

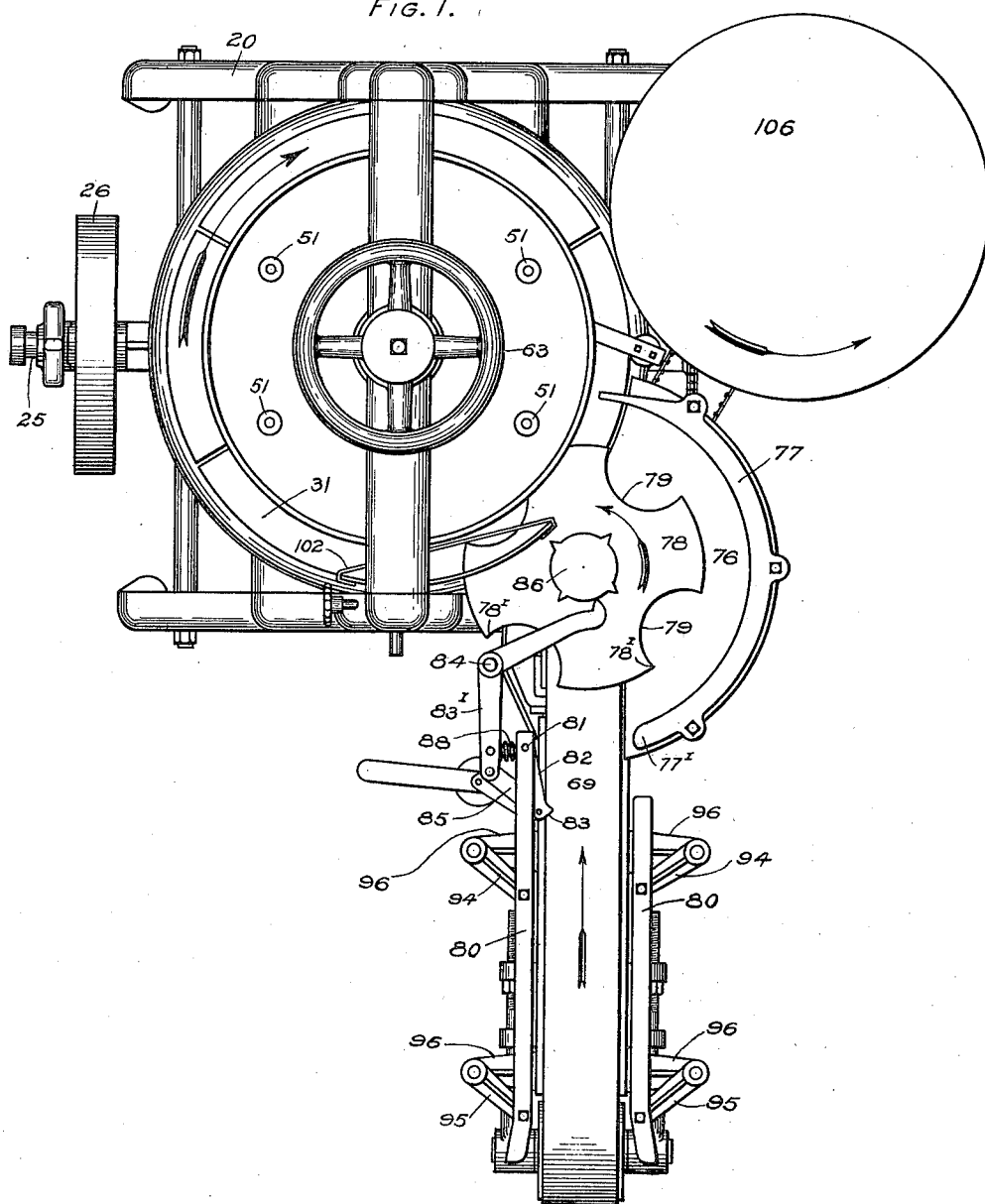
1,029,681.

J. P. HAIGHT.
CAN FILLING MACHINE.
APPLICATION FILED APR. 10, 1908.

Patented June 18, 1912.

6 SHEETS—SHEET 1.

FIG. 1.



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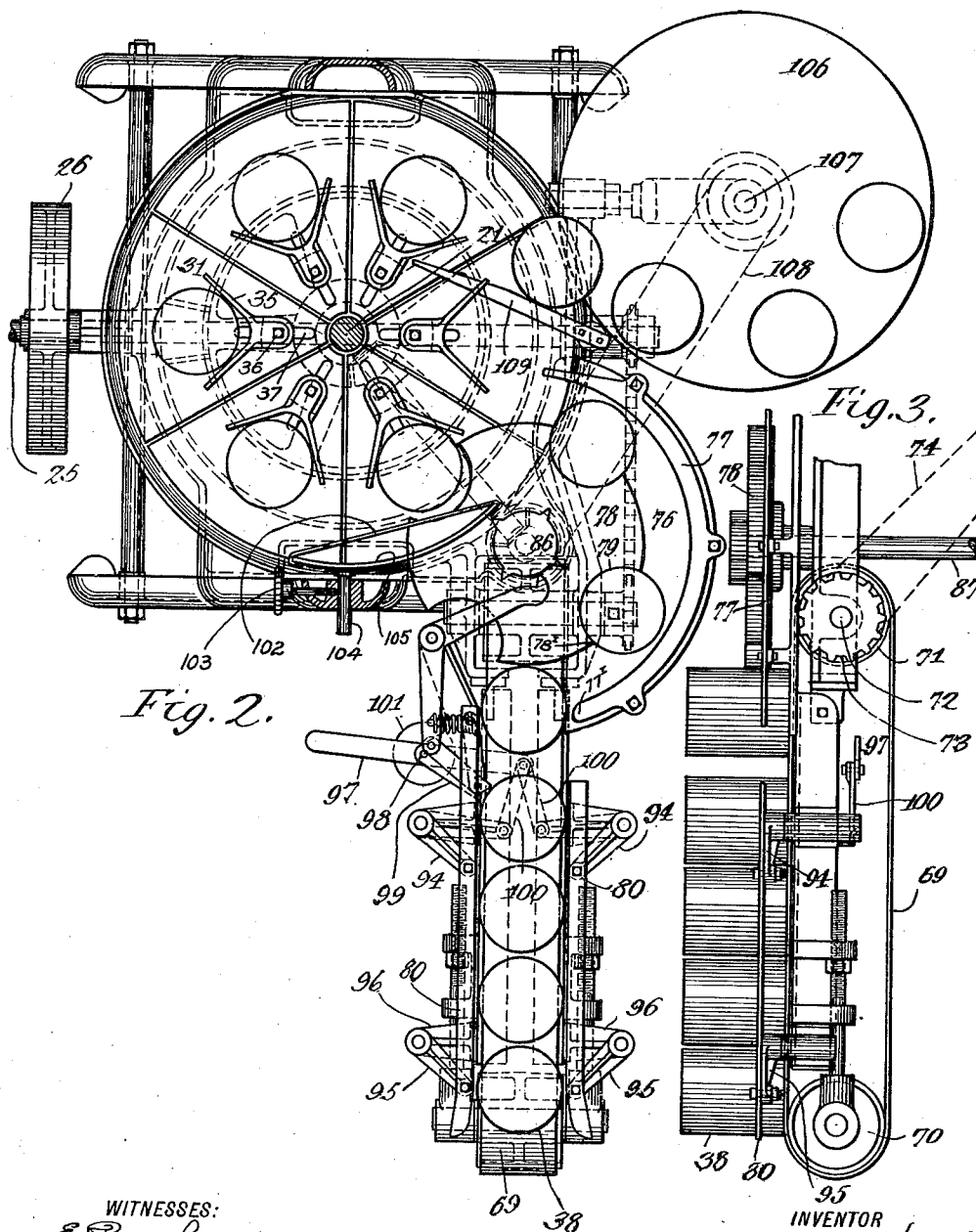
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6 SHEETS—SHEET 2.



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6 SHEETS—SHEET 3.

FIG. 4.

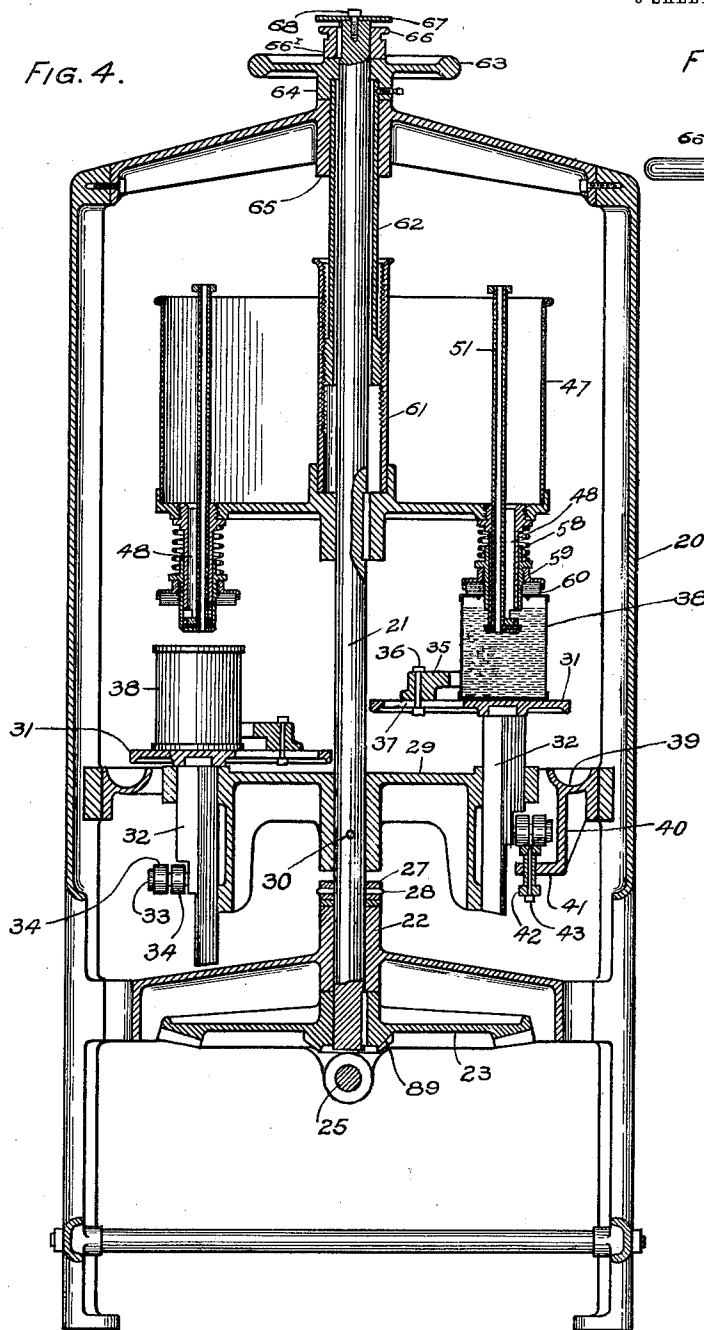
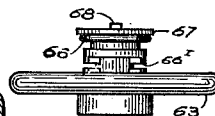


FIG. 11.



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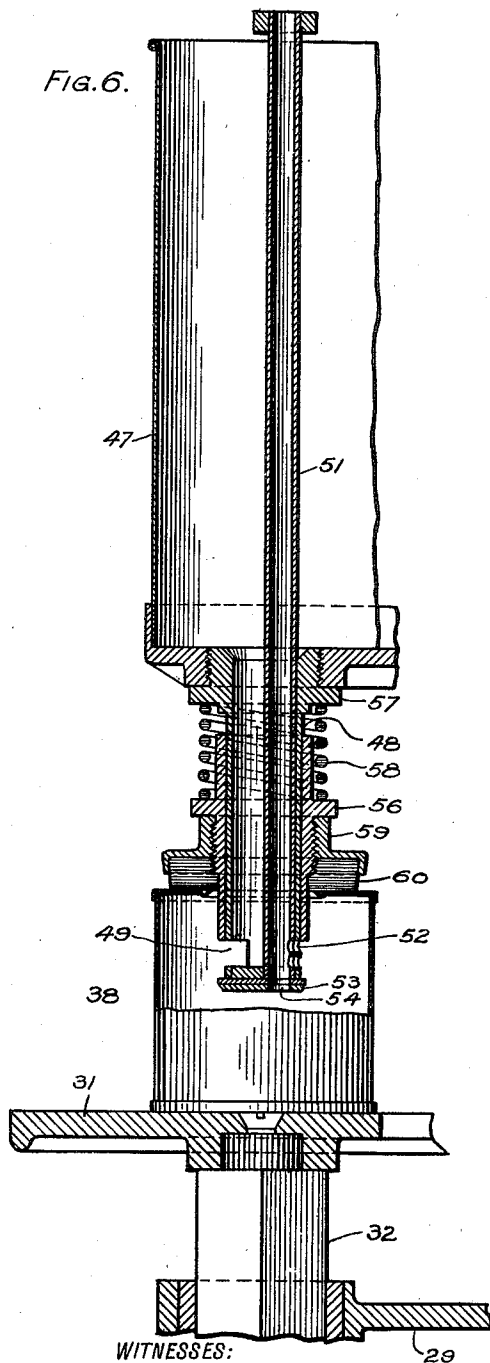
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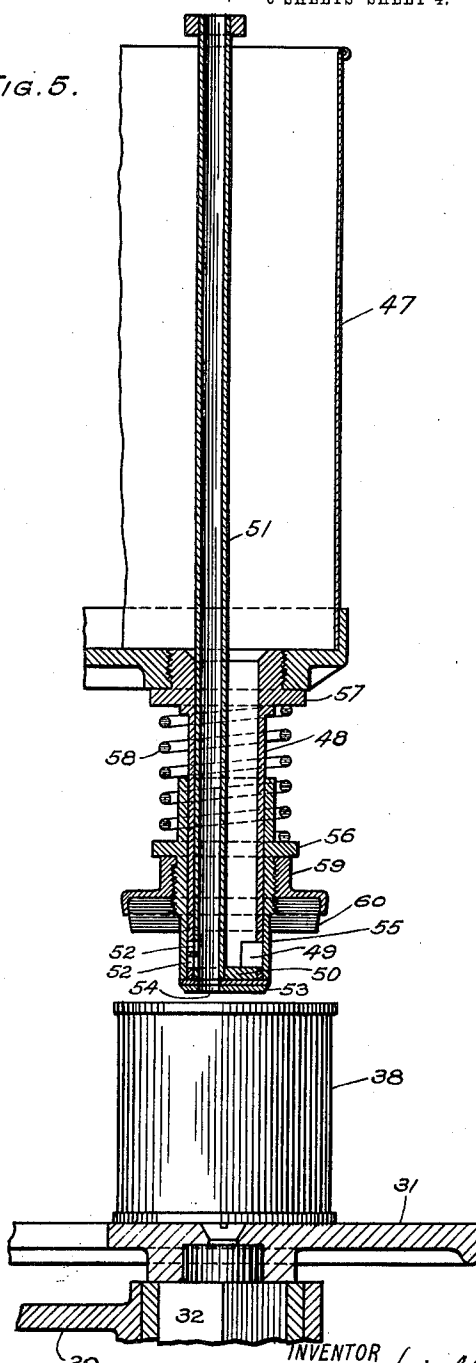
6 SHEETS—SHEET 4.

FIG. 6.



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FIG. 5.



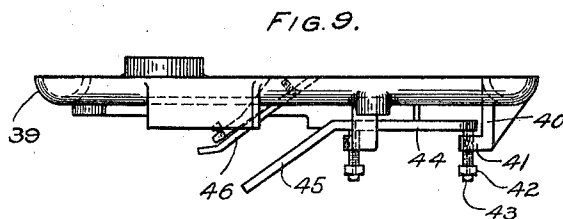
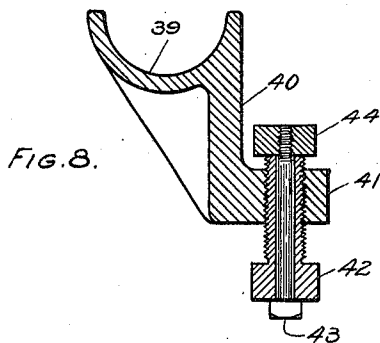
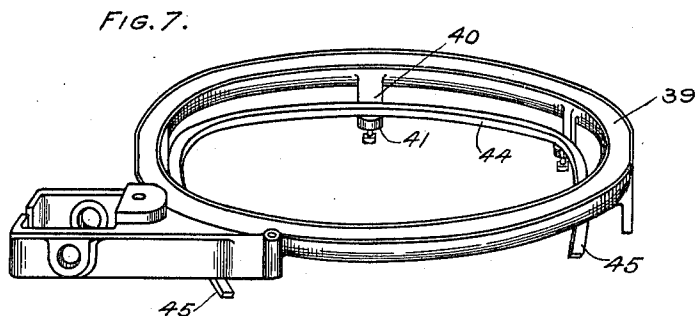
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APPLICATION FILED APR. 10, 1908.

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6 SHEETS—SHEET 5.



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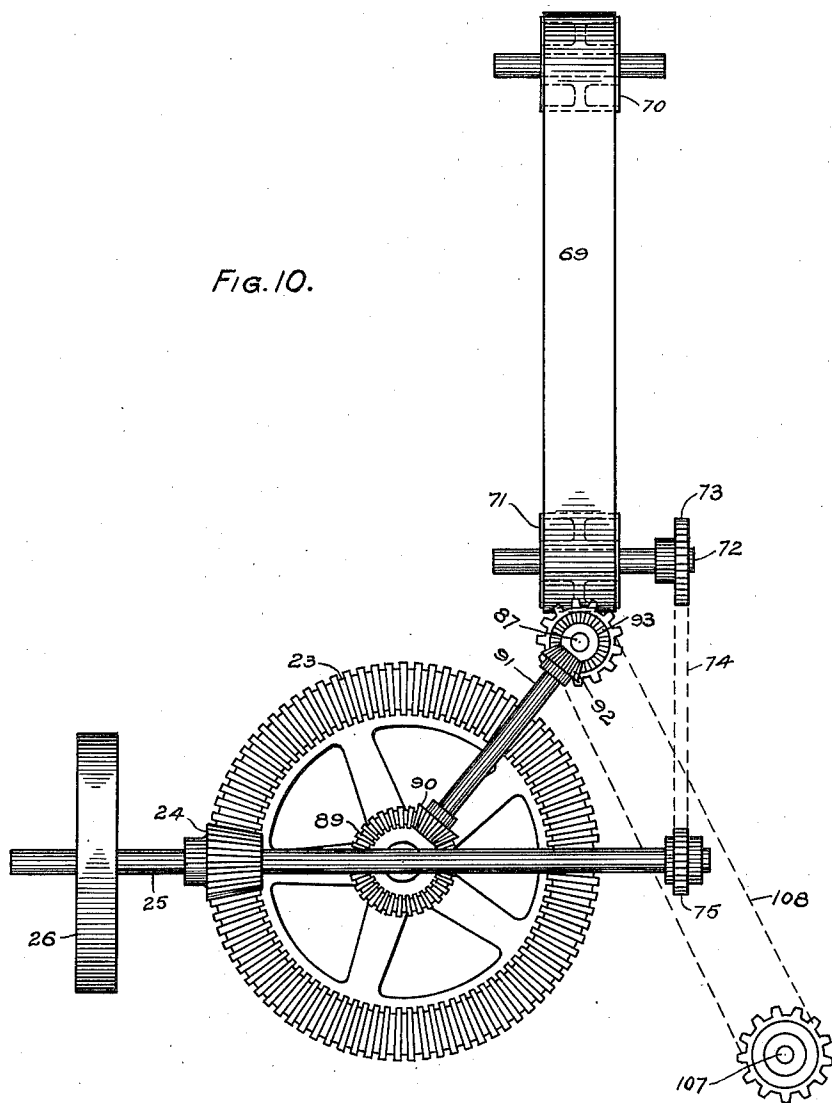
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6 SHEETS—SHEET 6.

FIG. 10.



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UNITED STATES PATENT OFFICE.

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CAN-FILLING MACHINE.

1,029,681.

Specification of Letters Patent.

Patented June 18, 1912.

Application filed April 10, 1908. Serial No. 426,320.

To all whom it may concern:

Be it known that I, JAMES P. HAIGHT, a citizen of the United States, residing at Hoopeton, in the county of Vermilion and State of Illinois, have invented certain new and useful Improvements in Can-Filling Machines, of which the following is a specification.

My invention relates to machines for filling cans, jars, bottles or the like with liquids and automatically stopping the discharge of fluid into the can when it has received the proper amount; that is, when the top of the liquid has reached the desired level in the can.

More particularly my invention concerns an improvement in the valve or similar mechanism for controlling the flow of liquid, this portion of the device also having means for permitting the escape of air from the can as the liquid is fed into the same.

Another feature of the improvement resides in the device for governing or regulating the feed or movement of the cans to the filling portion of the machine, while the receptacle or tank holding the supply of liquid is furnished with novel and improved adjusting means adapted for use when cans of different sizes or heights are to be filled.

Other features of importance and novelty will be apparent from the following description taken in connection with the accompanying drawings, forming a part of this specification. On these drawings like reference characters refer to the same parts throughout the various views.

Figure 1 is a plan view of a machine embodying my invention; Fig. 2 is a horizontal section of the machine below the fluid reservoir, and shows a number of cans in the device; Fig. 3 is a side elevation of the portion of the machine equipped with a conveyer belt; Fig. 4 is a longitudinal vertical section of the machine; Fig. 5 is a vertical section on an enlarged scale of a portion of the liquid reservoir and one of the valves controlling the discharge of the liquid; Fig. 6 is a view similar to Fig. 5 showing one of the cans raised so that the discharge pipe is projected into the same; Fig. 7 is a perspective view of the cam track and associated parts used in the elevation of the cans; Fig. 8 is a cross-section on an enlarged scale of the cam track and the trough adjacent there-

to; Fig. 9 is a side elevation of the construction shown in Fig. 7; Fig. 10 is a bottom plan view of the mechanism used for transmitting the power to operate the various parts of the machine; and Fig. 11 is a side elevation of the means for locking and unlocking the adjusting handle for varying the position of the liquid reservoir.

Vertically and centrally disposed in a main frame 20 of any suitable construction is a rotary shaft 21 having a bearing in the lower portion of the frame at 22. Fastened or keyed to the bottom end of this shaft I provide a bevel gear 23 with which meshes a bevel pinion 24 (see Fig. 10) on the main drive shaft 25 equipped with a driving pulley 26. Descent of this shaft is prevented by a collar 27 resting on the upper end of bearing 22 and pinned to shaft 21 at 28. Above this collar 27 a rotary table 29 is fastened to shaft 21 by a transverse pin 30, this table being provided with a plurality (in the present instance 6) of vertically reciprocating can supports 31 each of which has a depending square shaft 32 slidable in suitable guideways in the table or support 29. The lower end of each shaft or rod 32 has fixed thereto a laterally-extended stud shaft or pin 33 having rotatable thereon a pair of rollers 34.

On the top face of each slidable can support 31 I provide a V-shaped or two-armed centering bracket 35 held in place on the support 31 by a bolt 36 passing through the bracket and through a slot 37 of the support, whereby the bracket may be adjusted toward and from the shaft 21 so as to properly center cans of different diameters under the liquid discharging mechanisms described below.

In order that the open-top cans 38 may be raised and lowered as they revolve around the axis of shaft 21 I mount on the frame 20 an annular trough 39 having a number of depending track supporting arms 40, each at its lower end being equipped with an inwardly-extended portion or shelf 41 through a screw-threaded opening of which passes an adjustable threaded bushing or sleeve 42 centrally apertured to accommodate a screw 43, which at its upper end is threaded into a suitable hole of a cam-track 44, the ends of which 45 are downwardly-inclined so as to compel the rollers 34 to ride up the incline on to the top surface of the track 44 as the

shaft 21 and its supporting table 29 revolves. Above the incline 45 I provide a similarly inclined upper track 46 which assists in maintaining the rollers 34 of the rods or shafts 32 in proper relation on the cam-track. It will be apparent, therefore, from the parts as described, that as the table or support 29 revolves the can supports 31 are raised and lowered because of the cooperation of the rollers 34 with the track 44.

Splined or keyed to the central shaft 21 so as to rotate therewith, but capable of adjustment longitudinally thereof, is a liquid receptacle or reservoir 47, the bottom of which has screwed thereinto a plurality of depending liquid discharge-pipes 48 located so as to be centrally positioned over the cans, and centered by the V-shaped brackets or forks 35. At its lower end each discharge pipe 48 has a discharge opening or port 49 in one side thereof, the end of the pipe being closed by an internal stopper or plug 50.

Located within each discharge pipe 48, in contact with one side thereof, extended at its lower end through the plug or stopper 50, and projected upwardly beyond the top of the liquid receptacle 47 is an air vent pipe 51. This pipe, as is obvious, may be held in place by soldering or otherwise attaching it to the internal surface of the discharge pipe 48, and extending through the side walls of each of the pipes 48 and 51 is the plurality of air discharge openings 52, the top margin of the upper one of which is substantially on a line with the top margin of the fluid discharge opening 49, for a purpose hereinafter indicated.

On the bottom end of the discharge pipe 48 is fastened one or more washers or disks 53 apertured in alinement at 54 with the bore or longitudinal opening of the air vent pipe 51 to permit downward flow or escape of the liquid or syrup which may pass into tube 51 through the side openings 52. The disk or washer 53 is slightly larger in diameter than the external diameter of the pipe 48 and forms a stop to limit the descent of a valve bushing or sleeve 55 rotatably mounted on the pipe 48 and slidable lengthwise thereof. If there is a tendency for the sleeve 55 to stick on the pipe 48, this may readily be overcome by rotating the sleeve 55 by hand, thus causing the sleeve to move freely lengthwise on the pipe 48 during the regular operation of the machine. This valve or bushing has a collar 56, and between the latter and a similar collar 57 on the upper end of pipe 48 I interpose a coil expansion spring 58 which normally pushes the bushing down, as indicated in Fig. 5, closing the ports or openings 49 and 52.

On the outside of the valve or bushing 55, and having a screw-threaded adjustable connection therewith, is a holder 59 having a rubber or similar collar or washer 60 adapt-

ed to come in contact with the top surface of the can 38, forming a substantially air tight connection therewith.

When a can is being raised, as has been described above, by means of the cam track 44, the lower end of the combined discharge and air vent pipes 48 and 51 passes in to the open-top mouth of the can, as illustrated in Fig. 6, the top wall of the can engaging the rubber closure 60 and pushing the same upwardly to a slight extent against the pressure of spring 58, the latter holding the rubber closure in contact with the top of the can, whereby the can for the time being is rendered substantially air tight except for the exit provided by the air vent pipe 51. This upward movement of the rubber closure 60, which is attached to the valve bushing or sleeve 55, causes the lifting of the latter and the opening of the ports 49 and 52. The liquid then descends from the reservoir or receptacle 47 through the pipe 48 and is discharged through the opening 49 into the can, this discharge or feed of liquid continuing until the liquid has risen to a sufficient height to close all of the openings 52. Since no further air can, under these conditions, escape from the can, no more liquid flows through the opening 49 into the can, and as soon as the rollers 34 pass down and off of the cam track 44 spring 58 acts to push the sleeve or bushing 55 downwardly, thereby closing the openings 49 and 52. An aperture 54 which is in communication with the interior of pipe 51 is provided so that the rubber closure 60 may be readily separated from the can, since if no provision of this kind were made it would be difficult to separate the can and closure.

In order to adapt this can filling machine for use with cans of various heights, I have made the liquid receptacle or reservoir vertically adjustable on the central shaft 21 with which it revolves. Fastened to the bottom wall or floor of the receptacle or reservoir 47 I provide an internally screw-threaded sleeve or shell 61, with the threads of which engage those on the lower end of an adjusting tube 62 surrounding the shaft 21 and fastened at its upper end to an adjusting wheel or handle 63 to revolve with the shaft 21 and be turned relatively thereto only when it is desired to raise or lower the fluid receptacle or tank 47. I have, therefore, provided means for locking and unlocking the handle 63 to the shaft. Splined or feathered to the shaft 21 above the handle 63 I provide a locking bushing or collar 66 rotatable with the shaft 21 and slidable longitudinally thereon, its upward lifting or movement being limited by an abutment or stop disk or washer 67 fastened as by the screw 68 to the top end of the rotary shaft 21. The locking sleeve 66 is equipped with one or more teeth 66¹ adapted normally to

engage notches or recesses in the hub of handle 63, forming a clutch connection between the two so that the handle 63 and tube 62 are compelled to rotate with the shaft 21. However, when it is desired to raise or lower the reservoir 47 the locking sleeve 66 is raised manually so as to disengage its teeth from the hub of the handle, whereupon the latter may be turned so as to elevate or lower the receptacle. Release of the locking collar 66 allows its tooth or teeth 66¹ to engage in the notches of the handle, thereby locking the handle and tube to the shaft.

At one side of or in front of the filling portion of the machine described above, I provide an endless conveyer belt 69 passed around horizontal pulleys or drums 70 and 71 for feeding the cans to the other part of the machine, power for causing the travel of the belt being transmitted to the shaft 72 of the drum or pulley 71 by means of a sprocket wheel 73 mounted thereon and a connecting sprocket chain 74 which also passes around a sprocket wheel 75 on the main driving shaft 25. Between the inner end of this conveyer belt 69 and the upright filling part of the machine I provide a table or shelf 76 and supply the same with a curved or arcuate guard or guide 77 and a concentric wheel or disk 78 notched substantially semi-circularly at 79 to receive the cans as they are fed forwardly on the conveyer belt 69, the cans partially filling the notches 79 and riding along the inner curved surface of the guide 77. In order that the cans as they advance to the notched wheel or disk 78 may be properly admitted to the notches 79 they must be fed thereto in proper timed relation, and in order to reach this result I have provided means for retarding or temporarily stopping the movement of the cans on the conveyer belt 69 until the time arrives when the foremost one should be fed or permitted to advance to the notched wheel in order that it may enter one of the notches 79. If I did not provide some such retarding device, it is evident that the cans might be fed so as to be caught between the point 78¹ of disk 78, and end 77¹ of guide 77, crushing the can, or damaging the machine. To accomplish the desired result, the following described mechanism has been provided. At each side of the conveyer belt 69, and somewhat above its top surface, is a guide bar 80. To the end of one of these at 81 I pivot or hinge a stop arm or lever 82 whose end 83 is adapted to be projected into and be withdrawn from the path of travel of the advancing cans. This stop arm or lever 82 is connected to the end of one arm of a bell-crank lever 83¹ fulcrumed at 84 by a link 85, the other end of the bell-crank lever 83¹ being adapted to travel on the external sur-

face of a toothed trip cam 86 mounted on the upper end of the shaft 87 carrying the notched disk or wheel 78. A spring 88 is provided acting against one arm of the bell-crank lever 83¹ so as to normally press the end of the other arm of the bell-crank lever on to the surface or toothed periphery of the trip or tappet cam 86 and hold the stop arm or lever 82 in the path of travel of the cans. The trip or tappet cam is so positioned angularly on the shaft 87 and the speed of travel of the can advancing parts is such that when one of the teeth arrives under the end of the bell-crank lever 83¹ so as to turn the latter on its fulcrum 84 the can stop arm 82 will be withdrawn from the path of travel of the cans, permitting the foremost can to travel on the belt and enter one of the notches 79 of wheel 78 which will carry the same around in contact with the guide 77 so as to feed the cans into the V-shaped centering brackets 35 described above. As soon as the tooth of the trip or tappet cam 86 passes from beneath the end of the bell-crank lever 83¹, the latter, due to the action of spring 88, will project the stop arm 82 into the path of travel of the next can and detain the latter a sufficient length of time so that upon its release it will be advanced by the conveyer belt to the succeeding notch of the wheel 78. The shaft 87 is driven from the driving shaft 25, or rather from the gear 23 which is driven by the shaft 25, through the smaller bevel gear 89 on the gear 23 with which meshes a bevel pinion 90 on a jack-shaft 91, the rotation of which is transmitted to the upright shaft 87 by cooperating bevel gears 92 and 93.

It will be obvious that it is desirable to provide or supply some means for adjusting the guide bars 80 to agree or conform to the size of cans being filled. Each bar 80 has a parallel motion mounting including a bell-crank lever 94 and a link 95 pivoted at their inner ends to the guide bars 80 and at their outer ends to suitable brackets 96. It is desirable that these guide bars be actuated simultaneously, and consequently I have provided an adjusting handle 97 fulcrumed at 98 on a suitable bracket or support 99, the inner end of the lever being connected to the free arms of the bell-crank lever 94 by a pair of connecting links 100, 100. At 101 I have shown a friction clamp or lock of any suitable design for maintaining the lever 97 in any adjusted position. It will be apparent that by unlocking and shifting the lever 97 the guide bars 80 may be brought closer together or spread apart as occasion demands, the bars always maintaining their parallel relation. By pivoting the stop arm 82 on one of the guide bars 80 it will, of course, be shifted at the same time the bar is adjusted.

In order that the cans may be fully pushed

into the V-shaped brackets 35, I provide an elastic leaf spring 102 (Figs. 1 and 2) which engages with the cans during their revolution around shaft 21 soon after they leave the notches 79 of the disk or wheel 78, the spring having sufficient elasticity to operate upon cans of varying sizes. However, it may be adjusted and held in adjusted position by a set-screw 103 adapted to bear against the side of a shaft 104, held in the frame of the machine, and having mounted thereon a bow 105 carrying the spring proper.

Adjacent to the revolving table 29 there is provided another revolving table 106 mounted on the top of an upright shaft 107 and driven from the shaft 87 by a connecting sprocket chain 108 passed around sprocket wheels on the two shafts 87 and 107. After the cans have substantially completed their revolution around the axis of shaft 21 they strike against a deflector bar 109 which causes them to be shifted over on to the revolving table or plate 106, from which they can be removed in any approved manner.

The operation of this device has been set forth to a considerable extent in connection with the description of the construction of its various parts. However, in order to give a more connected description of its operation the following detailed statement hereof will be found of advantage. The cans 38, with their open mouths uppermost, are placed upon the conveyer belt 69 and are carried forwardly toward the filling machine thereby. Their movement, however, is arrested and retarded by means of the stop arm 82 which is normally projected into the path of travel of the cans in front of the foremost one. When the notched wheel 78 is in such a position that the release of a can on the belt would carry it into one of the notches, a tooth on the cam release or tappet 86 engages the end of bell crank lever 83¹ and withdraws the stop arm from in front of the first can. This can is now carried forwardly by the belt into one of the notches, and the stop arm is immediately projected in front of the next can, so as to restrain the same and release it at the proper time, whereby it may be advanced by the belt into the next notch. The cans in the notches 79 are carried around in contact with the curved guide 77 which prevents their leaving the notches, and are delivered to the can supports 31 and in contact with the diverging arms of the V-shaped centering brackets 35, being pushed fully home into these brackets by the spring 102. Then the rollers 34 engage the cam track and the cans are lifted so as to project the lower ends of the liquid discharge and air vent pipes into their open tops. As the cans move upwardly their top walls come in contact with the rubbers or closures 60,

forming a substantially air tight closure therewith. The upward movement of the cans in contact with the rubbers pushes upwardly the valve sleeves 55 which open the liquid discharge ports 49 and the air-outlet ports 52. The liquid now descends through each pipe 48, discharging through the opening 49 into the cans, the air being expelled through the ports 52 and 54 into the pipe 51. This filling operation will continue until the liquid rises sufficiently in the can to close all the ports 52, further feed of the liquid being prevented because the remainder of the air in the can cannot be expelled. Further travel of the rollers 34 on the cam track 44 causes the descent of the cans successively, and this downward movement of the cans permits the descent of the rubbers 60 and the closure of the ports 49 and 52 by the valve sleeve or bushing 55, as is indicated in Fig. 5. On account of the fact that the sleeve 55 is rotatable on the pipe 48, it is necessary to provide the opening 54 in the lower end of the pipe 51, since in order to insure closure of the discharge opening 49 in whatever position of its rotation the sleeve 55 may be it is also necessary to simultaneously close the openings 52. As the cans revolve around the axis of shaft 21 they come in contact with the inclined deflector bar 109 and are pushed over onto the other revolving table 106, from which they can be removed in any desired manner. If other sizes of cans are to be filled it may be necessary to adjust the position of the guide bars 80 by means of the handle 97, as described above, and it may also be necessary to adjust slightly the closure holders 59, and especially the position of the liquid reservoir 47.

Although I have described quite minutely the particular features of construction of the various parts of this mechanism, it is not to be understood that my invention is limited to the precise structural features set forth, since they may be varied within wide limits without departure from the substance of my invention.

I claim:

1. In a machine of the character described, the combination of a liquid receptacle or reservoir, a downwardly-extended discharge pipe leading therefrom, closed at its lower end, and having a discharge opening in one side, a sliding sleeve associated with said discharge pipe and adapted for vertical and rotary movement, and an air-vent pipe inside of and extended through the closed end of said discharge pipe, said air-vent pipe having an open lower end, said discharge and air-vent pipes having registering air outlets in their sides, said discharge and registering air outlets being arranged to be opened and closed by said sliding sleeve, substantially as described.

2. In a machine of the character described, the combination of a liquid receptacle or reservoir, a downwardly-extended discharge pipe leading therefrom, closed at its lower end, and having a discharge opening in one side, a sliding sleeve associated with said discharge pipe and adapted for vertical and rotary movement, and an air-vent pipe inside of and extended through the closed end of said discharge pipe, said air-vent pipe having an open lower end, said discharge and air-vent pipes having registering air outlets in their sides, the top of the uppermost of said air-outlets being substantially on a level with the top of said discharge opening in said discharge pipe, said discharge and registering air outlets being arranged to be opened and closed by said sliding sleeve, substantially as described.

3. In a machine of the character described, the combination of a liquid receptacle or reservoir, a downwardly-extended discharge pipe leading therefrom, closed at its lower end, and having a discharge opening in its side, means to raise and lower an open top can to project said discharge pipe into the same and withdraw it therefrom, a sliding sleeve associated with said discharge pipe and adapted for vertical and rotary movement, and an air-vent pipe inside of and extended through the closed end of said discharge pipe, said discharge and air-vent pipes having registering air outlets substantially on a level with the discharge opening of said discharge pipe, said discharge and registering air outlets being arranged to be opened and closed by said sliding sleeve, substantially as described.

4. In a machine of the character described, the combination of a liquid receptacle or reservoir, a downwardly-extended discharge pipe leading therefrom, closed at its lower end, and having a discharge opening in its side, means to raise and lower an open top can to project said discharge pipe into the same and withdraw it therefrom, a sliding sleeve on said discharge pipe adapt-

ed to open and close said discharge opening, said sleeve being controlled by the movements of the can and being rotatable with relation to said discharge pipe, and an air-vent pipe inside of, in contact with the inner surface of, and extended through the closed end of said discharge pipe, said air-vent pipe having an open lower end, said discharge and air-vent pipes having registering air outlet openings in their sides on substantially the same level as said discharge opening, said air outlet opening being controlled by the movement of said sleeve, substantially as described.

5. In a machine of the character described, the combination of an endless conveyor belt on which cans are adapted to be transported, a stationary shelf or table on which the cans are adapted to travel, a shaft, a notched revoluble wheel on said shaft above said table and adapted to receive the cans in its notches and move the same on said shelf or table, a stop lever adapted to be projected into and withdrawn from the path of travel of the cans on said belt to control their travel to the notched wheel, a spring-pressed arm, teeth or projections on said shaft with which said arm coöperates, and a connection between said arm and stop lever whereby the stop lever is operated in proper timed relation so that each can will be received in one of said notches, substantially as described.

6. In a machine of the character described, the combination of a rotary shaft, a reservoir rotatable with and adjustable longitudinally of said shaft, a sleeve surrounding said shaft, a handle to turn said sleeve on said shaft, a screw-threaded connection between said sleeve and reservoir whereby the position of the latter on the shaft may be adjusted, and means to lock said sleeve to and unlock it from said shaft, substantially as described.

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Witnesses:

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