March 27, 1928. 1,664,002

C. W. STONE ET AL

RECEPTACLE FILLING MACHINE

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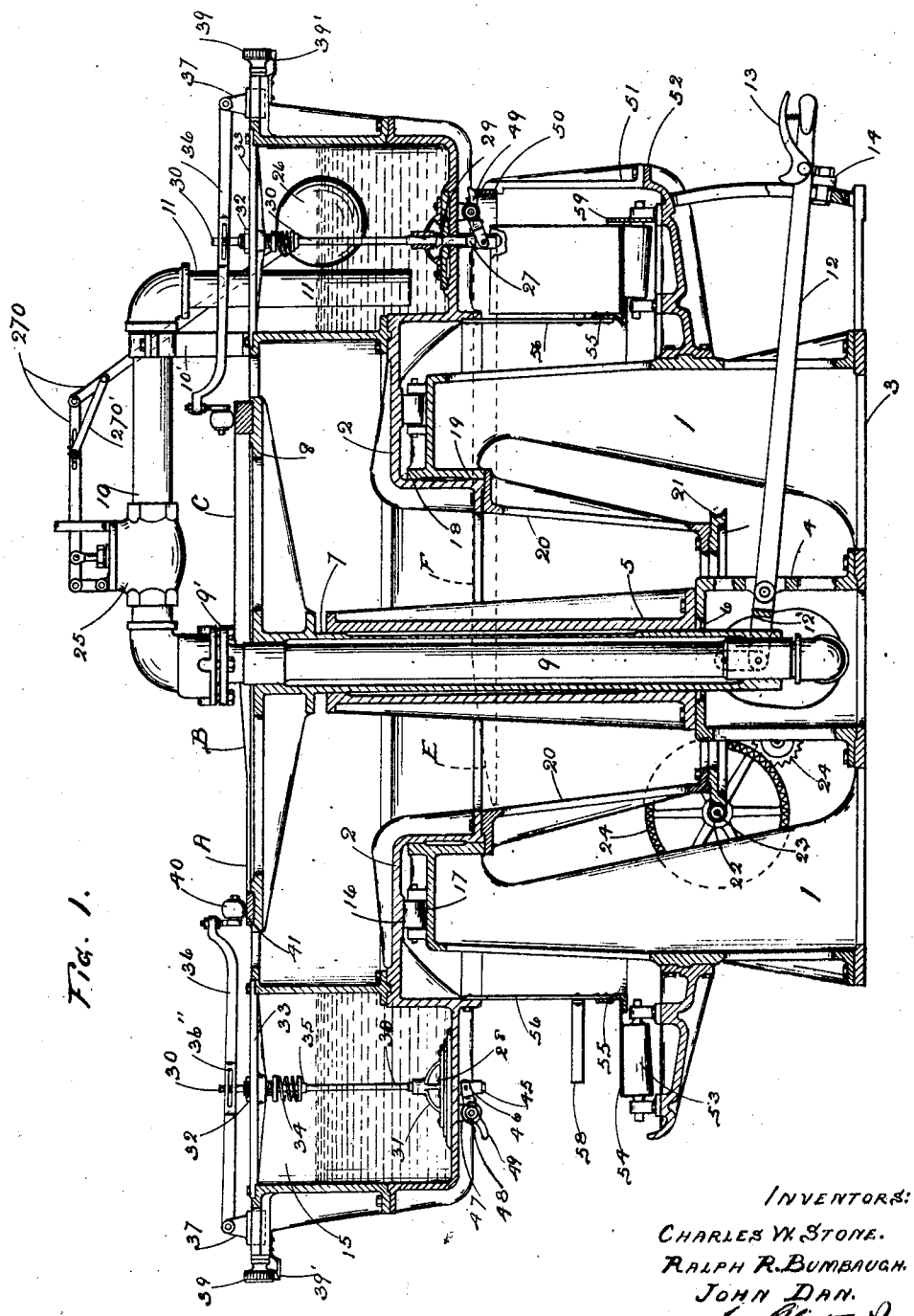


Fig. 1.

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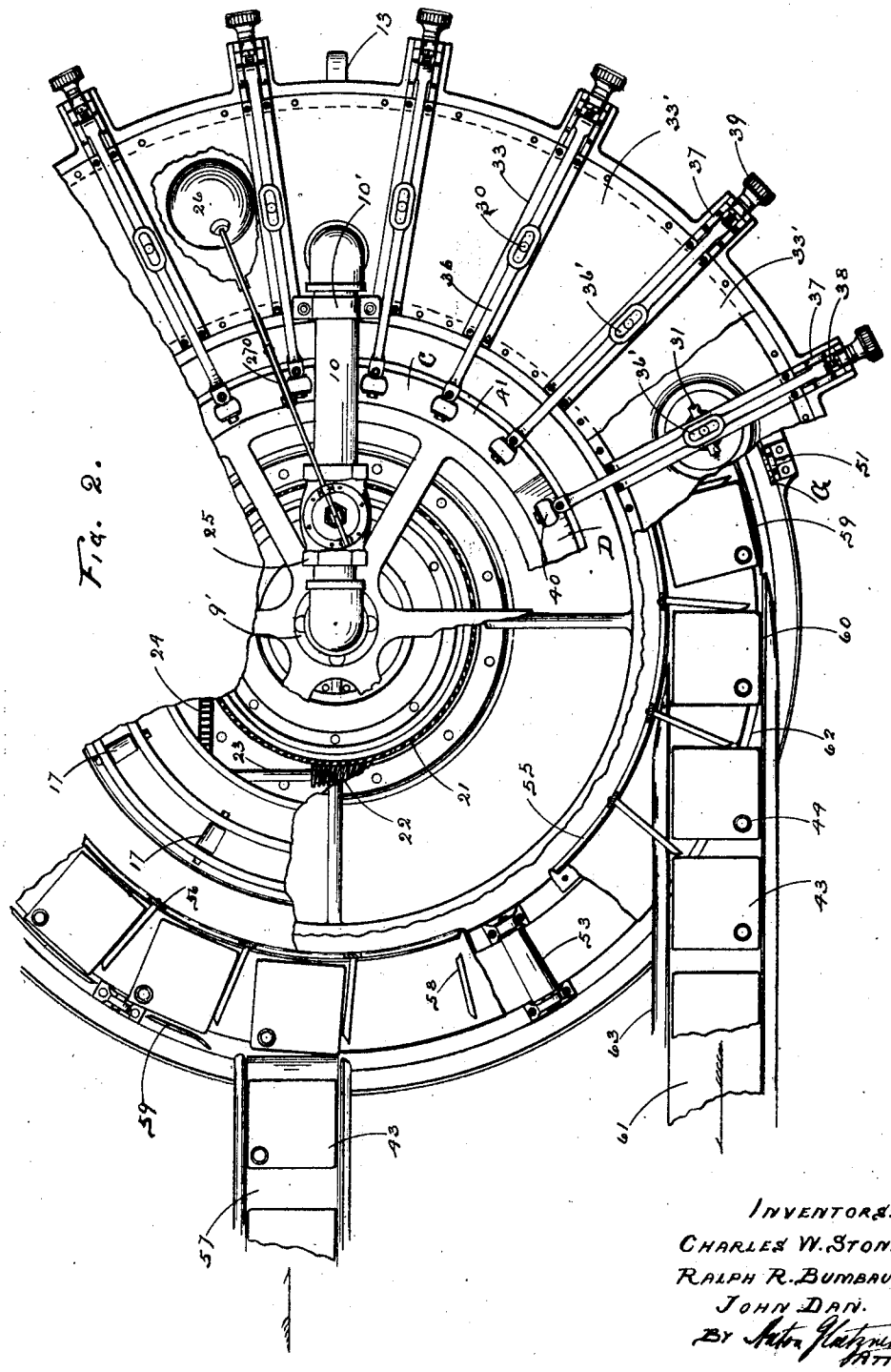


Fig. 2.

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UNITED STATES PATENT OFFICE.

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RECEPTACLE-FILLING MACHINE.

Application filed August 25, 1924. Serial No. 733,866.

Our invention relates to a machine for filling cans or other receptacles with liquids, granular or other material, and it has more especial reference to that class of dispensing machines in which receptacles may be filled in uninterrupted continuity from a common container or reservoir.

The object of our invention is to provide an apparatus of this character in which the factor of time governs and controls the filling of the cans or receptacles; in which the quantity of fluid delivered shall be automatically controlled with respect to each individual receptacle; in which the quantity to be delivered to the receptacles continuously may be varied during the operation of filling, whereby receptacles of different content-capacity may be filled, and in which the entire filling-controlling mechanism may be placed in inoperative position without interfering with the other appurtenant parts of the machine.

Other objects will appear from the specification following, in connection with the accompanying drawings, which illustrate a form of means for carrying out the principle of the invention, and in which

Fig. 1 is a vertical sectional elevation showing in the preferred embodiment of the invention a can-filling means, a revoluble tank or reservoir from which the supply for the cans is derived; control mechanism for the liquid and regulating means for the control means for governing the quantity which the control mechanism shall deliver in a given or predetermined period of time, and

Fig. 2 is a fragmentary plan view of an assembled device embodying our invention.

The invention comprises broadly a combination of means actuable seriatim to accomplish the operation of the fluid controlling means, first, initially to open same; second, to hold same open for a pre-determined length of time, and third, to close same when a can or receptacle has been supplied with a required quantity of fluid.

The invention comprises also means, complementary to those recited, for conducting the fluid material into the receptacles to be filled, without splashing, and a means whereby the entire fluid-controlling means may be set in inoperative or operative position.

In the accompanying drawings, the invention is shown as consisting of a sectional stationary main frame 1, and a revoluble frame 2, the main frame 1 forming a support for and around and upon which the revoluble frame is movable, and the sections of the main frame 1 mounted upon a base or sole plate 3. A hollow base 4, constituting a central part of the frame 1 is fastened to the sole plate and forms a support for the hollow pillar 5 which is attached thereto preferably by bolts.

The base unit 4 is provided with a central opening 6, registering with the bore through the vertical pillar 5 and is arranged to accommodate the hollow tubular post 7 of an annular track support 8, hereinafter more specifically referred to. Through said hollow post 7, extends a fluid conveying standpipe 9, connected at the bottom with a source of fluid supply, and to the top of which and above said support 8, is conjoined by a swivel connection 9′ with a complementary pipe 10, having a nozzle 11, for discharging the fluid, as pointed out later. The hollow post 7, connected with and forming part of the track-support 8, is movable in a vertical plane relative to said standpipe 9, and also relative to said pillar 5, by a lever 12, having a bifurcated end 12′ conjoined by pivotal connection with the bottom of said post, as shown. This lever 12 is fulcrumed in said hollow base unit 4 and extends beyond the frame sufficiently far to afford a convenient purchase for the foot or hand in manipulating the lever 12 and the means 13 for locking the lever in position of adjustment. An adjustable stop member 14 is also provided in the frame and is disposed in the path of movement of said lever 12, for limiting the downward movement thereof, which movement regulates the extent of elevation of the track-support 8. By this means, the control of the entire receptacle-filling mechanism is effected, that is, such mechanism is either set in motion for supplying the filling fluid in determinate quantities to the receptacles, or such mechanism is placed in an inoperative state, during which time no discharge of fluid occurs. The movement of the track support, however, does not interfere with the rotatory motion of the reservoir.

The track support 8 is supported, when in elevated operative position, by the lever 12 and is stationarily held against revolutionary movement thereby. When in inoperative position, the track-support 8 rests upon the

top of the pillar 5, and when in such position, the frame 2 is free to rotate independently of the support 8.

The frame 2 is shown as consisting in the main of an annular fluid receiving and containing tank or reservoir 15, provided with an annular bearing surface 16, which rests and is operable upon a plurality of circumferentially arranged rollers 17, journaled upon the top of the frame 1, as shown. The frame 2 is also shown as being formed with a cylindrical portion 18, vertically disposed and co-operating with a similar portion 19, on the stationary frame 1, in insuring steadiness of the apparatus and reducing vibration. A dependent cylindrical part 20 is bolted or otherwise fastened to the cylindrical portion 18 and to this dependent part 20 is fixed in any suitable manner a worm gear 21, which encircles the base unit 4 and with which a worm 22 is in mesh. This worm 22 is keyed or turned upon a shaft 23, which is set in motion by geared means, generally indicated at 24, through which the entire frame 2 is revolved. The annular fluid containing and receiving tank or reservoir 15 is supplied with a quantity of fluid delivered through the nozzle 11 and the quantity of fluid in the tank 15 is regulated by a valve 25, in the complementary pipe 10, which is connected by a member 10′ with the tank 15 for movement therewith and which is controlled by a float 26, through intermediate connecting members, generally shown at 270. Included in these members is a bar 270′ for obtaining a fixed position of the members 270, by which the height of the fluid in the reservoir may be automatically regulated.

The tank is provided with a plurality of equally distanced spouts 27, through which the fluid in the tank 15 is discharged. Valves 28, operable relatively to seats 29 within said reservoir of tank 15, control the passage of the fluid through said spouts 27. These valves 28, are mounted on the ends of stems 30, operating in guides 31, on the bottom of the tank and extending through upper guides or bearing sleeves 32, which thread and are secured in spaced cross bars 33, bridging the tank 15. The tank 15 is covered by a plurality of plates 33′ secured upon the tank between the cross-bars 33 and provided to prevent evaporation, contamination and generally to reduce the fire danger.

These sleeves 32 are adjustable in cross-bars 33 relatively to said valve stems 30 for regulating the tension of springs 34, which are coiled about the stems 30 and are interposed between the sleeves 32 and collars 35 on the stems and tend to urge the valves thereon upon their seats. The upper ends of said valve stems 30, are pivotally and slidably connected with operating levers 36, by which the valves 28 are lifted against the tension of the springs 34. These levers 36 are pivotally supported at their outer ends upon and in suitable bearings 37, which are adjustable by threaded means 38, manually operable by knurled means or heads 39 held in position by tension means or pawls 39′. At their inner ends, these levers are supported upon rolling members or elements 40, which travel upon a track 41, constituting an integral part of the support 8 and having varying planes, as pointed out presently, for effecting, first, the normal closed position of the valves; second, the gradual opening of the valves; third, the maintenance of the valves in open position, and fourth, the closing of the valves.

To regulate the valves relative to their respective seats 29, and insure uniformity of movement of each valve, the adjustable means 38 is provided. The manipulation of the threaded means 38 moves the levers 36 with respect to the valve stems 30 and, according to the direction of movement of the levers 36 and the position of the fulcrum connection between them, and the stems, is the extent of movement of the valves determined. In this manner, each of the valves has an independent adjustment by which a uniform control of the discharge or feed of the fluid from the tank or reservoir may be assured, either while the machine is inoperative or during the operation of the same.

The track 41 is shown as formed with surfaces A, B, C and D, Fig. 2, the surface A and the surface C being in parallel planes, but the surface C lying in a higher elevation than the surface A. These surfaces A and C are connected by the inclined way B, and the surfaces C and A are connected by a declined way D, all for the purposes now appearing. The rolling members or elements 40, travel with the levers 36 upon the track 41, and initially upon the surface A of same. During such travel of the members 40, the valves 28 are held upon their seats 29, and closed by the springs 34, and the spouts 27 are obviously also closed. When, during the revolution of the tank 15, with the frame 2, the rolling members 40 are caused to ascend the incline B of the track 41, the levers 36, are gradually lifted, such lifting continuing until the surface B has been traversed and the rolling members are moved upon the higher horizontal plane C of the track. The lifting movement of the valves 28 occurs concurrently with the movement of the stems 30 to which they are attached and the stems are carried upwardly or permitted to move downwardly by said levers 36. The full open position of the valves 28 is maintained by the surface C for a definite length of time determinable by the extent of such surface and the speed with which the levers 36 travel over such surface, and for purposes of this invention,

the extent of the surface C is such that the quantity of fluid passing through the valve-controlled spouts 27 during the traverse of the rolling members 40 over such surface C is just sufficient to meet a definite or given measure. It will be seen that the operation of the valve-stem-controlling levers is dependent entirely upon the position of the track 41, with respect to the rolling members 40. When in the position indicated in Fig. 1, the rolling members 40 are operative upon the track 41, and the valves will answer in movement according to the various planes over which the rolling members 40 travel. When the support 8, with its track 41, is lowered into engagement with and upon the top of the pillar 5, the revolution of the valve-operating levers 36, with the revoluble frame 2, will occur without being affected by the track 41. By the lever 12, the track 41, may be adjusted vertically between the limits of its movement and held in such position. The adjustability of this track 41, in the manner noted, provides for a regulation of the valves 28, that is, of the movement of said valves relative to the outlets in the reservoir, in accordance with the supply desired discharged from the tank 15. This means, to wit, the movable track may regulate all of the valve-movements, but each individual valve-movement may be independently regulated at any time for accurately causing cans of varying capacities to be filled. The means for adusting this valve movement has already been referred to and described.

Cans or other receptacles 43 to be filled from the tank are positioned with their mouths 44 in register with the spouts 27 on the tank. Between the openings or mouths 44 in the cans 43, and the spouts 27, there is necessarily a space, which, even with accurately alined receptacles, would permit leakage and splashing of the fluid leaving the tank 15. To prevent this, we have provided funnels or other devices 45, which fit over or telescope on said spouts 27, and to which are pivotally attached operating levers 46, fulcrumed in suitable bearings 47, on the underside of the tank 15. The levers 46 are under influence of springs 48 tending normally to hold said levers 46 and funnels 45 retracted with respect to the spouts 27, and they are provided with extensions or fingers 49, by which their operation against the tension of the springs 48 is controlled. These extensions or fingers 49 are arranged to travel with the tank 15, upon a track 50, having varying planes E, F and G, corresponding accurately with the planes B, C and D of the track 41. These planes E, F and G control the operation of the levers 46 and the funnels 45, synchronously with the operation of the valves 28, that is, simultaneously with the opening of the valves. The downward movement of the funnels relatively to the spouts 27 is accomplished by the movement of the levers 46 and such downward movement projects the funnels 45 into the cans or receptacles 43 and holds them in that position until the regulated quantity of fluid has been supplied. With the closing of the valves 28, by the means stated, the simultaneous withdrawal of the funnels 45, from the cans or receptacles is effected by the springs 48 which exert themselves against the funnel-carrying levers 46 when the extensions or fingers 49 are carried by the revolving tank off the planes F and G of the track 50. The track 50 is supported and held in place by suitable standards, such as shown at 51, bolted or otherwise fastened to an annular support or stationary table 52, upon which are journaled a plurality of circumferentially arranged taper rollers or roller bearings 53, for supporting an annular, horizontally disposed apron 54, upon which the cans or receptacles 43, are carried by the revolving frame 2, during the filling thereof by the means outlined. The apron 54 is fastened at the inside thereof to a circular bracket 55, which is supported by a plurality of hangers 56, depending from a part of the frame 2. The apron 54 and its parts, as shown, are complements of the frame 2, with which they revolve. The cans or receptacles 43 are delivered upon the apron 54, by any means, as that shown at 57, and they are spaced apart the distance required by arms 58, which are mounted upon and extend at right angles to the hangers 56 and prevent the cans from shifting during the travel and filling of them. The cans 43 are also steadied during their travel, by the bracket 55 and a guard 59, attached to the stationary table 52 and, as seen, is fixed, while the bracket 55, and the guide arm 58 are revoluble.

At a point in the revolutionary travel of the machine and the cans or receptacles carried thereon, and after the filling of the cans in continuous succession has been completed, the removal of the cans from the apron 54 is effected in a continuous automatic manner. The guard and guide 59, at that point in the revolutionary travel of the frame 2, where the filling of a can has been completed, continues at a tangent to the periphery of the apron 54 and terminates slightly inwardly of a projecting ledge 60 formed on a table 61, which is in substantially the same plane as the apron 54 and which has its entrant edge 62 curved in correspondence with the peripheral edge of the apron. The table 61 is provided with a ledge 63 which extends over the apron and terminates near the circular bracket 55. This ledge 63 co-operates with the ledge 60 in guiding and holding the cans 43 upon the table 61, the surface 64 of which is, as stated, in substantially the same parallel plane as the apron, whereby the cans

may be moved upon this table in continuous manner while being carried along by the apron 54 and arms 58. The engagement of the cans 43 with the apron and by the arms 58, continues until the cans have been moved entirely upon the table 61. The arms 58, then proceeding in their revolutionary travel with the tank 15, escape from between the cans.

What we claim, is:

1. In a machine for filling receptacles with fluids, the combination with a rotatable fluid containing reservoir having a plurality of outlets, and a receptacle supporting device movable with said reservoir, of valves to open and close said outlets, valve operating devices movable with said reservoir, a circular cam track for operating said valve operating devices, and a lever selectively operable to move said cam track into or out of engagement with said valve operating devices.

2. In a machine for filling receptacles with fluids the combination with a rotatable fluid containing reservoir having a plurality of discharge openings and a receptacle supporting means movable with said reservoir, of valves normally closing said openings, actuating means for said valves to open same and permit a predetermined quantity of fluid to discharge from said reservoir, and means to control said actuating means to vary the movement of said valves relatively to said openings and thereby vary the predetermined quantity of fluid to be discharged from said reservoir.

3. In a can filling machine, a main frame, a track formed with a plurality of planes varying in elevation, a circularly movable reservoir supported upon said frame, means to regulate the quantity of fluid delivered to and contained within said reservoir, valves within said reservoir normally closing said outlets, levers to which said valves are connected operable upon said track, and means for varying the fulcrum of said levers to vary the relative extent of movement of said valves.

4. In a can filling machine, a main frame, a track formed with planes varying in elevation, a circularly movable reservoir supported upon said frame, means to supply fluid to said reservoir, means to maintain constant in said reservoir a supply of fluid, said reservoir having a plurality of outlets, a plurality of levers fulcrumed upon said reservoir and operable upon said track, valves within said reservoir normally closing said outlets and connected with said levers, and means for adjusting said levers to regulate the extent of opening of said valves.

5. In a can filling machine, a rotatable reservoir having a plurality of outlets, a nozzle attached to said reservoir for supplying a fluid thereto, a main supply stand-pipe to which said nozzle is swiveled, a main stationary frame, a tubular post extending through said frame and surrounding said stand-pipe, said post carrying a substantially horizontal annular track formed with planes varying in elevation, valves within said reservoir, means connected to said valves and operable by contact with said track to control the movement of said valves.

6. In a can filling machine, a rotatable reservoir having a plurality of outlets, means for supplying a fluid to said reservoir, means to maintain constant within said reservoir a definite level of fluid, a track formed with varying elevations, levers fulcrumed on said reservoir and having rollers contacting with said track, valves closing said outlets and connected with said levers, and means for moving said levers relative to the point of connection with said valves to regulate the extent of movement of said valves.

7. In a can filling machine, a rotatable reservoir having a plurality of outlets, means for supplying a fluid to said reservoir, means to maintain constant within said reservoir a definite level of fluid, a track formed with various elevations, a plurality of levers fulcrumed upon said reservoir and having rollers contacting with said track, a plurality of valves within said reservoir normally closing said outlets and connected with said levers, and means for changing the fulcrum of each lever to regulate the extent of movement of each valve relative to the outlets and control thereby the amount of fluid discharged from the reservoir.

8. In a can filling machine, a rotatable reservoir having a plurality of outlets, a track having various elevations, said track being vertically adjustable, means to support said track in position of adjustment, a plurality of valves normally closing said outlets, levers fulcrumed upon said reservoir having rollers contacting with said track to operate said valves, said valves connected with said levers, and means for varying the fulcrum of each lever to control the extent of movement of said valves.

9. In a can filling machine, a rotatable reservoir having a plurality of outlets, levers fulcrumed upon said reservoir, valves normally closing said outlets and connected with said levers, and a lever operating track having varying surface elevations, a lever for moving said track in engagement with said levers, and means for locking said lever in moved position.

10. In a can filling machine, a rotatable reservoir having a plurality of outlets, levers fulcrumed upon said reservoir, valves normally closing said outlets and connected with said levers, a track having varying surface elevations, means for moving said track into engagement with said levers whereby said levers are operated during their rota-

tory travel, and means for moving said levers relative to said valves to vary the extent to which said valves may move.

11. In a can filling machine, a rotatable reservoir for a fluid having a plurality of outlets, levers fulcrumed upon said reservoir, valves seated upon said outlets and connected with said levers, means periodically operating said levers to permit a gravitational discharge of a determinate quantity of fluid from said reservoir in a predetermined length of time, comprising a track having varying surface elevations, means for adjusting said track relative to said levers to control their operation, and means for adjusting said levers to control the extent of movement of said valves.

In testimony whereof we have set our hands.

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