J. SCHMIDT, JR.

CAN FILLING MACHINE.

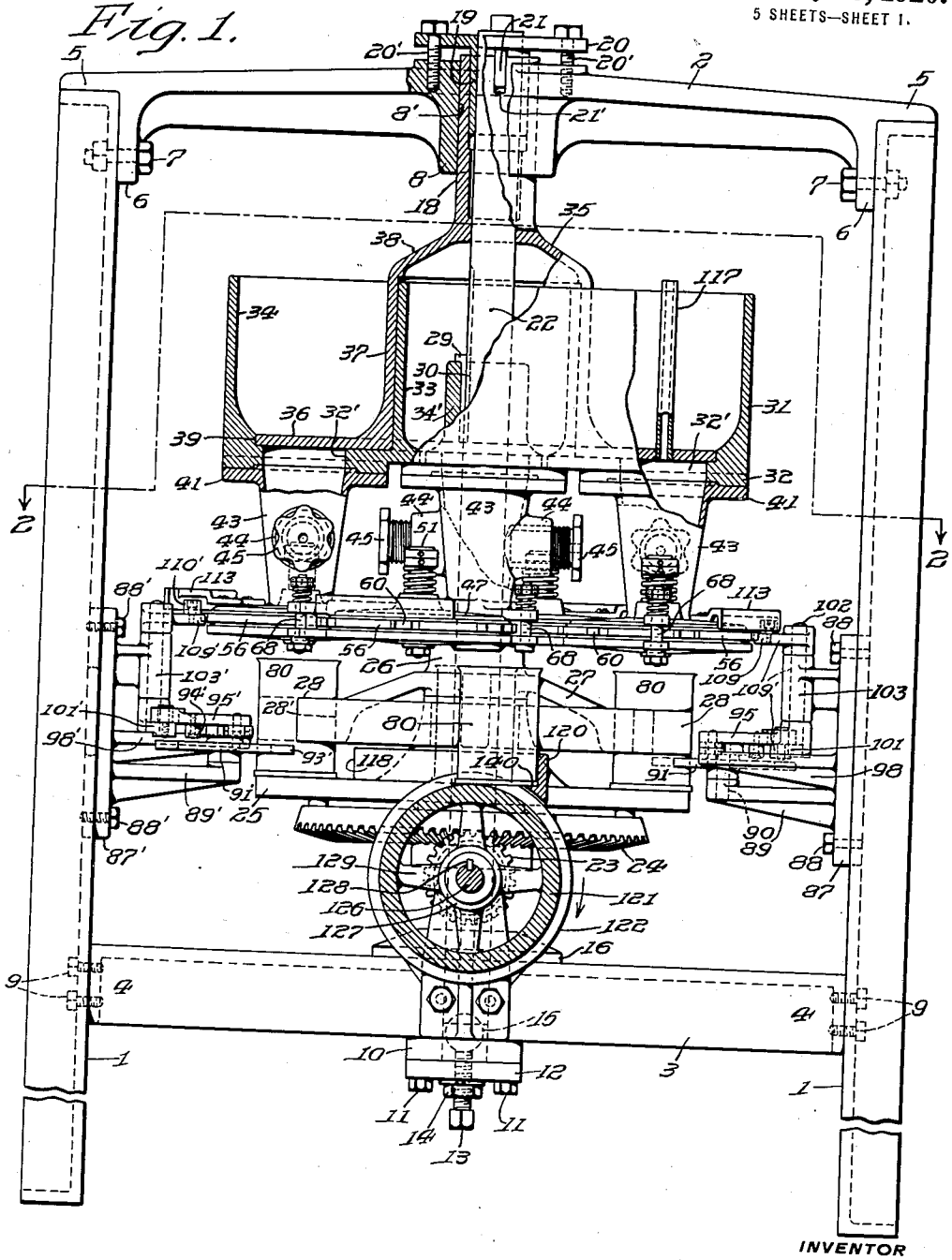
APPLICATION FILED JAN. 12, 1918.

1,340,185.

Patented May 18, 1920.

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

Fig. 2.

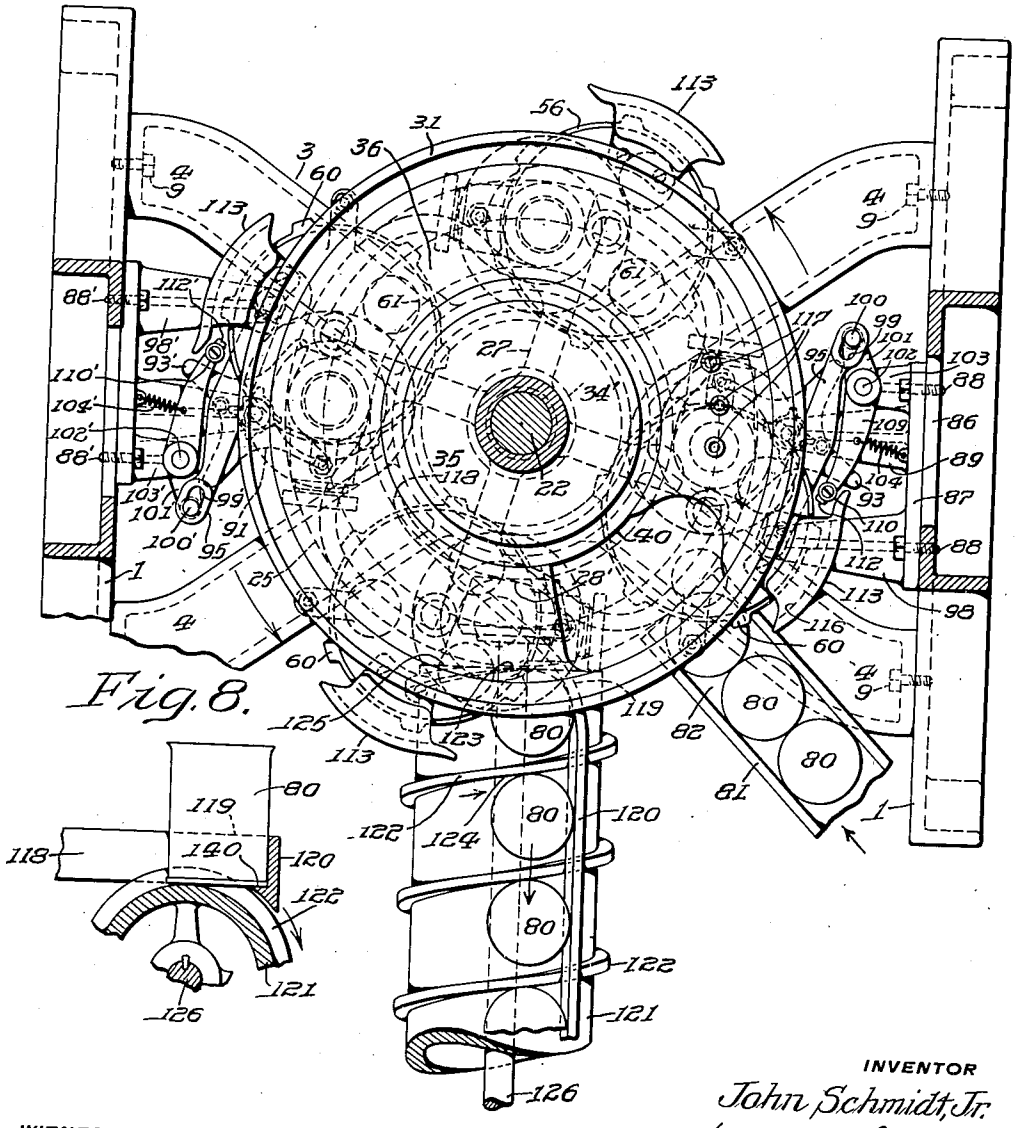


Fig. 8.

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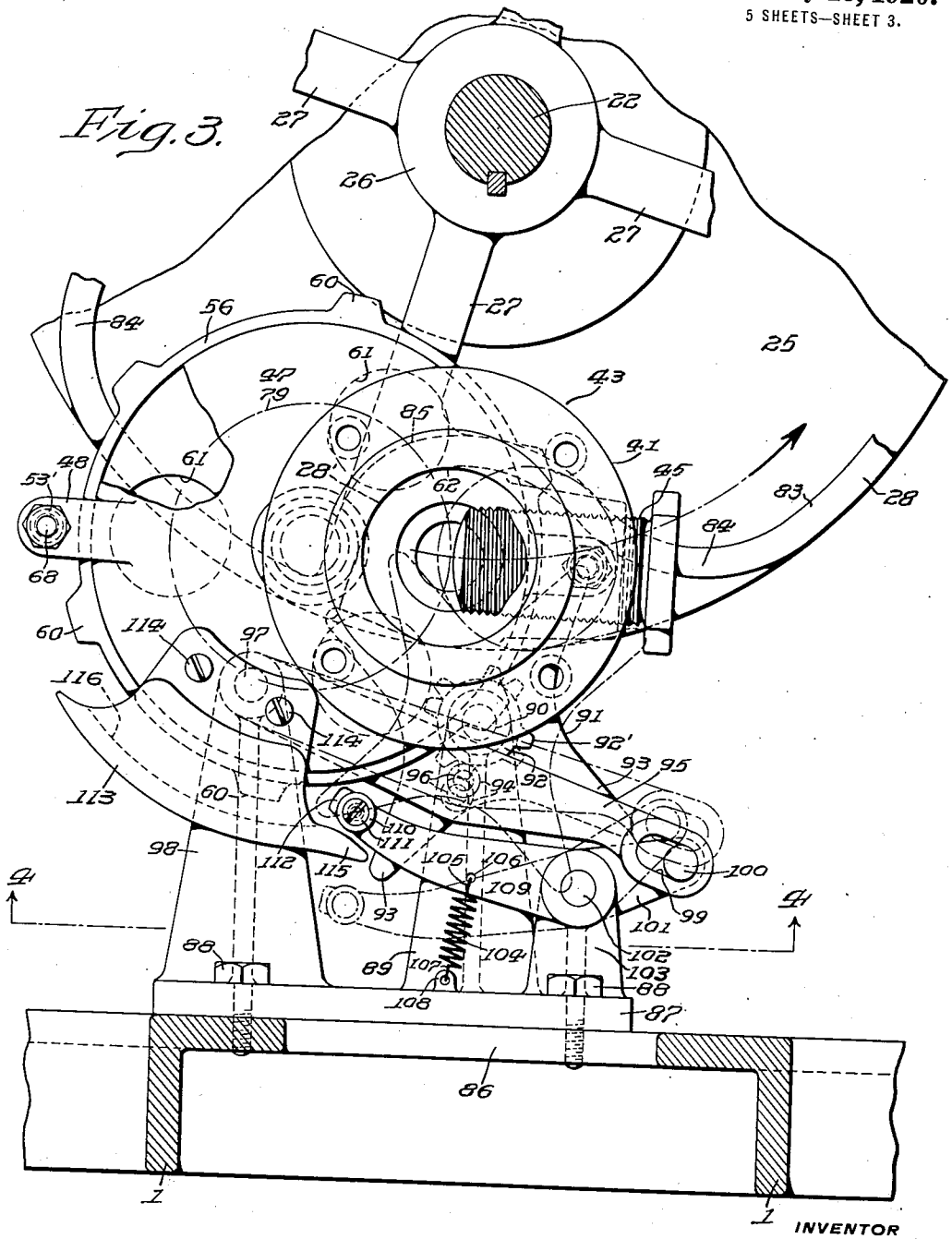
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5 SHEETS—SHEET 3.

Fig. 3.



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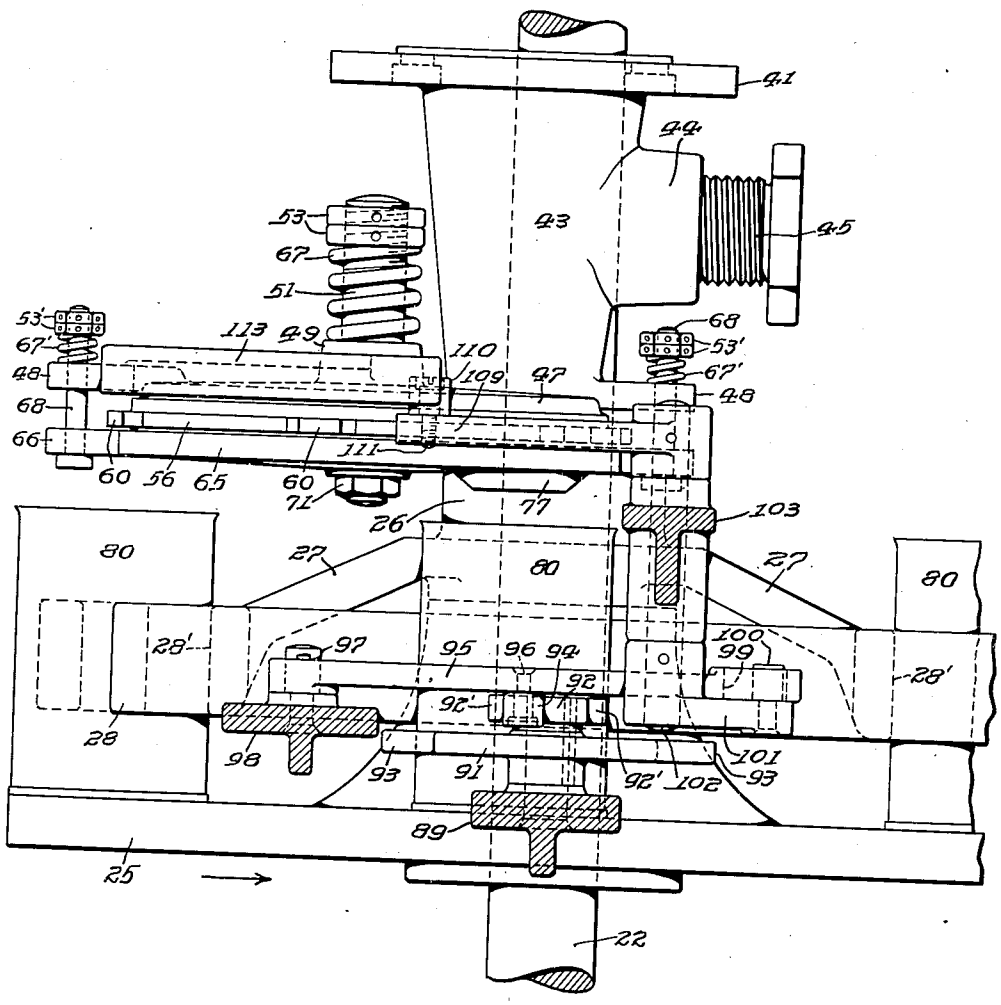
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5 SHEETS—SHEET 4.

Fig. 4.



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5 SHEETS—SHEET 5.

Fig. 5.

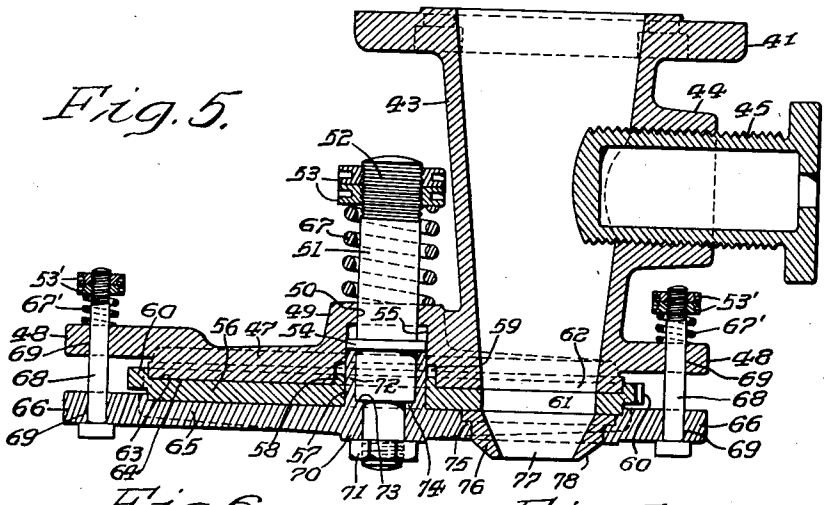


Fig. 6.



Fig. 7.

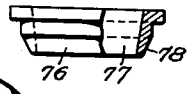


Fig. 9.

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UNITED STATES PATENT OFFICE.

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CAN-FILLING MACHINE.

1,340,185. Specification of Letters Patent. Patented May 18, 1920.

Application filed January 12, 1918. Serial No. 211,645.

To all whom it may concern:

Be it known that I, JOHN SCHMIDT, Jr., a citizen of the United States, residing in Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Can-Filling Machines, of which the following is a specification.

My invention relates to a filling machine wherein the empty cans are continuously received, filled and transported thereafter directly to a soldering machine, and while it is adapted to fill the cans with soup, the method and means present in this machine are very well suited to fill cans with other commodities. This can filling machine is designed to receive the soup in its finally prepared form in a reservoir therein and to pass the soup therefrom into measuring devices capable of being varied as to capacity, and the filling material into the cans, all of said operations being timed and coöperating with each other and with a can which is positioned to receive the filling material. Should no can be present, improved means are included to prevent the soup or other material from being discharged.

One object of my invention is to produce a simplified form of can filling machine wherein the number of parts is reduced to the ultimate minimum, and in which the moving parts maintain their direction of motion without reversal thereof.

Another object of my invention to be described is to provide such a relative position and contact of moving parts that the wear incident to the necessary movement serves to grind said parts into more intimate contact.

Still another object of my invention is to produce a can filling machine in which leakage from the receptacles and conveying passages is substantially absent.

Another object of my invention is to reduce the number of parts necessary to actuate the can filling machine itself by utilizing the power and rotary motion present in the can moving worm of a can sealing machine to which machine the can filling machine which I have invented is connected, and with which it coacts to supply the filled cans to be sealed.

An additional object of my invention is to produce a self adjusting self grinding cut off valve which shall so conform itself under the condition of practice that its double seat and its contacting surfaces shall bear and wear upon each other so that substantially no space shall exist therebetween, thereby preventing the passage, with subsequent leakage, of the material which fills the can.

A further object of my invention is to obtain a means for controlling the position of the cut off valve so that it shall permit a discharge therethrough only when a can is present to be filled, and shall prevent the valve from taking an open position when such position is undesirable.

A further object which I have procured in my invention is that by rotation of the receptacle for the material to be canned and by interposing suitable stops adjacent to the path of the rotating parts I have been able to produce all movements of rotation and translation with a single point of application of power, thus avoiding a multiplicity of points of application of power for various purposes.

In the drawings accompanying this specification and relating thereto, Figure 1 is a view in elevation, partly in fragmentary section showing the moving parts mounted in the supporting frame; Fig. 2 is a plan view on section line 2—2 of Fig. 1; Fig. 3 is a detail plan view of a preferred form of cut off valve actuating mechanism; Fig. 4 is a side elevation taken on line 4—4 of Fig. 3; Fig. 5 is a detail vertical section of a measuring device and cut off valve mechanism; Figs. 6 and 7 are detail sections of different sized removable nozzles for the cut off valve outlet; Fig. 8 is a fragmentary vertical section of the can withdrawing mechanism; and Fig. 9 is a plan view of a modified cut off valve actuating mechanism.

In the drawings there is shown a frame to support and retain in place the operative parts of the machine and those parts connected therewith to be described, which consists of vertical members 1, 1; a horizontal member 2 fastened at each end to the top of the frame members 1, 1, and extending from one to the other thereof; and a spider frame 3 connected at each of its leg extremities 4 to adjacent parts of the frame 1 near the bottom thereof. The frames 1, 1 at each side of the machine are formed of cast metal in this case having a right angle cross section and comprising a horizontal portion which joins the feet of the slanting sides of the

frame, and similar cross bars intermediate the feet and the top of the frames. The top is not formed into a pointed upper extremity but is formed so as to receive in place the top member 2.

Acting with the vertical frames 1, 1, the horizontal top frame 2 and the horizontal spider 3 serve to form a frame carrying the moving parts and maintaining them in co-operative relation.

The top frame 2 for the most part is of T cross section, however at the ends and center its form is altered for special reasons. At each end the frame is shaped in the form of a knee of which the horizontal part 5 rests upon the upper surface of the frame 1, while the vertical portion 6 of the knee is provided with an aperture through which the bolt 7 extends and thus fastens frames 1, 1 and 2 together. At the center of its length the conformation of the top frame 2 is such as to form the vertical cylindrical flange or boss 8 surrounding the aperture 8′ through which the bearing members and shaft, later to be described, pass.

The spider 3 is for the most part of a V-shaped cross section with a suitable disposition of metal at the ends of the arms 4 so that bolts 9, 9 may be threaded thereinto after passing through suitable holes in the frames 1, 1. Reference to Fig. 2 shows the arms 4 of the spider 3 so conformed as to unite about the vertical shaft as shown and provide a suitable housing 10 for the lower end of the shaft and accompanying parts. The opening formed by this housing is directly beneath that formed by the cylindrical flange 8 on the top frame.

It will be readily understood that cross bars or brackets may be positioned where desired upon the frames 1, 1, and serve in the manner of the top frame 2 or the spider 3; to receive the ends of such constructions, the frames 1, 1, may have introduced therein a horizontal member to receive the said ends of the cross bar adjacent the frames. For instance, one of such horizontal members extends across slightly above the feet of the frames near the widest part of the frames to serve as a tie member in the frames. A horizontal member 86 is also inserted in the frames higher up to receive the brackets 87.

The housing 10 in the spider 3 is drilled and tapped on its lower edge to receive the tap bolts 11 passing through the head 12, whereby the lower end of the housing is closed. The stud 13 with lock nut 14 is located in the center of plate 12 and provides adjustable means for positioning the ball 15 placed within the housing 10 and forming a step bearing for the vertical shaft 22. The interior surface of the housing is carefully turned to dimension so as to form a bearing for the shaft 22 and fixed in place above the spider 3, is the bearing collar 16 which is also carefully turned to inside size to form an extension of the cylindrical bearing in the housing for the vertical shaft 22.

Passing to the top of the machine the boss 8, positioned to receive and retain the vertical shaft 22, is provided with a cylindrical surface 8′ which is dimensioned to receive therein the upper cylindrical end 18 of the cut off plate 35. Within the part 18 is the depending cylindrical portion 19 of cap 20, which is connected to the crosspiece 2 by the studs 20′. The cylindrical portion 19 is machined inside so as to serve as a bearing for the shaft 22. This bearing is alined with the coöperating step bearing at the lower extremity of the shaft.

Extending along and between the depending cylindrical portion 19 of cap 20 and the sleeve portion 18 of the cut off plate 35 at diametrically opposite points, are two keys 21 which extend loosely into keyways in the adjacent parts and thereby prevent the cut off plate 35 from rotating.

Extending from the bearing inside the cap 20 into the bearing in the spider 3 is the vertical power shaft 22 to which rotary motion is transmitted from the horizontal power shaft 126 which carries fastened thereto the small bevel gear 23 in mesh with large bevel gear 24 which may be fast on the vertical shaft 22, or fast to the rotary table 25 which in turn is keyed or otherwise fastened to the shaft 22.

Just above the table 25 is a collar 26 from which project four arms 27 which connect with a rim 28 of form shown provided with pockets 28′ for cans 80, the action of which will later be described. The table and the collar are both fast to the shaft 22 thus rotating together and with said shaft.

Above the collar 26 and fastened by way of a hub 34′ to the shaft 22 by a key 29 in a keyway 30 in shaft 22 is a receptacle or reservoir 31 for soup or the like, which comprises a bottom 32, a cylindrical inner wall 33, and a cylindrical outer wall 34 all integral and rotating with the shaft 22. Depending from the bottom 32 are small measuring devices 43, in this case four, whose function will later be described.

Just above the reservoir 31 is located the upper cylindrical portion 18 of the cut off plate 35, which comprises at its lower portion the cut off plate proper 36 which is connected to the sleeve portion 18 by the cylindrical portion 37 and the portion 38.

The part 36 of the cut off plate 35 is carefully fitted into a recess 39 in the bottom 32 of the reservoir 31 and its vertical and lower horizontal faces neatly fit the corresponding portions of the bottom 32 of the reservoir 31. There is a neat fit also between the vertical portion 37 of the cut off plate and the cylindrical portion 33 of the reservoir 31. As the cut off plate is care-

fully positioned, there is little contact and incident wear between the parts 37 and 33, but between the horizontal parts 31 and 32 there may be some wear which results in a grinding to a closer fit of the adjacent parts. Such wear, therefore, cannot spoil the fit between the cut off plate and the reservoir because the cut off plate by reason of its weight maintains itself in contact with the bottom of the reservoir. As the key 21 does not tightly fit in the keyway 21′, the cut off plate moves constantly into closer contact with the bottom 32 of the reservoir. In this way a tight fit is maintained between the parts 32 and 36 and the cut off valve continues to perform its function without leaking in spite of wear.

In order to pass the soup or like material from the reservoir 31 through the part 36 of the cut off plate 35, an aperture 40 best shown in Fig. 2 is provided. The action of the cut off plate is therefore to permit the soup or material to be canned to pass through the cut off plate and into contact with the surface of bottom 32 only at one place. Further, only at this one location can the soup continue its downward travel through one of the apertures 32′ in the bottom 32 into the measuring device 43 below.

Passing through the bottom 32 of the reservoir are four openings 32′ and 90° apart. By means of flanges 41 with suitable bolts passing therethrough, the measuring devices 43 are fastened to the bottom 32 of the reservoir 31. The measuring devices are shaped like hollow frustra of cones. At one side of each is carried a boss 44, threaded internally to receive the screwed plug members 45 which carries a star shaped rim thereon for contact with and turning by the hand of an operator. By varying the position of the plug the volume of the measuring device 43 is changed as will be obvious.

At the lower end of the measuring device the casting extends to one side in the form of a circular plate 47. At the center of the circular plate is a hub portion 49 centrally apertured. Through this aperture 50 is extended the stud 51 threaded at its upper end at 52. Upon the threaded portion are placed the lock nuts 53, 53 to be adjusted in the customary manner. Between the lower lock nut 53 and the upper surface of the hub 49 a stout spring 67 is interposed closely encircling stud 51. Said stud 51 has thereon an integral collar 54 neatly fitting a cylindrical recess 55 in the hub 49 and by means of said collar fitting neatly in recess 55 and said stud 51 fitting equally well in the aperture 50 the stud is maintained erect, the stud and collar 54 sliding within the contiguous surfaces but capable of preventing leakage.

Any other suitable form of means may be used to perform the functions described in connection with the arrangement of stud 51 and I, therefore, do not wish to limit myself to the particular means shown.

Extending from the plates 47 and 65 are the diametrically positioned lugs 48 and 66 in vertical alinement, with holes 69 therein, and extending therethrough are the bolts 68 with lock nuts 53′, 53′, threaded upon the top.

Between the lowermost of the nuts 53′, 53′, and the lug 48 are the coiled springs 67′, 67′, which may be tensioned as desired to hold the plates 47, 56 and 65 in co-active position and with such pressure thereon that there shall be no leakage therebetween as the force of the spring is transmitted through the head of the stud 68 to the lower plate 65, and thereby forces the surface of the adjacent plates into close contact.

Below the plate 47 is a circular plate valve 56 with an aperture 57 being provided about said aperture 57 with a sleeve 58 which fits neatly in a corresponding recess 59 in plate 47. On the periphery of said circular plate valve 56 are several detents 60 the use of which will be later described, there being six shown in the present construction. Arranged in a circle about the center of the plate valve 56 are three circular openings 61 of the same diameter as the exit opening 62 with which the openings 61 at times coöperate as will later appear.

The upper surface of the plate valve 56 is dished at 63 to receive with neat fit the correspondingly projecting lower portion 64 of the plate 47. The valve 56 may be made of bronze or like metal to advantage, or it may well be made of steel. As this part 56 is subject to considerable wear, it is necessary to employ a metal of such density as to accommodate the incident wear and at the same time maintain a smooth continuous surface.

Below the valve 56 is another plate member 65 with two lugs 66, 66 thereon at diametrically opposite points on the periphery thereof. These lugs are provided with holes 69 through which the bolts 68 pass. Corresponding holes 69 are present in the lugs 48 of the plate 47, and above the lugs 48 are placed the springs 67′ and the nuts 53′, 53′, as described. By means of this construction, plate 65 is prevented from rotating, being held stationary with plate 47.

At the center of plate 65 on the lower side a boss 70 is provided which is squared off for the reception of the nut 71 which is positioned on the lower threaded end of the stud 51.

On the upper central portion of plate 65 is formed the sleeve 72 which extends upwardly through the plate valve 56 to the collar 54 on the stud 51, contacting therewith and held firmly thereon by the spring

67. The sleeve 72 is shouldered at 73 to form a bearing with the shoulder 74 on stud 51, said shoulders being of such shape and size as to contact throughout their extent and are positioned longitudinally of the sleeve 72 and the stud 51 so as to permit of their co-action with the top of the sleeve 72 and the collar 54 which are contiguous throughout on their contacting surfaces. In this manner the plate 65 and stud 51 are maintained in position as if integral and thus move vertically together.

At one side of the center of plate 65 is the stepped circular aperture 75 which is concentric with the aperture 61 and the opening 62 in the bottom of the measuring device 43. Removably positioned in the aperture 73 is the nozzle 76. The nozzle is exteriorly stepped to fit into the steps of the aperture 75 and has therethrough the tapered exit passage 77. The lower exterior portion is suitably tapered at 78. It is evident that a set of nozzles may be made similar to 76 having the same exterior dimensions at the stepped portion and provided interiorly with a desired tapered passage of the designed capacity as shown in Figs. 6 and 7.

Referring to Fig. 3 it will be noted that the plate valve 56 has therein three apertures 61 symmetrically placed and from the above statements it will be seen that as they are repeatedly brought under the exit opening 62 of the measuring device a passage through plates 56 and 65 will be provided. Between the apertures 61 there are spaces 79 which being solid prevent the passage from the measuring device through the nozzle 76 and below to a can when they are positioned under the orifice 62 of the measure.

As stated heretofore the detent teeth 60 are suitably positioned on the periphery of the plate 56, and when the detent 60 is passed into contact with a suitable dog 112 or other similar projection the plate 56 is turned on the stud 51 as an axis. The contact between the detent and the dog is so timed that when made the opening 61 is either under orifice 62 or a solid portion of plate valve 56 is thereunder. When closed, the orifice 62 cannot discharge the contents of the measuring device under the action of gravity, the contrary being true when openings 61, 62 and 77 coincide. The plate valve 56 through action of the detents 60 may thus rotate between the plates 47 and 65, and any wear incident to said intermittent rotation is taken up by reason of the action of the springs 67 and 67′ which force the studs carrying said springs upwardly and draw the plate 65 up against the plate 56, and plate 56 against plate 47. Under these conditions the plate 56 wears itself true and maintains the surface of the contiguous plates 47, 56 and 65 true and very smooth. Particularly is this so for the reason that the rotation of the plate 56 is always in one direction.

The foregoing applies to all of the measuring devices and the valve mechanism in connection therewith.

After dealing with the reservoir and the valve mechanism for controlling the discharge of soup or like material therefrom, it is necessary to consider the manipulation of the containers for the material used in the machine under consideration.

The containers 80, in this case tin cans, are delivered, while empty, without the caps or tops thereon, through and by a chute 81 which has a horizontal portion 82 in the same plane as the rotating table 25. Before the cans reach the level portion 82 they travel downward by force of gravity through a vertical portion of the chute not shown. During their passage through the vertical portion of the chute 81 and thereafter while on the level portion 82 thereof, the cans are in close contact with each other and those behind force the forward ones across the level portion and into contact with the vertical sides of the rim 28 on the arms 27.

As shown in Fig. 3 the rim 28 has a portion 83 in the form of a circle whose center is at the center of the upright shaft 22. The outer surface of the rim is of the same circumference as that of the table 25 and consequently as the level portion 82 of the chute extends to the table 25, and as the rim 28 is raised a suitable distance above the table 25, the forward can 80 is held in contact with the portion 83 in the interval of rotation of table 25, when portion 83 is adjacent the level portion of the chute. While this contact continues, the cans are prevented from moving forward in the chute at 82.

At the portion 84 the rim 28 is curved inwardly and at 85 it is reversely curved or outwardly to join the circular portion 83 of the rim 28 forming the pocket 28′. By reason of the form of the curves 84 and 85 a can 80 can gradually progress onto the table 25 always in contact with a portion of the rim 28 at 84 and 85, and be firmly held by the pocket 28′, entirely on the table 25 and be carried by the pocket 28′. As the can 80 entirely fills the pocket 28′ another can in contact with the front can has no chance to move onto the table 25 because after the pocket 28′ is filled the circular portion 83 in its rotation intercepts the next can which is held in contact therewith temporarily as above described. After the portion 83 sweeps by the second can, said can progresses in the manner shown and the same action occurs in connection with suc-

ceeding cans. As here shown, the rim is formed with four portions 84 and 85 but the rim is not limited to this number of parts.

After can 80 is in place, it is carried by the rim and table to be filled and discharged and thence to be capped and packed.

Almost immediately after the can 80 is positioned upon the table 25 it is carried on the table to the point where the discharge thereinto from the measuring device is commenced. At this point means are present to turn the valve 56 so that one of its apertures 61 coincides with the exit opening 62 of the measuring device. Means are presented to contact with the detent 60 so that as it is carried with the connected mechanism rotating with the driving shaft 22 the path of the detents 60 shall be intercepted by a relatively stationary projection or dog 112 for a suitable period so as to fully open the discharge passage from the measuring device. The mechanism controlling the position of the dog 112 will now be described.

Upon the side frame 1 extending from front to back is the horizontal frame member 86. It should be noted here that the same mechanism is provided on each side frame. The second one will be considered in connection with the action of closing the passage from the measuring device. A bracket 87 is fastened to frame member 86 by the bolts 88 passing through suitable holes in bracket 87 into threaded holes in frame 86. Extending from the bracket 87 is the arm 89 which is formed at its end remote from the frame with an enlarged end which is apertured to receive the stud 90. The stud serves to carry a double star wheel, the larger one being 91 and the smaller one being 92. The star wheels may be formed of the same piece or fastened to each other in order to move together and on the same axis. It should be noted that the points of the stars of the large wheel are not co-radial with those of the smaller star wheel 92 which are behind the points of the large star wheel in accordance with a timed relation therebetween.

The points 93 of the large star wheel extend over the rotating table 25 and consequently contact with and are moved by a can moving on the table 25 and pushed by the pocket 28′ of the rim 28. Thus as the can advances the points 93 are alternately struck by the can 80, moved thereby, and later slip off of the can which action is repeated by succeeding cans on the following points of the star wheel.

This rotation of the large star wheel carries with it the small star wheel, which with the large star wheel, is shown in extreme positions by the full and dotted lines.

Contacting with the points of the small star wheel is the roller 94 mounted on the underside of the lever 95 on a suitable pivot stud 96 positioned in lever 95. One end of lever 95 is pivotally supported on a stud 97 suitably inserted in arm 98 extended from bracket 87. The other end of lever 95 is enlarged so as to accommodate the insertion of a slot 99 which receives the stud 100 located at the end of the lever 101 which forms with vertical shaft 102 and lever 109 a bell crank lever 109′. The vertical shaft is carried by the arm 103 through which it passes, which is extended from the bracket 87. As levers 101 and 109 are fast to shaft 102, the motion of 101 is communicated to 109.

A spring 104 is fastened at one end by insertion of its end portion 105 into a suitable hole 106 in lever 109, its other end portion 107 being fastened to a pintle 108. The action of the spring on lever 109 is to throw the end of lever 101 carrying stud 100 away from the bracket 87 and thereby force the lever 95 away from the bracket 87 and thus maintain the roller 94 on the small star wheel 92 and in contact with the star wheel and its points 92′. On the other hand, the action of the points of the small star wheel when in contact with the roller 94 is to force its lever toward the bracket 87 and thus through the action of the stud 100 in the slot 99 to force the lever 101 to move about its pivot 102 and throw the end with the stud 100 toward the bracket 87, thus distending the spring and forcing the lever 109 away from the bracket 87. This action and the resulting position of parts is shown by the full line drawing while the foregoing action of the spring is shown by the parts in dotted lines.

The lever 109 acts as a dog to contact with and move the detents 60 on the valve plate 56. Near the end of the lever 109 is positioned a roller 110 suitably held by and rotating on the pivot stud 111, the dog proper being at 112.

Reference to Fig. 1 will show that the large star wheel 91 is located in a plane just below the plane of the lower edge of the rim 28 while the lever 95 is slightly above the plane of the large star wheel 91. The lever 101 is placed below the lever 95 so as to support one end thereof and the vertical shaft 102 extends upwardly and receives one end of the lever 109 which is in the plane of the cut off valve 56. The end of lever 109 is shaped to contact with the plate 56 and its detents 60 with which it is brought into contact, at the end portion denoted by numeral 112.

The position for contact occurs when the dog 112 is placed in the path of the detents 60 due to the action of the points 92′ of the wheel 92 on the roller 94 on the lever 95, which takes a position so as to move the lever 101 toward the bracket 87 and thus move

the lever 109 and the dog 112 on its end away from the bracket 87. In order to hold the dog 112 tightly on the detents 60 a clip or guide 113 is fastened by screws 114 onto the top surface plate 47 on the lower end of the measuring device. This clip swings around with the reservoir and measuring device and by means of the lip 115 whose inner surface is suitably formed picks up the roller 110 if slightly out of place and forces it into the channel 116. Thus the dog 112 is forced against the edge of plate 56 and later when detent 60 has advanced the dog and detent are held together until the clip has entirely passed the dog 112 at about which time the roller 96 has passed off the point 92′ of the small star wheel 92 and is in contact with the surface of the wheel 92. While the parts are in this position the spring 104 acts to draw the dog 112 into the dotted line position shown in Fig. 3.

Should no can be presented to the large star wheel 91 to move it, it is evident that the foregoing action will not occur and therefore the plate 56 will remain unmoved and the contents of the measuring device will not be discharged. The star wheel and connected parts just described may very well be termed a "no can no fill" device.

It is apparent that the dog 112 and detent 60 meet at a practically fixed point in the travel of the measuring device and the rotary valve 56 about the vertical axis. Hence the contents of the measuring device 43 commence to leave it on their downward passage at this point. In order to prevent the formation of a partial vacuum above the contents connection is made with the atmosphere through the vent pipes 117 which are attached to the fixed cut off plate 36. The vent pipes 117 are located in the cut off plate in spaced relation so that, just before the measure is emptied, connection shall be made through the first pipe with the atmosphere. The space above the measure, even before emptying, is, therefore, at atmospheric pressure. When the measure has reached the point at which discharge is made, another pipe 117 is acting and later still when the measure has continued further, the second pipe and the third pipe will be connected to the space above the measure. By this means a sudden connection with the atmosphere is done away with and the contents of the measure gradually start downward without the slop and splash incident to a sudden connection of the space above the measure with the atmosphere. In addition the period of discharge without the action of a partial vacuum is extended so that practically all of the contents are neatly discharged without sudden movement or holding of part of the contents in the measure.

As the can 80 is carried on the table the measuring device continues in connection therewith so that by dripping the remaining portions of the contents may pass into the can. This part of the filling action continues for approximately a half rotation of the can 80 on the table 25. Located on the left frame, as shown in Fig. 1, is the same star wheel construction controlling a dog 112′ as has been described for opening the disk valve 56. The dog 112′ contacts with the succeeding detent 60 and moves the disk valve 56 a sixth of a revolution and moves the aperture 61 away from the aperture 62 in the measuring device, the motion being sufficient to cover the exit 62 with a continuous portion of the disk 56 and thus close the exit 62.

Inasmuch as the movement of all of the parts at the left of the machine shown in Fig. 1 controlling the closing of the opening 61 are the same as those fully described in connection with the parts shown at the right of Fig. 1, it is deemed necessary only to draw the distinction between the final results thereof. That is to say, while at the right the valve plate 56 is moved so as to permit the discharge of the contents of the measure into the can and leave the parts in the discharge condition, at the left the action is to further rotate the plate 56 and move an opening 61 out of register with the adjacent openings and a blank portion of the plate 56 between the adjacent openings. The "no can no fill" arrangement works similarly also and prevents the dog 112′ from moving the valve plate 56 when no can is present. Thus, the measure is ready for filling after passing the mechanism at the left.

When the plate 56 takes the new position the measure is ready to be refilled and so it is continued in its rotation until the contents of the reservoir 31 are discharged thereinto through the opening 40 in the cut off plate 35. After filling of the measure a new can is placed to receive the contents and the operation of the valve plate 56 occurs to permit the discharge of the contents of the measure.

Shortly after the can 80 passes the point where the dog 112′ has operated to close the aperture above said can, it is contacted with and pushed along the inner end 118 of the guide bar 120, which is formed with the straight portion following the slightly curved portion 118, and with the curved portion 119 which merges into the straight away portion of the bar.

The action of the guide bar is to gradually remove the can 80 from its place on the table 25 in contact with the pocket 28′ which pushes the can until another agency supplies a moving force for the can.

The combined action of the guide bar 120 and the pocket 28′ is to move the can into position to contact with the outer vertical edge of the rim 28 in which position the can 80 is entirely removed from the table 25 for the reason that the outer rim of the table is of the same circumference as the outer vertical edge of the rim 28.

As the bottom of the can 80 moves off the surface of the table 25 it contacts with the surface of the cylinder 121 whose upper element is on the same level as the top surface of the table 25. The cylinder 121 has disposed about it the worm 122 which is drawn to a point 123 at the inner end 125 of the cylinder 121. The rotation of the point 123 is so timed with the rotation of the table 25, or better with one fourth of a rotation thereof that it sweeps behind the can 80 at the time that the rearmost point of the edge of the can is entirely off the table 25. The rotation of the cylinder 121 and of the worm 122 results in the contact of the driving edge 124 of the worm 122 with the can 80. As the cylinder has a right hand rotation and the worm moves toward the guide 118, the can is forced into contact with the guide bar 120 and under action of the worm is removed to a capping and soldering machine at a suitable distance not shown. Fig. 8 shows clearly how the can 80 rests near one edge on the top element of the cylinder 121 and is maintained in contact with the guide bar 120 and upon a shelf or ledge 140 on the guide bar 120. I contemplate the use of any other method to support the edge of the can 80 which rests upon the ledge 140.

The cylinder 121 is mounted on the power shaft 126 by being keyed thereto, and is rotated by said power shaft 126 turning in suitable bearings not shown. At the inner end of the shaft 126 and removably keyed thereto is the bevel pinion 23 from which power is delivered to the large bevel gear 24 as previously described. The connection between the shaft 126 and the cylinder 121 comprises a hub 127 slotted to receive the key 128, which extends into a suitable slot in the shaft 126, and four arms 129 which join the hub 127 to the rim of the cylinder 121.

The cylinder 121, its worm 122 and the shaft 126 are in fact parts of a capping machine not shown and in utilizing the shaft 126 to drive the can filling machine I have effected a substantial saving in space and also of parts necessary to drive the can filling machine. I have also made it possible to unite the can capping machine and the can filling machine so that there is no variation in speed of delivery from the can filling to the can capping machine, and the can filling machine is so constructed that it works to supply the capping machine to its utmost capacity. Between the filler and capping machine there is a minimum distance over which the cans must move, thus an additional saving is produced.

While in the foregoing a preferred form of mechanism operating the dog 112 has been described whereby the movement of the valve 56 may be effected or omitted, another means for moving said valve has been devised by me which I will now describe. Reference to Fig. 9 will show a bracket 130 secured by bolt 131 to a portion 86 of the frame of the machine.

A stud 133 which may be provided with a head or nut on top is fixed in the bracket 130 and forms a pivot for the lever 134 formed on its end with a dog 135. A stud 136 carries a roller 137 which will contact with the outer surface of the internal channel 116 in the clip or guide 113. By the pin 138 in the slot 139 the arm 134 is limited in its pivotal movement. The foregoing described construction is located so that the dog 135 is normally in the path of the detent 60 and is locked in contact therewith when the clip 113 swings over the roller 137. When the clip has entirely passed said roller, the dog 135 slips off the detent 60 and stays in the position where the dog clears the detent. In order to accommodate any displacement of the lever 134 a lip 115 on the clip 113 is formed with a sloping surface to guide the roller 137 into the channel in the next clip on the following measuring device. A positive actuation of the plate 56 is thus obtained to open the discharge aperture at one point and to close it on the opposite side of the machine.

The operation of the can filling machine invented by me is as follows:

The soup or material to be filled into the cans is brought to and deposited in the rotating reservoir and passes through the cut off plate therein into the measuring devices just before the point in the travel where it is to be dropped into an empty can. Adjacent the point of travel at which the material to be canned drops down into the measuring device, the empty cans are fed into the rotating table and into position in the pocket which carries the can through its path and to the point of departure thereof from the rotating table into the supplemental can conveyer.

Just after the time when the can has been firmly positioned in its place on the table and in the pocket, the valve at the bottom of the measure is opened and the contents are deposited in the can. The can and measure rotate at the same speed and the can is therefore under the measure substantially 180° of rotation, the contents therefore being allowed to drop from the measure. At a point practically diametrically opposite

that at which the valve in the bottom of the measure is opened, a second dog contacts with another detent upon said valve and moves said valve one-sixth of a revolution which brings a solid portion of the valve under the exit orifice of the measure. After this point the can is then progressed by the pusher to an adjacent point in its travel where it is intercepted by the guide member on the can removing device and is gradually shifted from its inner position in the pocket to the outer edge of the table, and finally passes entirely off of the table. During this interval the measure is returning to the point in its travel where the opening in the cut off plate shall allow another discharge to be dropped thereinto.

At the moment when the rear edge of the can has left the table, the pointed end of the worm sweeps around behind it and thereafter continues in contact with the lower edge of the can. The rotation of the worm is such as to continually maintain the can against the guideway referred to which has at its lower edge a shelf or ledge upon which one portion of the bottom of the can rests while an almost diametrically opposite portion rests upon the cylindrical surface of the can removing worm. Under the continued action of the thread on the worm the cans are advanced through a short travel to a can capping mechanism at which point the cans are sealed. From this point the cans are passed to be processed and then labeled and packed.

Although in the foregoing I have described with some particularity the particular construction present in the drawings, it should nevertheless be understood that I do not in any way limit my invention to that which has been referred to as I contemplate many other forms of apparatus which are necessarily included by the description and which are considered by me as not being departures from the spirit of my invention.

Having thus fully described my invention, I claim and desire to protect by Letters Patent of the United States:

1. In a can filling machine, the combination of a can conveying device, a rotating table, means to receive a can and move it through said filling machine, a container for the material to be filled, a measuring device therefor, a rotary plate valve thereon, and substantially fixed means interposed in the path of the valve member to cause an intermittent movement in said valve always in the same direction.

2. In a can filling machine, the combination of a rotating reservoir, a fixed apertured cut off plate, measuring devices attached to said rotating reservoir and filled therefrom, an apertured rotary valve on said measuring device with detent means thereon, a substantially fixed member adjacent the path of said valve member whereby the valve member shall be intermittently rotated, a can carrying table, a can pusher member and can removing means interposed in the path of the cans co-acting with the pusher member to remove the cans from said table and a can conveyer for transferring the output of the can filling machine away therefrom.

3. In a can filling machine, the combination of a rotating reservoir, a fixed apertured cut off plate, measuring devices attached to said rotating reservoir and filled therefrom, an apertured rotary valve on said measuring device with detent means thereon, a substantially fixed member adjacent the path of said valve member whereby the valve member may be intermittently rotated, and a second substantially fixed means interposed in the path of a detent upon said rotary valve whereby said valve shall be moved to a closed position, a cam carrying table, a can pusher member and can removing means interposed in the path of the cans coacting with the pusher member to remove the cans from said table and a can conveyer for transferring the output of the can filling machine away therefrom.

4. In a can filling machine, the combination of a rotating reservoir, a fixed apertured cut off plate, measuring devices attached to said rotating reservoir and filled therefrom, an apertured rotary valve on said measuring device, detent means thereon, said valve member comprising two outer plate members and an inner plate member provided with spaced apertures positioned to move between said other plate members, connecting means for holding said plate members in intimate contact and for taking up the wear thereof and a removable nozzle member interposed in an aperture therefor in the lower plate member, a can carrying table, a pusher bar arranged thereabove, substantially fixed means located in the path of the detent means on said rotary valve and adapted to engage therewith whereby the rotary valve may be intermittently moved to opened and closed positions, means for supplying empty cans and transfer mechanism for removing the filled cans.

5. In a can filling machine in combination, a rotary reservoir, a stationary cut off plate therein having a discharge aperture, a measuring device on said reservoir having a discharge orifice and a valve therefor adjacent an exit opening therein comprising a relatively fixed top plate member formed to receive adjustable retaining means for said valve, a lower plate member fitted to said top plate having spaced apertures co-acting with the discharge orifice of the measuring device, detent members upon said lower plate, a substantially fixed dog interposed in the path thereof whereby contact may be made with said detent members, a third

plate member connected to the upper plate having an aperture therein co-acting with the discharge orifice of the reservoir and means to move the reservoir and measuring device whereby the detent member on the valve plate is contacted by said dog member, moved into operative position to allow discharge from the reservoir and later moved to close the discharge orifice of the measuring device.

6. In a can filling machine in combination, a rotating reservoir, a fixed cut off plate therein, a frame for holding said parts, a discharge orifice in said reservoir, a valve comprising relatively fixed members and a rotary member, detents on said valve, a dog member on said frame, a controller therefor comprising a pair of coöperating star wheels, a lever pivoted at one end and having a roller thereon adjacent the smaller star wheel whereby said lever may be moved thereby, said lever having a slotted end, a bell crank lever having an extended vertical pivot carried by brackets on said frame and having its lower branch engaging the slotted lever while the upper branch forms the dog member, a flexible retaining member joined to said upper branch, anti-friction means on said upper and second branch and a guide member fastened to a non-rotating portion of said valve having a channel therein through which said anti-friction member passes whereby the dog member is placed in operative contact with the detent on the rotary part of said valve and removed from contact therewith by said flexible member when said guide member has passed said dog member.

7. In a can filling machine in combination, a frame, a reservoir held thereon, a cut off valve in said reservoir, a measuring device on said reservoir, a valve for the lower end of said measuring device, a casing therefor, detent members on said valve, a guide member carried by said casing, a bracket on said frame, a dog member thereon disposed in the path of said detent member and anti-friction means on said dog coöperating with said guide to maintain the dog and detents in contact during the movement of the measuring device whereby the valve is moved during the interval of time in which the dog and detent are in contact.

8. In a can filling machine in combination, a reservoir, an axis about which said reservoir rotates, a measuring device and a valve therefor comprising three plate members two of which move only about the axis of the reservoir while the third member has a movement about said axis and also about its own axis, a can carrying table below said valve and means for supplying and removing cans to and from, said can carrying table.

9. In a can filling machine, the combination of a rotatable reservoir provided with outlet orifices in the bottom thereof, a stationary cut-off plate provided with an aperture located in said reservoir, measuring devices connected to said reservoir beneath said orifice and movable relative to said plate whereby said measuring devices are periodically filled through said orifice and said aperture, a can carrying table operative to successively move cans beneath said measuring devices, rotating outlet valves for said measuring devices, projections on said outlet valves, means adapted to engage said projections for intermittently rotating said outlet valves into closed and opened positions and means adapted to render said engaging means respectively operative or inoperative dependent upon the presence or absence of a can.

10. In a can filling machine, the combination of means for guiding cans to said machine, means for conveying said cans from said machine, means for successively moving said cans from said guiding means to said conveying means, means for containing a commodity to be fed to said cans, means connected to said containing means adapted to hold a predetermined amount of said commodity, means for automatically opening and closing communications between said containing means and said holding means, means for automatically opening and closing communication between said holding means and said cans, means engageable by said cans for controlling the operation of said last mentioned means, said engageable means including rotary members adapted to be engaged and rotated by said cans and rotary means carried by said rotary members for rotation therewith, means engageable by said rotary means and with said opening and closing means, whereby said rotary means and said engageable means operate said opening and said closing means upon the presence of a can and remain inoperative upon the absence of a can.

11. In a can filling machine, the combination of a reservoir provided with orifices, a cut-off plate provided with an aperture located in said reservoir, said reservoir and plate being relatively rotatable, valved measuring devices adapted to receive the contents of the reservoir through said orifices and said aperture when in registration, a can carrying member, means for holding cans in place thereon, a frame member for supporting said parts, a detent member thereon, projections on said valved measuring devices adapted to be engaged by said detents and means engageable by said cans for rendering said detents operative to engage said projections.

12. In a can filling machine, the combination of a reservoir provided with orifices, a

measuring device provided with a discharge aperture and adapted to communicate with said reservoir through said orifices, a valve for said discharge aperture, said valve comprising a series of coaxial plate members normally held in intimate contact with each other, resilient means adapted to exert confining pressure throughout the series of said plates, the interior member of said series being formed to close contact with the adjacent members and to rotate relative thereto, a substantially stationary detent therefor and contact means thereon adapted to be engaged by said detent whereby said interior valve member is rotated to intermittently open and close the discharge aperture on said measuring device

In witness whereof I have hereunto set my hand this 11th day of January, A. D. 1918.

JOHN SCHMIDT, JR.