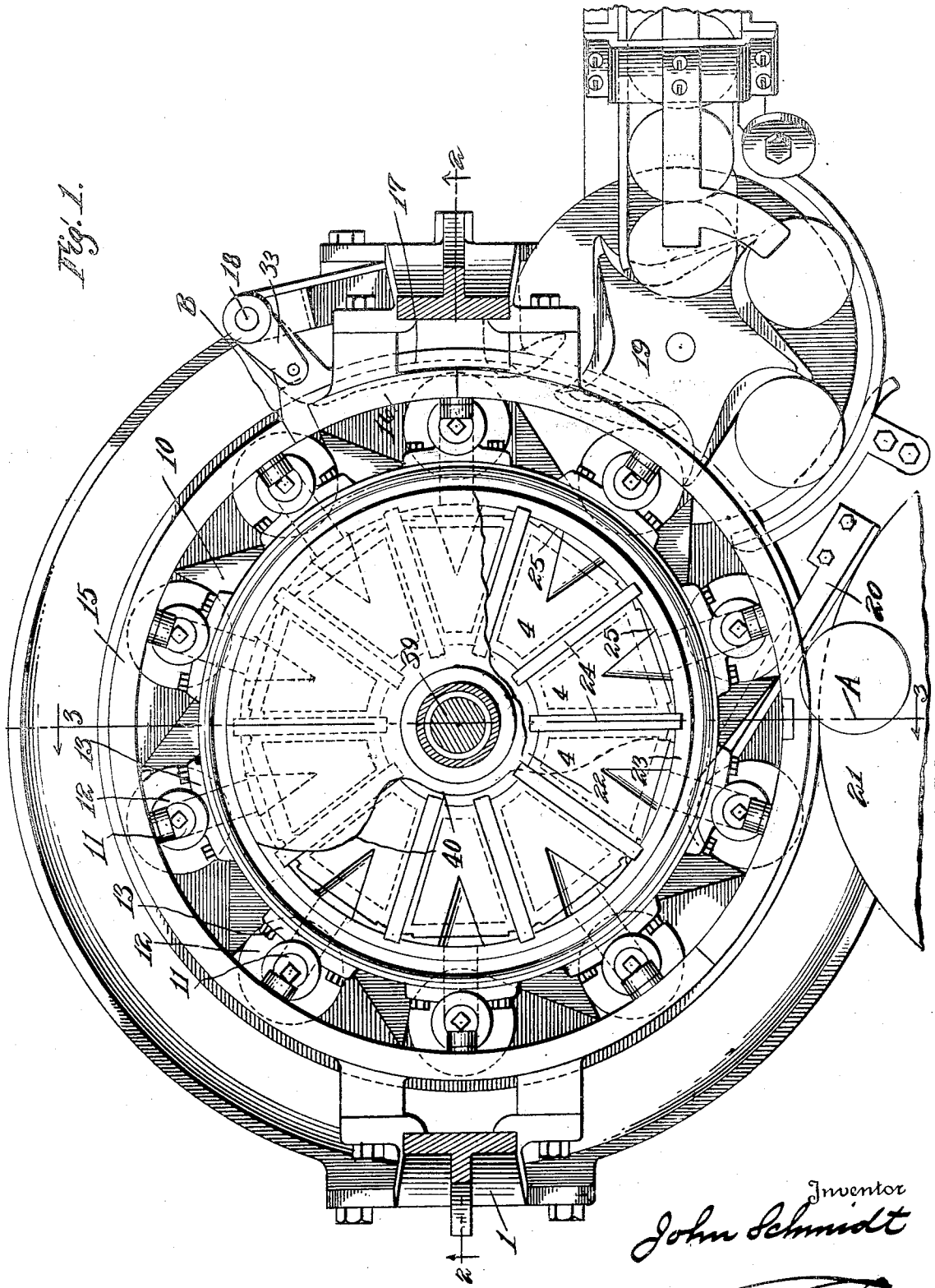
May 1, 1934. J. SCHMIDT 1,956,595

FILLING MACHINE

Filed Sept. 30, 1932 4 Sheets-Sheet 1

Fig. 1.



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FILLING MACHINE

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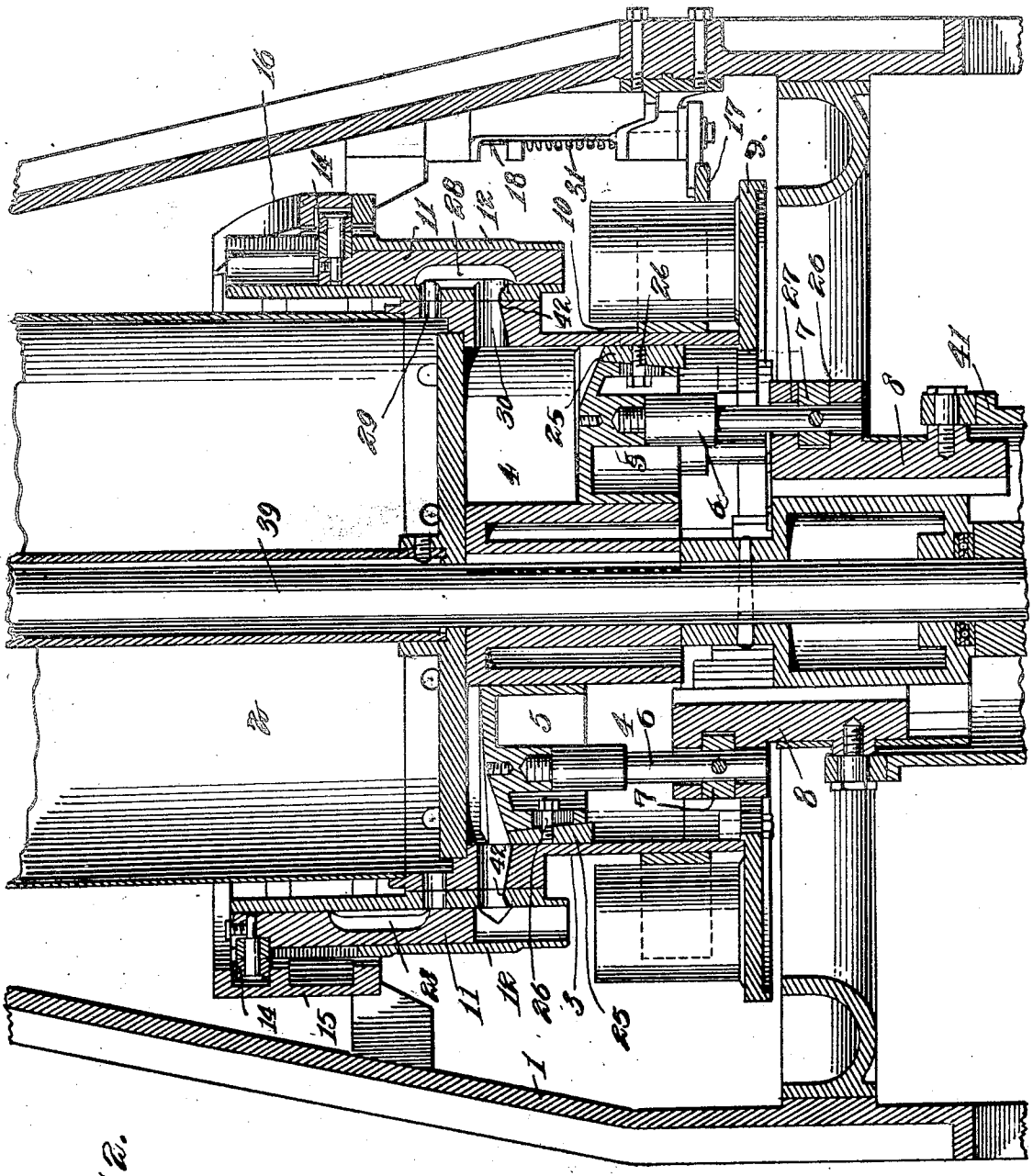


Fig. 2.

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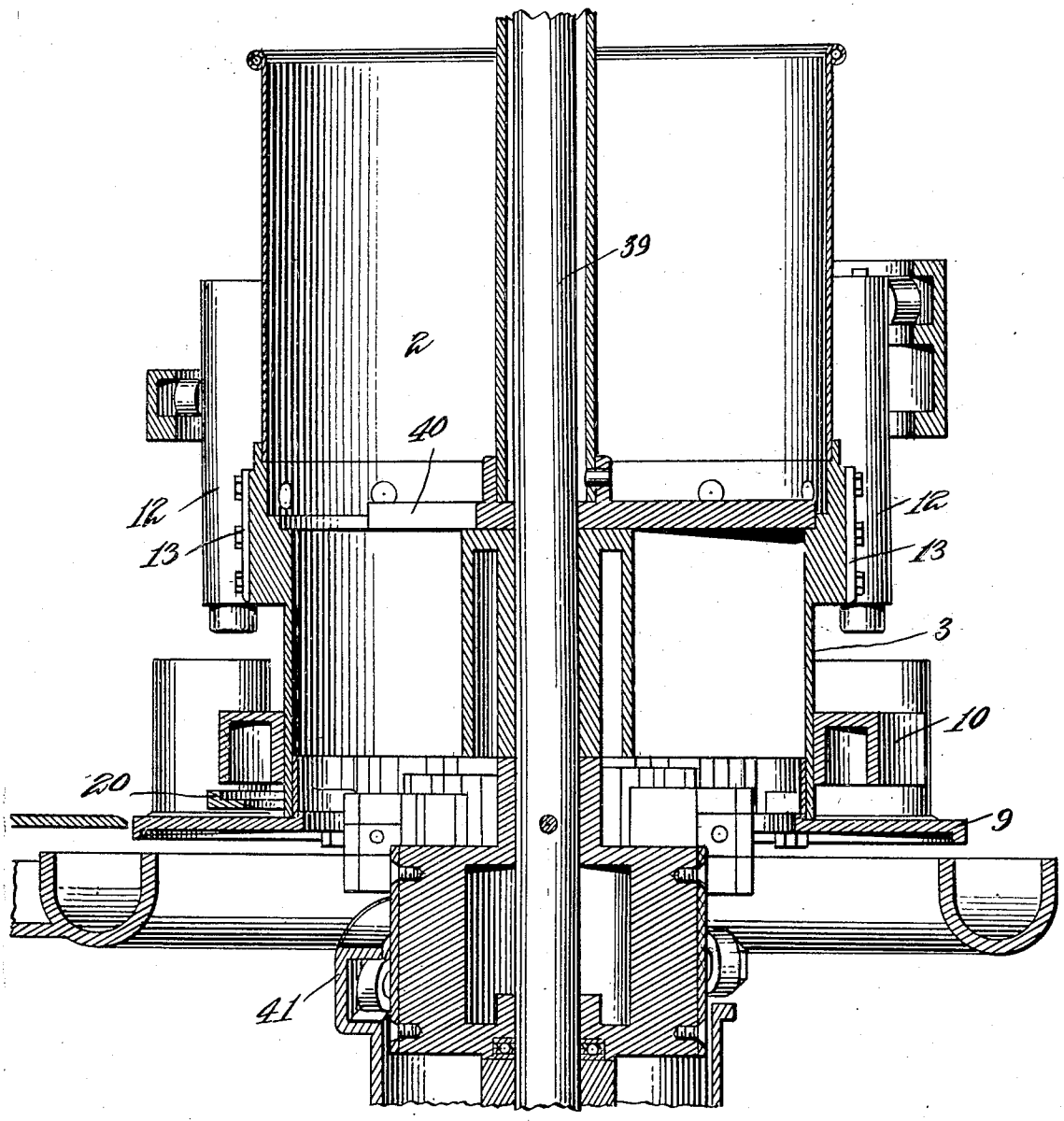
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FILLING MACHINE

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Fig. 3.



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FILLING MACHINE

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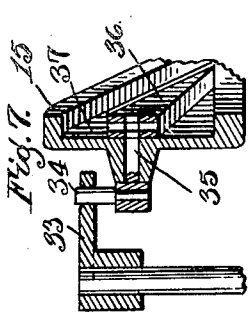


Fig. 7.

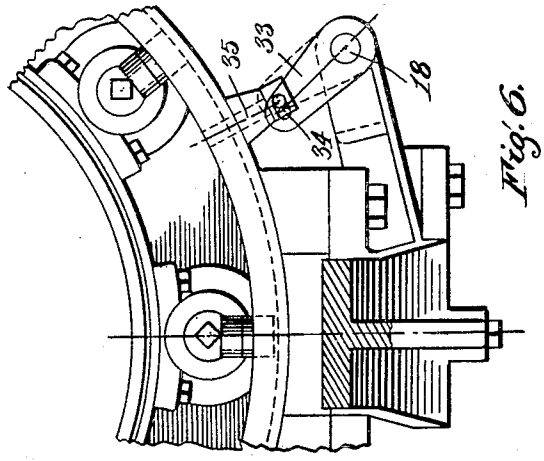


Fig. 6.

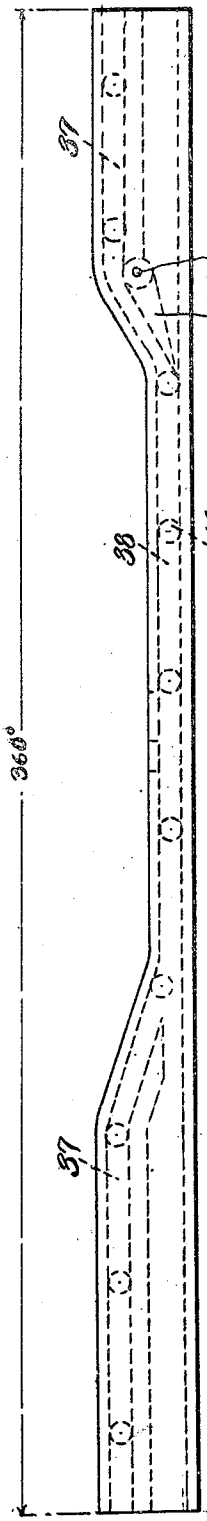


Fig. 4.

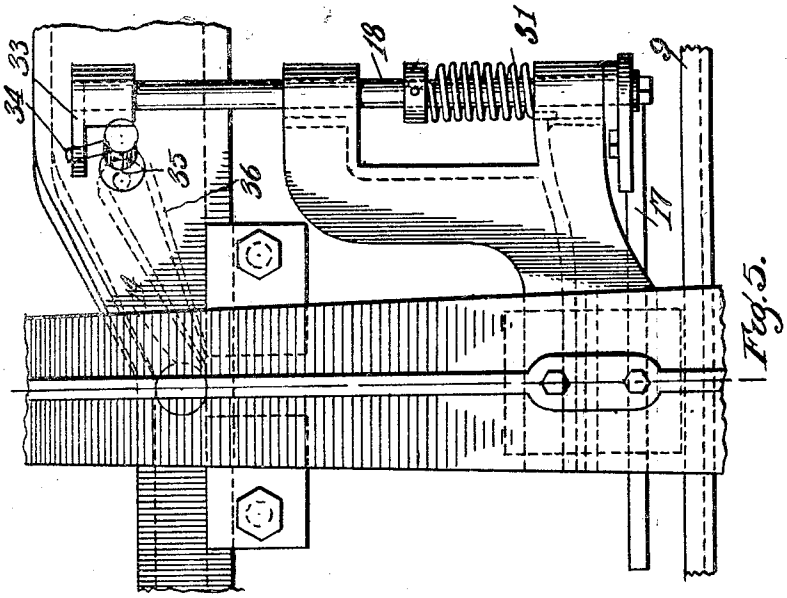


Fig. 5.

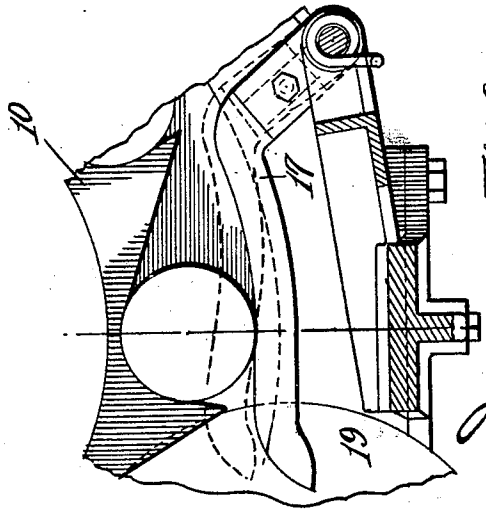


Fig. 8.

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UNITED STATES PATENT OFFICE

1,956,595

FILLING MACHINE

John Schmidt, Buffalo, N. Y., assignor to Food Machinery Corporation, San Jose, Calif., a corporation of Delaware

Application September 30, 1932, Serial No. 635,677

13 Claims. (Cl. 226—97)

This invention relates to a machine for filling liquid and plastic material into containers and is an improvement on previous machines for this purpose in that it is adapted to a higher rotative and filling speed than has been possible.

Practically all multi-filling machines are of the turret type wherein the containers are supported around a circular path adjacent to filling mechanism and moved in unison therewith while the material is filled into the containers.

Different types of mechanism is employed to support and align the containers with the filling devices and all of such mechanism requires some space in which to operate, with the result that the center to center spacing of the containers has of necessity been greater than is desirable for high speed operation, and especially so where thin liquids are being handled.

The greater the center to center spacing of the containers the greater the lineal speed of the containers to acquire a maximum output and with the liquid material this increased speed and change of direction of the containers in passing through the machine causes the thin liquids to spill from the containers and be lost, thereby increasing the cost of production and producing a constant soiling of the mechanism and adjacent equipment.

In the filling of most material it is necessary to quite accurately measure the charges going into the containers, and in a turret machine the measuring devices are usually arranged around a circular path inside of the path of containers, so that of necessity the path of the containers prescribes a greater center to center distance than is desirable since the containers and measuring devices are usually arranged in radial alignment. Also it has been the practice heretofore to make the measuring cylinders and devices of round cross section, which when placed around a circular path require a certain center spacing to give room for the assemblage of the parts, and this again caused a longer center to center distance than was desirable in a high speed machine.

The principal improvement in this invention comprises a changing of the shape of the measuring devices so that they can be spaced around their circular path with greatly reduced center to center distances and thereby reduce in the same proportion the center to center distances of the containers arranged radially therewith. This arrangement reduces materially the lineal speed of travel of the containers for a given capacity per hour and therefore reduces the liability to spill the product from the open containers due to too high a speed of travel.

This improvement consists in making the measuring chambers and the plungers moving therein of triangular shape so that there is the minimum of lost distance between chambers and since the division wall between chambers can be a thin membrane the center to center distance between chambers is reduced to the smallest possible amount.

Another improvement in this invention resides in the manner of connecting the measuring plungers to the slide means for imparting reciprocating movement thereto, and wherein a floating connection is provided so that the slide and plunger can automatically align themselves during operation and thus reduce and eliminate all side strains incident to unequal wear or slightly imperfect machining in the construction of the machine. This arrangement also reduces the close tolerance limits necessary if the parts must align perfectly with rigid bearings and thereby reduces materially the cost of manufacture.

Other detail improvements will be disclosed as the description of the invention proceeds.

It is therefore a principal object of the invention to provide an arrangement of measuring and feeding devices for filling machines wherein the center to center distances between devices is reduced to a minimum.

It is a further object of the invention to provide in a filling machine triangular shaped measuring chambers and plungers.

It is a further object of the invention to provide in a filling machine triangular shaped measuring chambers and filling plungers having adjustment on the plungers for taking up normal wear.

It is a further object of the invention to provide in a filling machine a plurality of measuring chambers of triangular cross section with radial walls separating the chambers to reduce to a minimum the center to center distance of the chambers.

It is also an object of the invention to provide in a filling machine measuring chambers and plungers therein and slide members for moving said plungers and a floating connection between the slides and plungers.

It is also an object of the invention to provide improved means for preventing the feeding of material if no can is presented to the feeding devices.

It is also an object of the invention to provide improved means for controlling the handling and positioning of the containers relative to the feed-

ing and measuring devices as well as in presenting and discharging the cans to and from the machine.

With such objects in view as well as other advantages inherent in the invention, the novel structural peculiarities, novel organization of elements, and the separate and collective operations involved in carrying out the recited objects of the invention, which will be made the subject matter of claims, I wish it understood that the several necessary elements and combinations constituting the same may be varied in their proportions, placement and general arrangement and operative relation without departing from the scope and nature of the invention. In carrying out the objects of the invention in a concrete form or machine, further objects, advantages and improvements have been evolved, and in order to make the invention more clearly understood there are shown, in the accompanying drawings means and mechanism embodying the preferred structural arrangement and dispositions of parts and combinations have been shown to illustrate one way of embodying the creative part or concept of the invention. The described devices are simply embodiments of the invention which other structures might employ and some of the parts and combinations may be used without the others in different types of machines without departure from the purview of the invention and I therefore regard myself as entitled to such variations from the shown and described devices as fall within the scope and meaning of the claims.

Reference now being had to the drawings which are more or less diagrammatic in character a better and clearer understanding of the invention will be had.

Figure 1 represents a plan of a machine embodying the invention with portions broken away to show some underlying parts.

Figure 2 is a vertical section taken on approximately the line 2—2 of Figure 1 .

Figure 3 is a vertical section taken on approximately the line 3—3 of Figure 1.

Figure 4 is a lineal plan of the operating cam for controlling the movement of the filling nozzle plungers.

Figure 5 is a side elevation of the switching mechanism that is controlled by the presence of a can to determine whether a measured charge of material is to be released or sent back into the tank.

Figure 6 is a plan of Figure 5.

Figure 7 is a detail on substantially line 7—7 of Fig. 6.

Figure 8 is a plan detail of the arm moved by a can to control the filling plungers.

The numeral 1 represents a general frame work on which the operative parts of the machine are mounted. 2 may represent a supply tank for material. 3 a turret member located directly under the supply tank 2. 4 may represent the measuring chambers and 5 the plungers in the chambers 4. 6 are connecting rods secured to the plungers 5 and having a floating connection 7 with the operating slides 8 carried in suitable bearings in the lower part of the turret. 9 may represent a container support secured to the turret 3 and 10 the container centering and guiding ring also secured to the turret 3. Arranged around the upper periphery of the turret 3 are a series of small plungers 11 mounted for sliding movement in the nozzle members 12 which latter are bolted to the turret 3 as at 13. The plungers 11 are given sliding movement through the medium of rollers 14 engaging with the cam member 15 and are further controlled by a movable cam section 16 which in turn is operated by the presence of a container moving the arm 17 connected to cam section 16 by means of the vertical shaft 18 and the connecting mechanism which will be described later. The cans or containers are fed to the turret by means of a feeding star wheel 19 and are discharged from the machine by a rake off arm 20 onto the disk 21.

Referring now to the measuring chambers 4. These as will be seen from Fig. 1 are triangular in shape and are formed by the central ring member 22, the outer ring member 23 and the division wall membranes 24. The ring members 22 and 23 being a part of the turret 3.

The plungers 5 are triangular in shape to fit into the triangular measuring chambers 4 and are provided with an adjusting wedge 25 held by the screw 26, the adjustment of this wedge member 25 determines the fit of the plungers in the measuring chambers.

The floating connection for the slides 7 and the connecting rods 6 comprise the blocks 7 pinned to the rods 6 and having lateral movement in the slot 26, permitted by the enlarged holes in the slides 8 as at 27. This arrangement permits the plungers and slides to automatically align themselves during assembling and operation.

The plungers 11 are provided with by-passes 28 registering with the ports 29 and 30 thereby establishing communication between the supply tank 2 and the measuring chambers 4 during a portion of the travel, the function of which will be explained later.

In order to operate a machine of this type successfully it is necessary to provide some means for preventing a feed of material if no can is present under the filling nozzle 11. The mechanism for caring for this feature of the invention will now be described.

The cans entering the turret encounter the arm 17 and deflect it away from its normal position within the path of the cans as is seen in Fig. 1.

Fig. 8 shows this arm in its two positions, the dotted line being its position when no can is present and the full line the position with a can present. The arm 17 is fixed to the vertical shaft 18 which is supported by suitable brackets secured to the frame of the machine. Fig. 5 shows the arrangement very clearly. A torsion spring 31 is secured at one end to the collar 32 on the shaft 18 and to the lower supporting bracket at the other end and is tensioned to hold the arm 17 in the dotted position of Fig. 8.

On the upper end of the shaft 18 is positioned the arm 33 also fixed to the shaft 18. The arm 33 has a hole in the end into which a pin 34 projects and which in turn is secured to the end of a short rock shaft 35 finding bearing in the cam member 15, the inner end of the rock shaft 35 having secured thereto the switch member 36. From the foregoing it is evident that a movement of the lever 17 by a can will move the various chain of elements just described and raise or lower the switch 36.

The cam member 15 extends entirely around the outside of the turret and the cam trackways for the control of the movement of the plungers 11 are best shown in Fig. 4 which is a lineal plan of this cam. The rollers 14 carried by the plungers 11 ride in the camways and are caused to ride through the camway 37 by the position of the switch 36 when it is in the downmost position as in Fig. 7.

If the switch 36 is in its upper position which it would be if a can did not move the arm 17, the rollers will ride around the entire circle in the camway 38 which will hold each plunger that is not supplied with a can in the position at the right of Fig. 2 with the by-pass 28 connecting the tank with the measuring chamber 4 so that the charge of material in the measuring chamber will be discharged back into the tank through the by-pass 28. The movement of the switch 36 through the mechanism leading to the arm 17, by the presence of a can being the determining factor for the positioning of the plungers 11, which plunger controls the feeding of a measured charge to a positioned can.

Operation

The operation of a machine embodying the invention would be substantially as follows with the arrangement shown but may vary somewhat with another arrangement.

The hopper 2 being supplied with material and a supply of empty cans being available the machine may be started and operated through the central shaft 39 from a suitable source of power not shown. The material supply tank is fixed and does not rotate, but the turret mechanism rotates under the tank. At one side of the bottom of the tank 2 is an opening 40 through which material passes into the measuring chambers as they pass thereunder and is pulled into the chambers by the plungers 5. The plungers 5 being moved up and down by the cam member 41.

The plungers 5 will be in the down position from about the point "A" Fig. 1 to about the position "B", when position "B" is reached the plungers 11 will have been properly positioned by a can and the material carried by the chambers 4 will begin to be discharged into the can because with a can present the plungers 11 will be in their upper position as at the left of Fig. 2 which will permit the charge in the chambers 4 to enter the positioned cans. After the charge has been forced from the chambers into a positioned can the plungers 11 will descend and force any adhering material from the mouths of the filling nozzles just before the sweep arm 20 removes the can from the turret.

The ports 30 have their bottom surfaces inclined as at 42 Fig. 2 so that any adhering material will tend to run back into the measuring chamber and not form a drip in the mouth of the nozzle.

The arrangement of the measuring chambers into triangular form as is clearly shown in Fig. 1 permits a comparatively close center to center distance between cans which greatly facilitates the handling of the cans after they are filled because their lineal speed is thereby reduced and this is a very important feature in machines for filling thin liquids, because with close center to center can distances there is much less chance of spilling the thin liquid from the cans as their direction of movement is changed.

It is thought that the description of Figs. 4 to 8 has been sufficient to give a clear understanding of the mechanism for operating the switch 36 for positioning the plungers 11 as regards the presence or non-presence of a can. The swinging of the arm 17 will swing the arm 33, thereby rocking the shaft 35 and moving the switch to the position of Fig. 5 which will cause the roller 14 to ride up the switch incline and permit the charge of material in the chamber 4 to be discharged into the can. If no can is present there will be no movement of the arm 17 and then the plunger will remain in the lower camway 38 and cause the charge of material in the chamber 4 to pass back into the tank through the by-pass 28.

What I claim as new and desire to secure by Letters Patent is:

1. An apparatus for measuring and filling liquids into positioned containers comprising a tank for a supply of liquid, a turret associated therewith, means on said turret for positioning containers and moving them therewith, triangularly shaped measuring chambers forming a part of said turret, filling nozzles connected with said turret and aligning with positioned containers with means for rotating said tank and turret in unison.

2. An apparatus for measuring and filling mobile materials into positioned containers comprising a tank for a supply of material, a turret associated therewith, means on said turret for positioning containers and moving them therewith, angularly shaped measuring chambers forming a part of said turret, angularly shaped plungers in said measuring chambers for drawing material from said tank, filling nozzles aligned with the positioned containers with means for operating said mentioned parts in unison and timed relation.

3. An apparatus for filling mobile material into positioned containers comprising a tank for a supply of material, a turret secured to said tank, means on said turret for positioning and moving containers therewith, angularly disposed measuring chambers concentrically arranged around the axis of rotation, the apices of the angles being radially nearest the center, angularly shaped plungers in said chambers and means for maintaining a determined adjustment of said plungers relative to said chambers with means for operating said parts in timed relation.

4. An apparatus for filling material into positioned containers comprising a tank for a supply of material and means for filling material into positioned containers, said means including a series of triangularly shaped measuring chambers arranged concentrically around a center of rotation with the apex of the angles radially nearest the center of rotation, angularly shaped plungers in said chambers, adjusting means carried by said plungers to maintain a tight operative fit between said plungers and said chambers with means for operating said plungers in successive relation to said filling means.

5. An apparatus for filling material into positioned containers comprising a tank for a supply of material and means for measuring and filling material into positioned containers, said filling means comprising angularly shaped measuring chambers arranged in closest possible concentric relation around the center of rotation, reciprocating angularly disposed plungers in said measuring chambers, means for giving lateral movement to said plungers to maintain a proper running fit between said chambers and said plungers with power means for operating said parts in timed relation.

6. An apparatus for filling materials into positioned containers comprising a tank for a supply of liquid and filling means for directing the material into the containers, measuring chambers having a series of radial walls separating them, plungers in said chambers having radial walls aligning with the walls of said chambers, with means for maintaining running contact between

said radial walls with means for moving said parts in operative relation.

7. An apparatus for measuring and filling liquids into positioned containers comprising a tank for a supply of liquid, a series of angularly shaped measuring chambers arranged under said tank and having operating connection therewith, a series of plungers in said chambers having angular shapes to correspond with the shapes of said chambers, means for reciprocating said plungers permitting a lateral movement thereto, means on said plungers for giving lateral movement thereto in said chambers for maintaining a running adjustment with means for operating said parts in unison and timed relation.

8. An apparatus for measuring and filling liquids into positioned containers comprising a tank for a supply of liquid, a series of measuring chambers positioned under said tank to receive material therefrom, said chambers being formed by radial walls intersecting circumferential walls, plungers positioned in said chambers having walls to coincide with the walls of the chambers with means for giving lateral movement to said plungers to adjust the wall surfaces for proper operative alignment with the wall surfaces of the enclosing chambers.

9. An apparatus for measuring and filling liquids into positioned containers comprising a tank carrying filling means, a series of triangularly shaped measuring chambers, a series of plungers in said chambers with means for giving lateral movement to said plungers to adjust them relative to said chambers and a loose drive connection permitting said lateral adjustment with means for operating said parts in timed relation.

10. An apparatus for measuring and filling liquids into positioned containers comprising a tank for a supply of liquid, means for measuring and filling liquid into the containers, a passageway leading from said tank to said measuring and filling means, a valve member in said passageway, means operative by the presence of said containers for controlling the fill of the liquid, said means including an arm deflected by a container, a vertical shaft connected to said arm, rock levers also on said shaft, a switch member connected to said rock levers and two camways adjacent said switch whereby the passage of a container will move said arm, shaft, levers and switch and thereby move said valve member to determine the flow of material from said measuring and filling means.

11. A filling machine comprising a reservoir, an annularly arranged series of wedge shaped measuring cylinders disposed to receive fluent material from said reservoir, wedge shaped pistons is said measuring cylinders, filling nozzles associated with said measuring cylinders, means for positioning containers to receive the discharge from said filling nozzles, and means for rotating said measuring cylinders, their associated filling nozzles, and the can positioning means in unison.

12. A filling machine comprising a rotatable reservoir, an annularly arranged series of wedge shaped measuring cylinders communicating with said reservoir and movable therewith, wedge shaped pistons in said measuring cylinders, filling nozzles associated with said measuring cylinders, means for positioning containers to receive the discharge from said filling nozzles, and means for rotating said reservoir and can positioning means in unison.

13. A filling machine comprising a rotatable reservoir, an annularly arranged series of wedge shaped measuring cylinders communicatively associated with said reservoir therebeneath and rotatable therewith, wedge shaped pistons in said measuring cylinders, filling nozzles communicating with said measuring cylinders and movable therewith, means for controlling communication between said reservoir and said measuring cylinders and the discharge from said nozzles, means for positioning containers to receive the discharge from said filling nozzles, means for rotating said reservoir and can positioning means in unison, and means for operating said pistons and control means in timed relation to the rotation of said reservoir and can positioning means.

JOHN SCHMIDT.