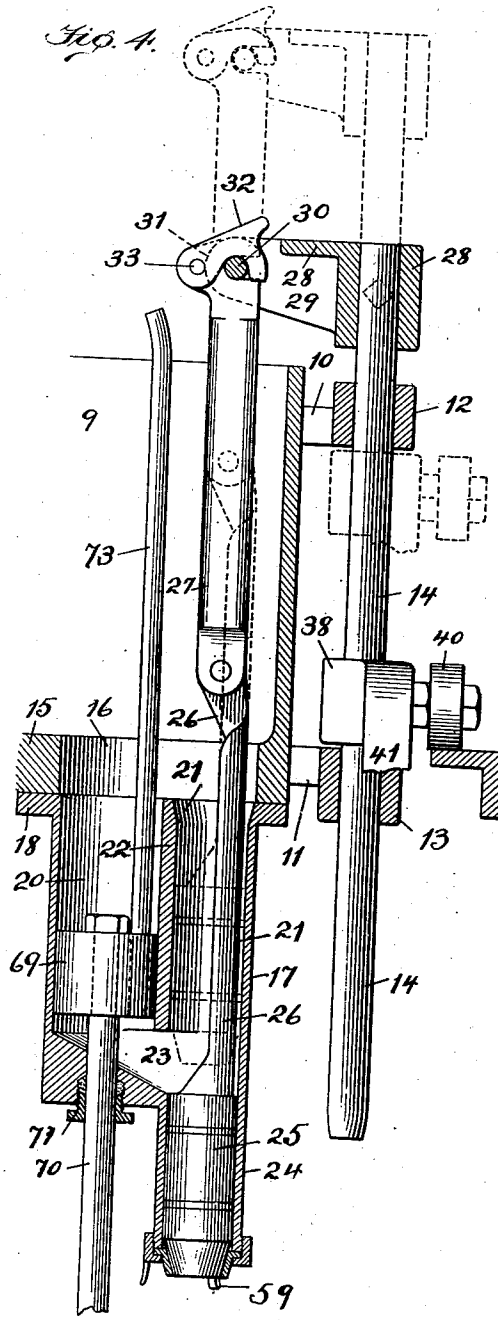
4 SHEETS—SHEET 4.

Fig. 4.



Witnesses

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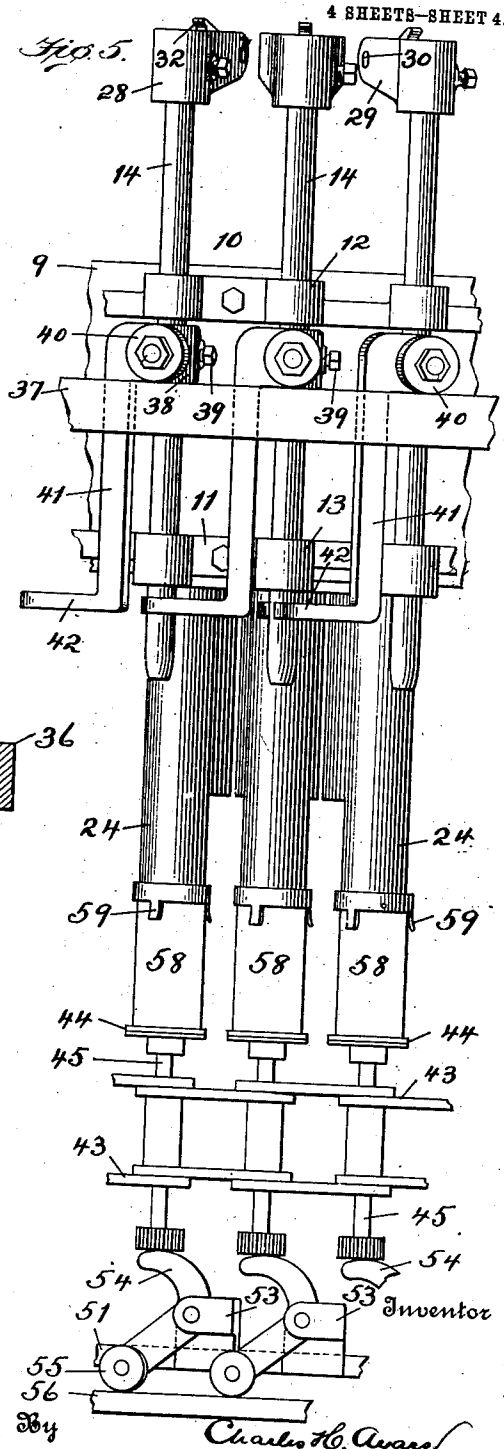
Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES H. AYARS, OF SALEM, NEW JERSEY, ASSIGNOR TO AYARS MACHINE COMPANY, OF SALEM, NEW JERSEY, A CORPORATION OF NEW JERSEY.

CAN-FILLING MACHINE.

1,073,067. Specification of Letters Patent. Patented Sept. 9, 1913.

Application filed April 24, 1912. Serial No 692,765.

To all whom it may concern:

Be it known that I, CHARLES H. AYARS, a citizen of the United States, residing at Salem, in the county of Salem and State of New Jersey, have invented certain new and useful Improvements in Can-Filling Machines, of which the following is a specification.

This invention relates to improvements in can-filling machines and has particular reference to a machine for filling cans with measured quantites of materials, such for example as fruits, vegetables, soups or other materials.

One object of the invention is to provide an improved machine of the character above-noted whereby the material in measured quantities will be drawn from a suitable hopper or container and after being measured, forced into the cans.

The invention also includes improved means for actuating the measuring devices including the adjustment of the same to increase or diminish the quantity of material according to the size of the can to be filled.

The accompanying drawings illustrate a practical application of the invention in the form of a machine, it being understood however that the invention is not to be restricted to the precise construction shown.

In the drawings, Figure 1, shows a top plan view of portions of the machine,—some of the parts however being omitted for the sake of better illustrating the invention without a multiplication of drawings. Fig. 2, shows a side elevation of the same. Fig. 3, illustrates a vertical sectional elevation through the machine and shows the two extreme positions of the filling mechanisms. Fig. 4, shows an enlarged vertical sectional elevation through one of the filling cylinders and shows the plungers and adjacent devices for actuating the same. Fig. 5, illustrates an enlarged side elevation of several filling cylinders with cans in position to be filled. Fig. 6, shows a detail side elevation of the upper cam-tracks for actuating the filling mechanisms as the latter are moved on a circular path, and Fig. 7, shows a detail sectional plan view of the lower cam-tracks for actuating the cans and the heads by which the measuring plunger rods are actuated.

Referring to the drawings by numerals, 1, designates the vertical side frames of any suitable construction and in the present instance having a lower horizontal beam, 2, which rigidly ties the side frames together at the lower end, and also having an upper cross-beam, 3, which extends horizontally between and rigidly connects the side frames at the upper end. A shaft, 4, extends vertically between the beams, 2, and, 3, and has its upper end retained in a bearing, 5, while its lower end is supported in a suitable bearing above the beam, 2.

Any preferred means may be employed to revolve the vertical shaft, 4, such for example as a worm gear, 6, shown in broken lines in Fig. 3, which is driven by a worm, 7, on a horizontal shaft, 8.

A receptacle or tank, 9, in the present instance circular in form, is sustained on the vertical shaft, 4, beneath the upper beam, 3, and revolves with the shaft. In the present instance this tank is open at the top but it is obvious that a cover may be provided to close it if desired.

The circular vertical wall of the receptacle or tank is provided with spaced-apart upper and lower bearing rings, 10, and, 11, respectively which are securely bolted or otherwise secured to said wall so that bearings, 12, in the upper ring will be in vertical alinement with similar bearings, 13, in the lower ring whereby to sustain vertical rods, 14. It is to be understood that the bearings, 12, and, 13, are preferably disposed about the entire circumference of the receptacle or tank wall although this is not essential, and that each pair of alined upper and lower bearings carry a vertical rod. In the present instance the machine shown employs thirty rods, 14, and as each rod forms a part of a filling mechanism there are also thirty complete filling devices on the machine. Of course the number of filling devices may be varied and the invention is not to be restricted in this respect.

By referring to Figs. 1, 3 and 4, it will be noted that the bottom, 15, of the receptacle or tank, 9, is provided with a series of outlets or openings, 16,—one opening or outlet being provided for each filling device. Beneath the receptacle or tank bottom there

are provided a number of measuring shells or devices, one of such devices being provided for each outlet or opening, 16. As all of these measuring shells are of the same construction a detailed description of one is deemed sufficient. By referring particularly to Fig. 4, of the drawing, it will be noted that a measuring shell, 17, has a lateral flange, 18, around its upper end which seats against the bottom, 15, of the receptacle or tank,—suitable bols, 19, being provided, as shown in Fig. 3, to rigidly secure the shell flanges in place. Each measuring shell has two vertical chambers, 20, and, 21, respectively which are separated by a wall, 22, and the upper ends of said two shell chambers are in direct communication with the receptacle or tank by means of the outlets or openings, 16. At the lower end the chamber, 20, of the measuring shell communicates with the chamber, 21, by means of a passage or opening, 23. In practice I prefer to form this passage so it will extend in an inclined direction from chamber, 20, to the chamber, 21,—the partition or wall, 22, being cut-away at its lower end to permit communication between the two chambers. While the term passage, 23, is herein employed to designate that opening between the two chambers it is to be understood that any opening that provides communication between the two chambers is included in this term passage. Below the opening or passage which provides communication between the two chambers, 20, and, 21, I provide the measuring shell with a discharge nozzle, 24, which may be thrown into communication at intervals with the chamber, 20, as will presently be more fully explained. A plunger or piston valve, 25, is located in line with the chamber, 21, so as to be moved vertically from the nozzle into the said chamber during the filling of a can or other receptacle and from the said chamber into the nozzle during the measuring period. A rod, 26, extends vertically from the plunger or piston valve, 25, up through the chamber, 21, and also through the outlet or openings, 16, in the bottom of the receptacle or tank, 9. The upper end of this rod, 26, is pivotally connected to the lower end of a link, 27, which latter is pivotally sustained at its upper end from a bracket, 28, which is carried on the upper end of the rod, 14, which extends vertically on the exterior of the receptacle or tank wall. By referring to Figs. 3, 4 and 5 of the drawings it will be noted that the brackets, 28, extend horizontally over the upper edge of the circular tank wall and have two arms or side plates, 29, which sustain a pin, 30. The upper end of the link, 27, has a side hook-arm, 31, and a catch, 32, pivoted on a pin, 33, at one side of the hook-arm. By means of this construction the link may readily be attached to or detached from the bracket without the use of tools so the plungers, rods and links may be removed for the purpose of cleaning. Vertical movement is imparted to the rods, 14, and to the plungers or piston valves, 25, primarily by inclined tracks, 34, and, 35, respectively,—the former inclining upwardly from a lower cam track, 36, to an upper cam track, 37, and the latter track 35, inclining downwardly from the upper cam track, 37, to the lower track, 36. Each rod carries a head, 38, which is adjustably secured thereon by means of a set screw, 39. The head is provided with a roller, 40, at one side which projects over and rolls on the tracks as the tank or receptacle revolves. As hereinbefore explained the rods, 14, are carried in bearings, 12, and, 13, on the outer side of the tank or receptacle, and in order to prevent said rods from rotating in said bearings the heads, 38, which are rigid on the rods are each provided with depending arms, 41, having lateral-turned bifurcated ends, 42, which straddle the next adjacent rod, as clearly shown in Fig. 5 of the drawings.

From the foregoing explanation it is to be understood that the tank or receptacle is continuously revolved, carrying the various filling devices in the rotary path with it, and during the travel the rollers, 40, will ride from the lower track, 36, at which time the plungers, 25, are down in the nozzles, 24, as seen in Fig. 4 then up inclined track, 34, to upper track, 37, thereby elevating the said plungers into the chamber, 21, as shown in broken lines in Fig. 4. In making this stroke the plungers pass from a point below the passage, 23, to a point above the said passage, 23,—thereby cutting off communication between chambers, 20, and, 21, when the plunger is in one position; establishing communication between those two chambers when the plunger is in another position and also serving to establish or cut-off communication between the chamber, 20, and the nozzle.

Before explaining the means employed in the chamber, 20, and the devices for actuating the same to effect the measuring of the material, it is deemed advisable to first describe in a brief way the mechanism for carrying the cans.

By referring to Figs. 1, 3 and 5 of the drawings it will be noted that the machine makes use of a can conveyer that approaches the endless or circular series of filling mechanisms at one side thereof; extends in a circular direction directly beneath the filling nozzles and then turns laterally and passes from beneath the filling nozzles after having made a partial circuit. The conveyer is substantially the same as that shown and described in the U. S. Patent Number

908,373 granted to me on the 29th day of December 1908 and makes use of an endless conveyer 43, which carries an endless series of can-seats, 44, on the upper ends of vertical spindles, 45. These spindles, 45, have movement in a vertical direction through the pivot points of the conveyer so that at a certain period in their travel they may be raised or lowered as and for a purpose presently to be explained. A suitable wheel, 46, is mounted on the vertical shaft, 4, so as to turn in a horizontal plane below the filling nozzles and the periphery of this wheel has suitably spaced-apart teeth, 47, which project between the pivots of the endless conveyer as shown in Fig. 3, and sustain the latter and at the same time impart a movement to the conveyer through a circular path. Directly beneath the wheel, 46, there is provided a second bearing wheel, 48, which is also mounted on the vertical shaft, 4, so as to turn with the latter and also with the wheel, 46. This bearing wheel has a plurality of depending bars, 49, extending vertically from its under side of its periphery and the lower ends of said bars sustain a horizontal ring plate, 50, which latter turns or rotates in a pendant position below the wheel, 48, and also about the vertical shaft, 4. Another ring plate, 51, encircles the ring, 50, and is sustained by and moves with the latter, as best shown in Fig. 3,—suitable plates, 52, serving in the present instance to secure the plates, 50, and, 51, in rigid relation. The encircling ring plate, 51, is provided with an endless series of bearing brackets, 53, each of which pivotally carries a sort of bell-crank lever, 54, as best illustrated in Figs. 5 and 7 of the drawing. One end of each bell-crank lever has position directly beneath a spindle, 45, which carries one of the said can seats, 44, while the other end of each bell-crank lever is provided with a roller, 55, at its outer side which travels or rolls on a circular cam-track, 56, which extends around the lower portion of the vertical shaft, 4.

By referring to Fig. 3, of the drawing it will be noted that the cam-track, 56, has a slight dip, 57, as shown in broken lines. This dip occurs directly beneath that point in the circular path of travel where the endless conveyer moves or diverges from the circular path to carry the filled cans away from the filling nozzles, consequently at such dip, the rollers, 55, will move downwardly allowing both the upper and lower ends of the bell-crank levers to swing downwardly and thereby cause the spindles, 45, and can-seats, 44, to be lowered so as to impart a like lowering movement to the cans, 58, which are carried on the seats to withdraw the latter from beneath the nozzles. In a reverse movement of bell-crank levers by reason of the rollers, 55, riding up out of the dip, 57, the can seats with the cans thereon will be seated up against the nozzles,—suitable centering fingers or projections, 59, on the lower ends of the nozzles serving to center the cans.

It will be understood that the teeth, 47, on the wheel, 46, and the bell-crank levers, 54, on ring-plate, 51, are always in vertical alinement with the nozzles, 24,—those parts all rotating together with respect to the nozzles above and the bell-crank levers below.

By now referring to Figs. 3 and 7, of the drawings it will be noted that the bearing wheel, 48, and ring plate, 50, have vertical bearing passages or openings so that suitable rods, 60, may be sustained in vertical positions thereby. By referring to Fig. 7, it will be noted that these vertical rods, 60, are located between adjacent depending arms, 49. In practice one of these rods, 60, is provided for each filling mechanism on the machine, so that if there are thirty filling devices there will be thirty rods. Each rod, 60, is provided with a head, 61, which is adjustably secured thereon by means of a set screw, 62, and each head has a notch, 63, at one side so as to embrace a depending arm, 49, and thereby prevent rotation of the rods, as clearly shown in Fig. 7. The inner side of each head, 61, carries a roller, 64, which latter projects into a circumferential groove, 65, of a stationary inclined cam, 66, in which groove said rollers travel as the wheel, 48, turns and carries the rods and heads around with the shaft. The stationary cam, 66, is pivotally sustained at one side at, 67, so that a set screw, 68, or equivalent adjusting device may be operated to raise or lower the opposite side whereby to incline the groove more or less for the purpose of varying the extent of the vertical stroke of the rods, 60, during each revolution of rods, 60, heads, 61, and rollers, 64, around the cam. It is believed to be obvious that as the rods travel around the cam the rollers, 64, being retained in the cam groove, 65, must necessarily cause the heads, 61, to move vertically and as the heads and rods, 60, are rigid the latter will be given one up and down stroke during each rotation of the shaft, 4. This up and down stroke of each rod, 60, is utilized to effect a measuring of the material before it is deposited into a can as will now be described, particular reference being made to Figs. 3 and 4 of the drawings.

It will be noted, by referring to Fig. 4, that the chamber 20, is provided with a plunger or piston, 69, and that a rod, 70, is connected to said plunger or piston and extends downwardly therefrom, passing through a suitable stuffing box, 71, beneath the chamber, 20, and projecting on the exterior of the measuring shell.

Now by referring to Fig. 3, of the draw-

ing it will be noted that the lower end of the plunger or piston rod, 70, is rigidly connected to the upper end of the vertical rod, 60, by means of a coupling member, 72, so that for all practical purposes said rods, 70, and, 60, may be one and the same rod as they make all their movements together. It will therefore be seen that as rod, 60, is given one complete up and down stroke while each filling mechanism makes a complete revolution with the shaft, 4, so also will the plunger or piston, 69, make one up stroke and one down stroke in the chamber during each of said revolutions.

In some cases I prefer to provide a tube, 73, which passes through the plunger or piston, 69, from the upper side and the lower end of which tube is exposed in the chamber, 20, beneath the bottom side of the plunger. This tube is of such length that it will extend up through the tank or receptacle, 9, and project above the surface of the material in said tank or receptacle. By means of this tube air will be admitted to under side of the plunger or piston to allow the material to entirely discharge when the piston valve, 25, is elevated.

If for any reason it is desired to have the measuring shells, tank and coacting devices to rotate with the shaft without cans being present on the can seats and at the same time prevent the escape of material from the nozzles, 24, this may be done by releasing a sustaining bolt, 74, which is carried on a bracket, 75, at the end of the upper cam track, 37, as clearly shown in Figs. 1, and 6, of the drawings, so that the inclined track, 35, may drop down from the upper track, 37, and allow rollers, 40, heads, 38, and rods, 14, to remain in the lowered position shown in Fig. 4. While these devices are in this lowered position the piston valves, 25, will remain in the lower ends of the nozzles, 24, consequently materials cannot escape from either chamber, 20, or, 21, and loss of such material will be prevented. A suitable hand lever, 76, is attached to the inclined track, 35, whereby the same may be raised or lowered by hand.

To provide a positive downward movement for the rods, 14, and avoid depending on gravity alone, I provide a bracket, 77, adjacent to the inclined track, 34, and pivotally sustain a lever, 78, from said bracket in order that the rollers, 40, and heads, 38, may pass beneath said lever and be pushed down by the latter.

A suitable spring, 79, yieldingly draws the levers, 78, down so that a stop, 80, on the lever will normally rest on the upper end of a stationary bracket, 81, as clearly shown in Fig. 2.

In operation, the cans to be filled are placed on the can seats, 44, with their open ends uppermost, and are carried by said can seats beneath the endless series of filling shells so that the successive cans will be brought into register with the successive depending nozzles, 24. After the can is in position beneath a nozzle its seat, 44, will be elevated by the roller, 55, actuating the bell-crank lever, 54, to raise the spindle, 45, thus elevating the can and bringing its open end into filling connection with the nozzle, 24, above it. At the time the can is elevated and brought into filling connection with the nozzle, the piston valve, 25, is located in the nozzle below the passage or opening, 23, so that the said passage will remain in communication with chamber, 21. Before the valve, 25, cuts off communication between chambers, 20, and, 21, the plunger or piston, 69, will be raised in the chamber, 20, by the roller, 64, traveling in the groove, 65, of the stationary cam, 66. This upward movement of the plunger, 69, will allow the flow of material from the chamber, 21, through passage, 23, into chamber, 20, beneath the plunger, 69,—it being understood that chamber, 21, is always in communication with the storage tank or receptacle, 9. It will thus be seen that when the upward movement of plunger, 69, occurs material from the tank flows into chamber, 20, by way of the chamber, 21, and that chamber, 20, below the plunger, 69, can only receive material from the receptacle, 9, through chamber, 21. It will thus be seen that chamber, 20, is substantially a measuring chamber while chamber, 21, is a feed chamber to allow material to pass to chamber, 20, from the receptacle when plunger, 25, is down and when plunger, 69, makes its up-stroke. The valve, 25, in nozzle, 24, is now raised by means of the rod, 26, link, 27, head, 28, and rod, 14, which latter is elevated by the roller, 40, on head, 38, riding up the inclined track section, 35. When the valve, 25, has been elevated sufficiently to pass beyond or above the passage, 23, the plunger, 69, is depressed by roller, 64, traveling down the inclined groove, 65, of cam, 66, and the material previously measured in the chamber, 20, below the plunger will then be forced out through passage, 23, into the nozzle, 24, and to the can. The valve, 25, is then moved downwardly past the passage, 23, into nozzle, 24, and first cuts off communication between said passage and nozzle and then by passing below the said passage again establishes communication between chambers, 20, and, 21. In making the downward movement into the nozzle, the valve, 25, also effectively discharges all the material from the nozzle into the can, after which the can seats and cans are lowered by the rollers, 55, following the dip, 57, in track, 56, and the can-seats with the filled cans thereon are led away from the wheel, 46.

Having thus described my invention what

I claim and desire to secure by Letters Patent is:—

1. In a can-filling machine, the combination with a tank having a plurality of outlets, of a measuring shell at each tank outlet and each shell having two chambers with a communication between said chambers; a plunger in each chamber of each shell; means for moving the tank, shells and plungers in a circular path; means for carrying cans in a circular path with the tank and shells; means for moving one plunger in each shell to admit material from the tank; means for moving the other plunger in each shell to cut-off material between the tank and shell and to allow the material admitted to the shell to escape.

2. In a can-filling machine, the combination with a tank having a series of outlets arranged in a circular row, of a measuring shell at each outlet of the circular row of outlets and each shell having two chambers with a communication between said chambers; a plunger in each chamber of each shell; means for sustaining a series of cans with one can adjacent to each shell; means for moving the tank, shells and can-sustaining means in unison in a circular path and means for successively actuating the plungers in the shells during their circular movement to admit material from the tank then cut-off communication between the tank and shell chambers and discharge the material from the shells in succession.

3. In a can-filling machine, the combination with a circular tank having a plurality of bottom outlets, of a measuring shell adjacent to each tank outlet and each shell having two chambers,—said chambers being in communication; a plunger movable in one chamber of each shell at one side only of said point of communication; a plunger movable in the other chamber of each shell and crossing said point of communication between the chambers; means for sustaining a can beneath each shell; means for moving the tank, shells, the plungers in the latter and the can-sustaining means all in a circular path, and means during the circular movement of the tank and cans for actuating the plungers in each shell to admit material into one chamber of the shell from the tank and to then cut off communication between the other chamber and the tank while the material is discharged from the first-named chamber.

4. In a can-filling machine, the combination with a circular tank having a plurality of bottom outlets, of a measuring shell adjacent to each tank outlet and each shell having two chambers,—one chamber being longer than the other and communicating with same; a plunger in the shorter chamber; a plunger in the longer chamber; means for actuating the plunger in said longer chamber to throw the two chambers into communication with the tank; a can-sustaining means; means for moving the tank, shells and can-sustaining means in a circular path; means for actuating the plunger in the shorter chamber to admit material therein from the longer chamber, and means for actuating the plunger in the longer chamber to allow the material in the shorter chamber to escape.

5. In a can-filling machine, the combination with a rotatable tank having a plurality of outlets, of a measuring shell secured to the tank adjacent to each outlet of the latter and each shell having two chambers; two plungers in each measuring shell one plunger being in each chamber thereof; means extending up through the tank for raising and lowering one of said plungers as the tank revolves; means below the tank for raising and lowering the other of said two plungers as the said tank revolves whereby to admit material from the tank into the shells and discharge said material from the shells in succession and a can-carrying means movable with the shells and tank and sustaining a can adjacent to each shell.

6. In a can-filling machine, the combination with a rotatable tank having a plurality of outlets, of a measuring shell adjacent to each outlet of the tank; two plungers in each measuring shell; two cam-tracks; means connected with one plunger of the shell and extending through the tank and coacting with one cam-track to move said plunger and admit material from the tank to the shell as the tank revolves; means connected with the other plunger of a shell and coacting with the other cam-track to move said latter plunger as the tank and shells travel; means for carrying cans adjacent to the shells and means for moving the tank and shells in a circular path.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES H. AYARS.

Witnesses:
O. W. ACTON,
MARY D. BANKS.