

May 4, 1926.

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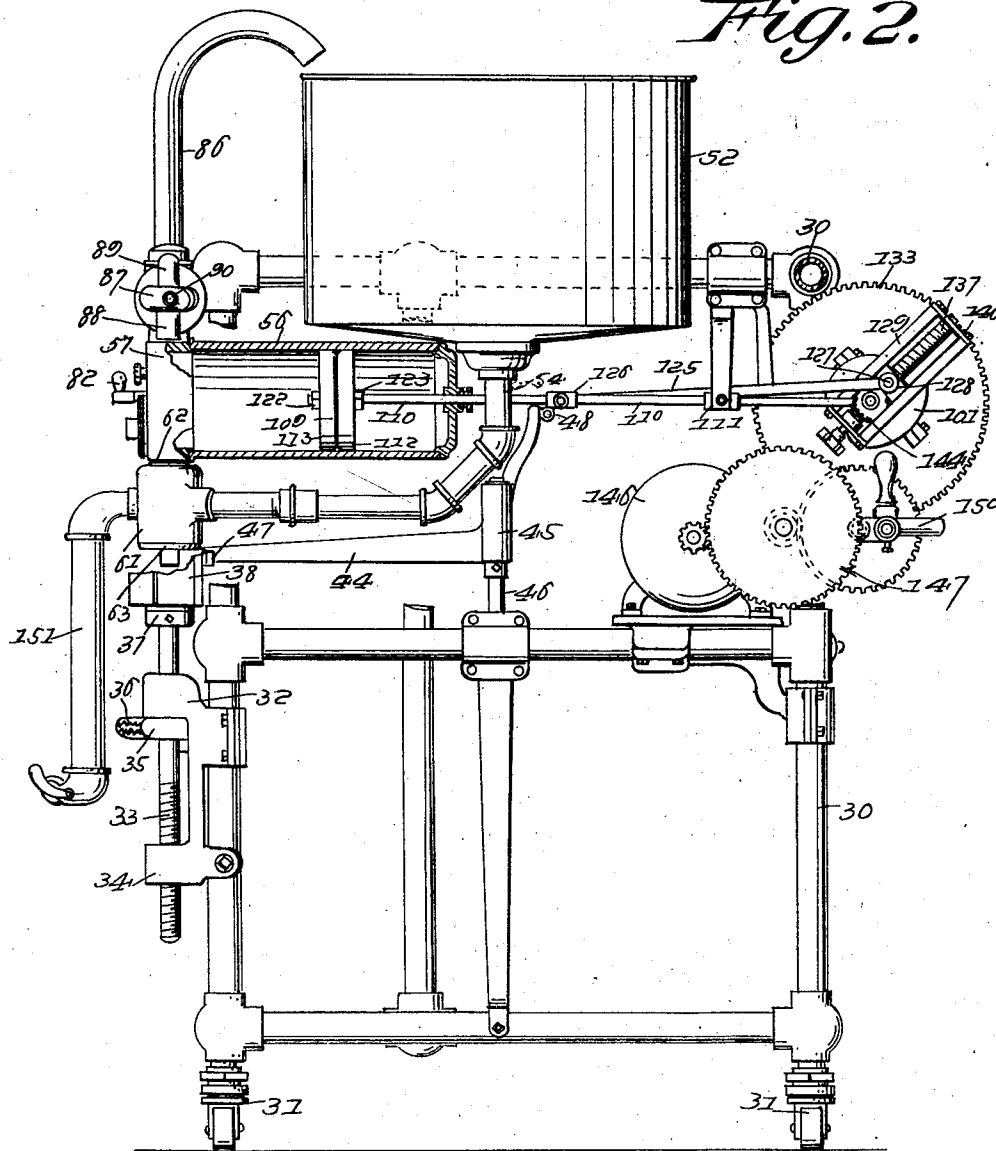
M. HOFHEIMER

CAN FILLING MACHINE

Filed Oct. 25, 1920

7 Sheets-Sheet 2

Fig. 2.



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7 Sheets-Sheet 4

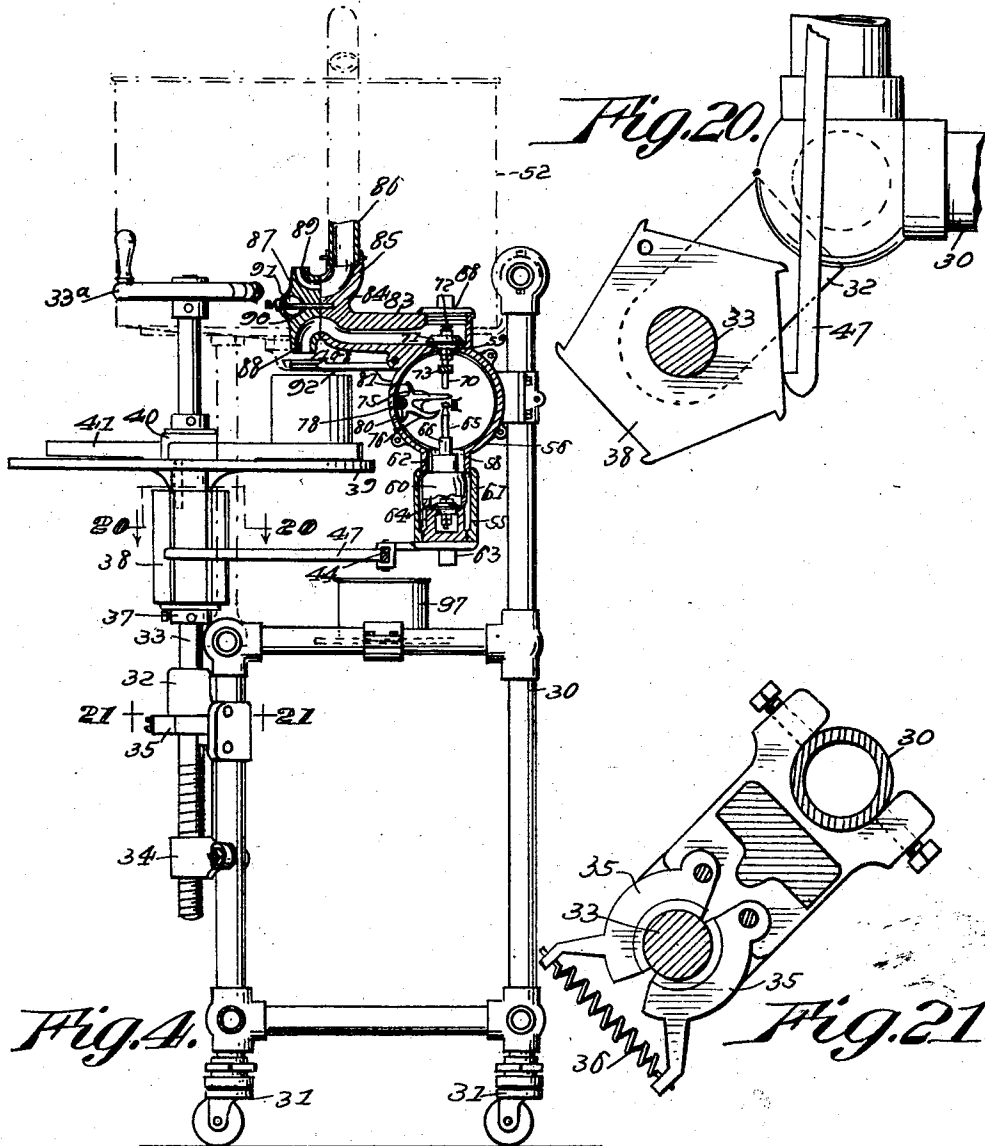


Fig. 20.

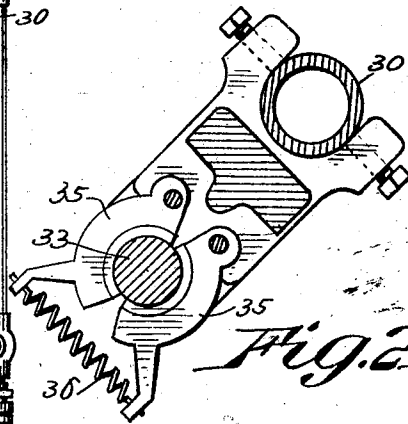
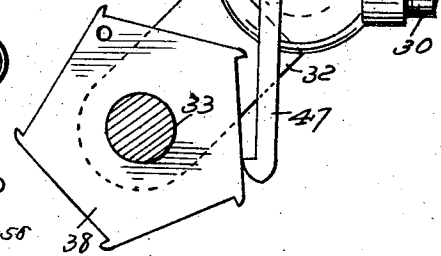


Fig. 21.

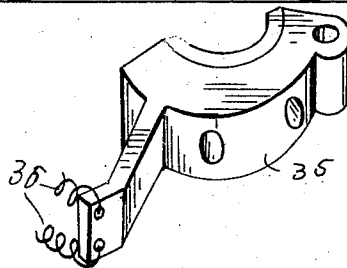


Fig. 22.

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CAN FILLING MACHINE

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7 Sheets-Sheet 3

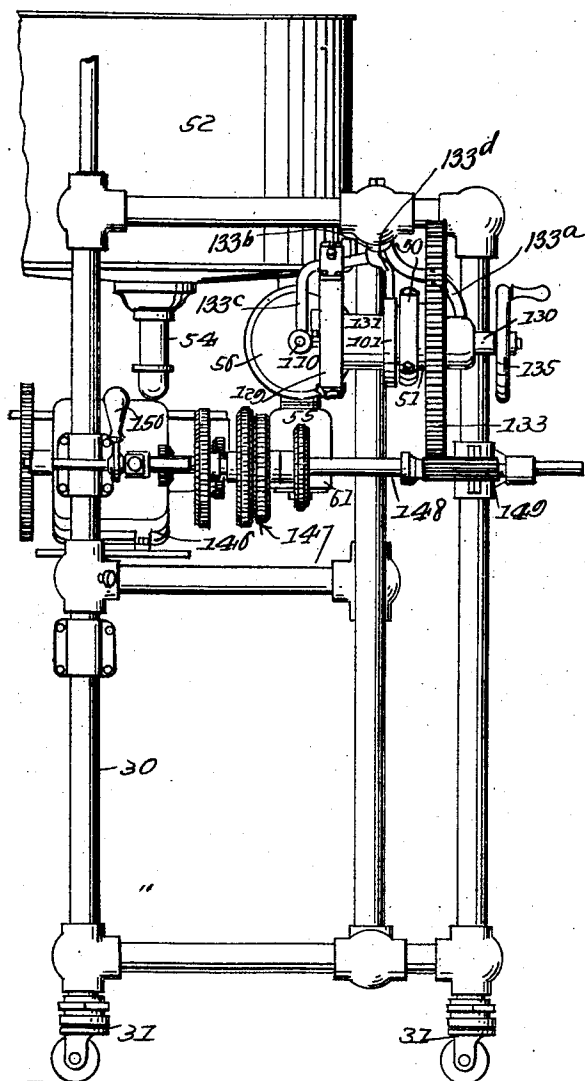


Fig. 3.

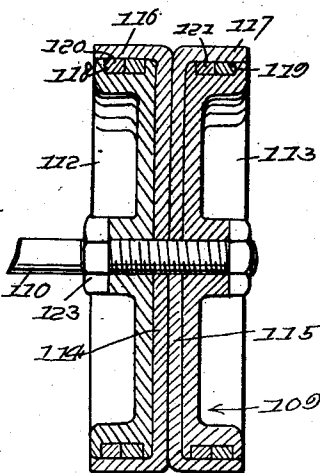


Fig. 23.

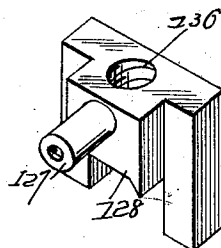


Fig. 24.

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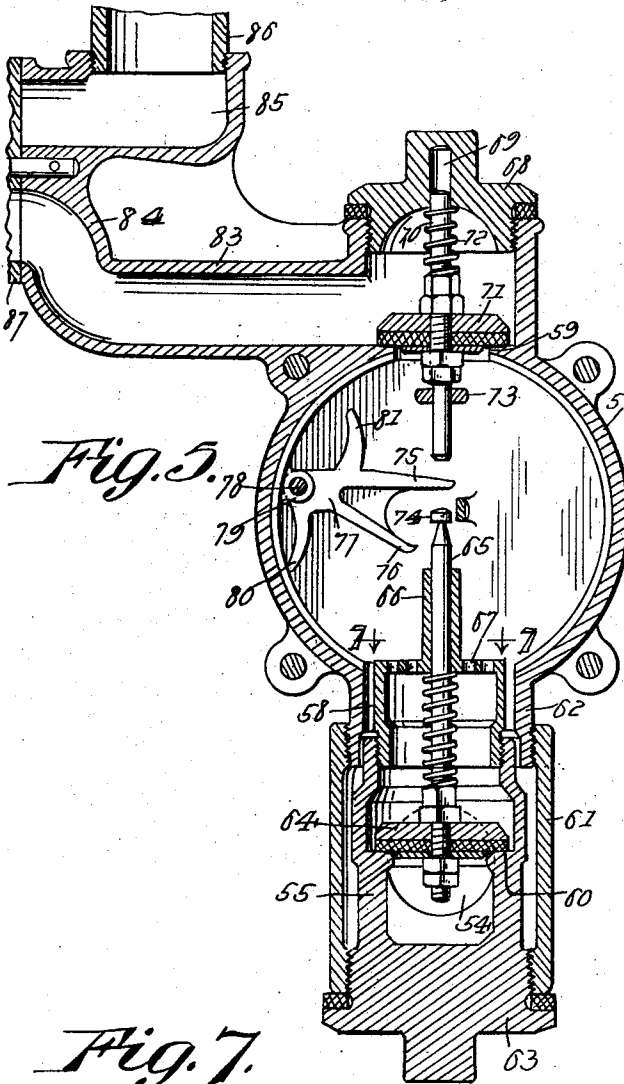


Fig. 6.

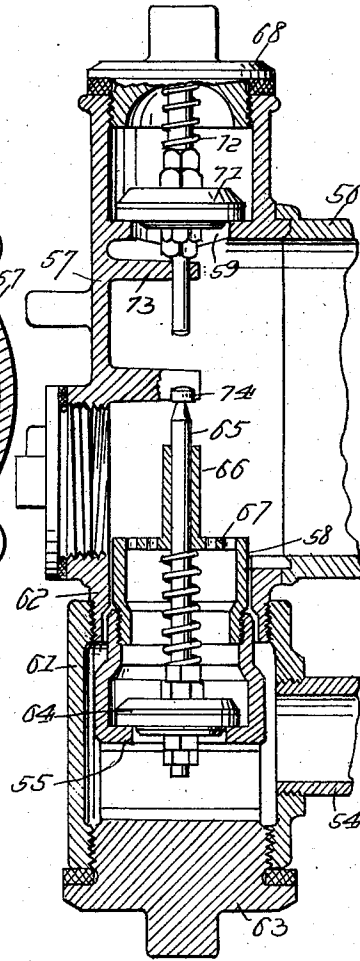
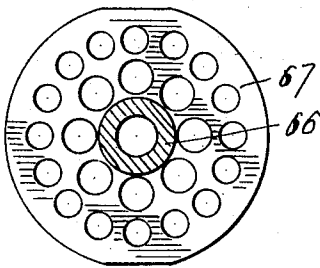


Fig. 7.



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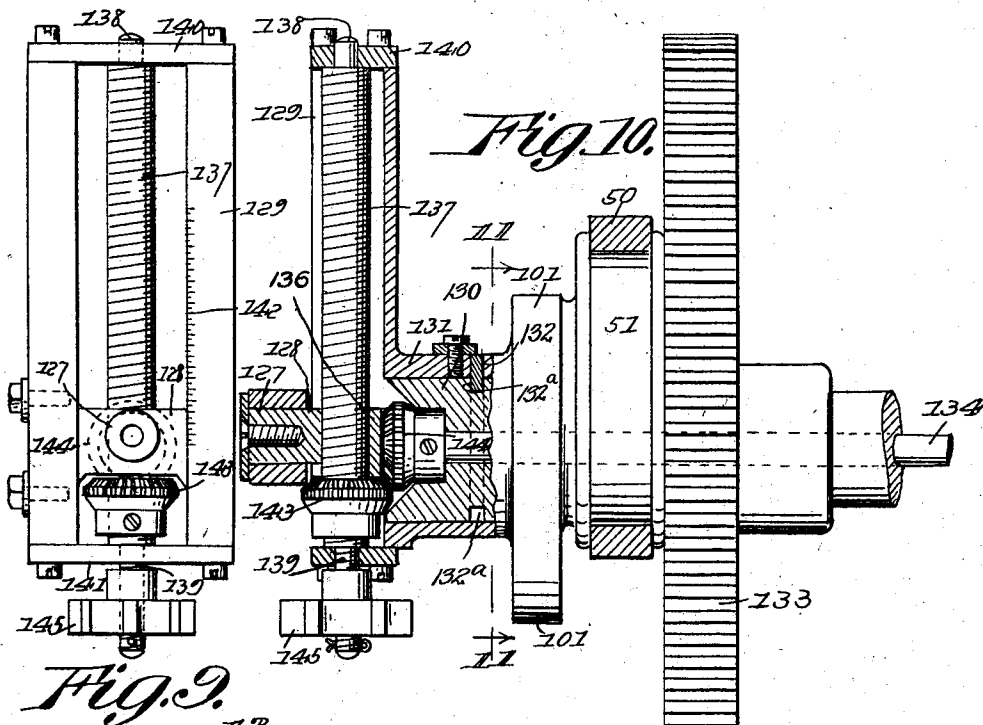


Fig. 9.

Fig. 10.

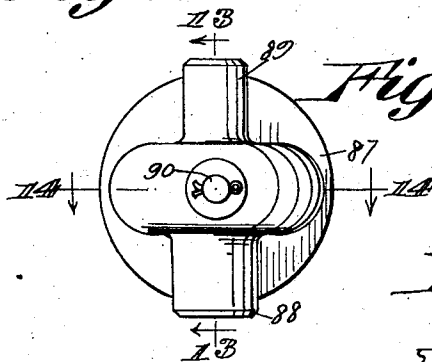


Fig. 12.

Fig. 13.

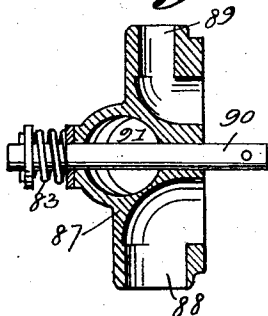


Fig. 11.

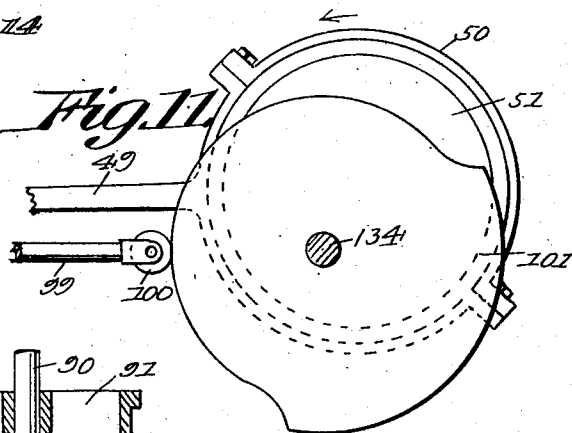
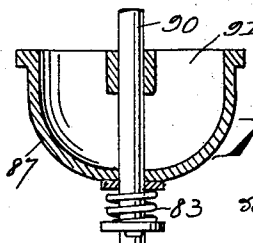


Fig. 14.



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Fig. 15.

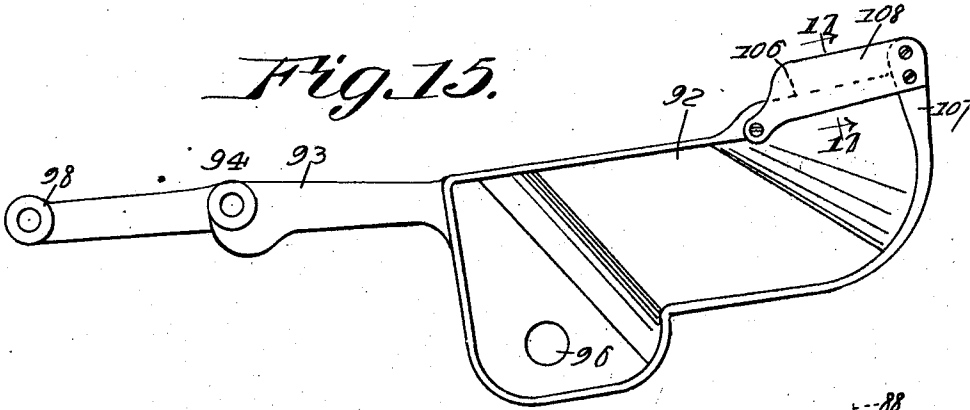


Fig. 16.

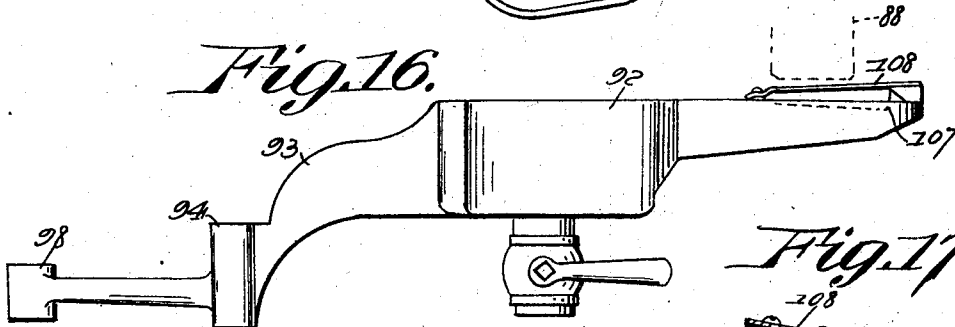


Fig. 17.

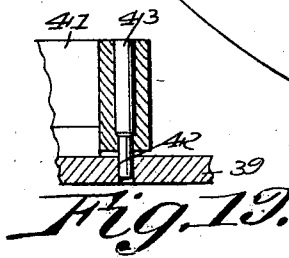
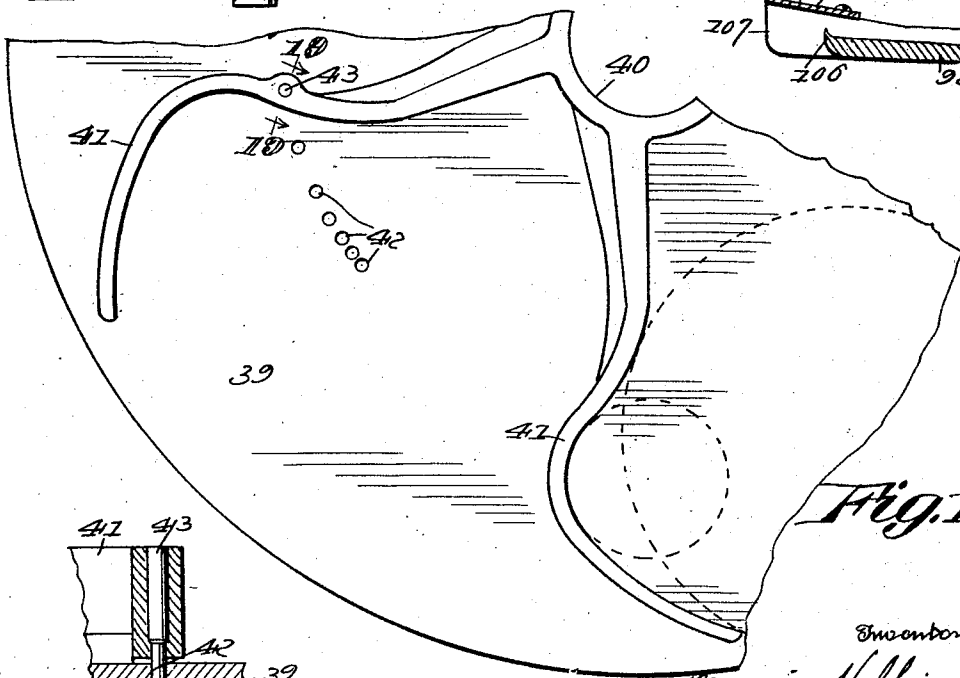
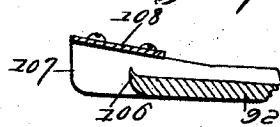


Fig. 18.

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UNITED STATES PATENT OFFICE.

MAURICE HOFHEIMER, OF BALTIMORE, MARYLAND.

CAN-FILLING MACHINE.

Application filed October 25, 1920. Serial No. 419,378.

To all whom it may concern:

Be it known that I, MAURICE HOFHEIMER, a citizen of the United States of America, and resident of Baltimore, in the county of Baltimore City and State of Maryland, have invented certain new and useful Improvements in Can-Filling Machines, of which the following is a specification.

This invention relates to filling machines, and particularly to a machine intended for use in filling cans with paint, the said invention having for an object to provide novel means whereby cans of different sizes may be carried to a position where their open mouths or ends are centered with relation to the paint delivering nozzle, thus making it possible to adjust the machine so that cans of different sizes may be operated upon by the same mechanism without changing the operating mechanism except to re-set one element with relation to which the other elements of the cam carrying mechanism may coact.

A still further object of this invention is to provide means for operating the mechanism of the can carrying machine when the said mechanism is in different positions of adjustment; when such adjustments are necessary, to accommodate cans of different heights; it being possible by the use of this machine to carry very small cans and then by a very simple contrivance to make it adaptable for filling comparatively large cans, and so without predetermined limits the machine may be used in connection with a plurality of sizes of cans.

With the foregoing and other objects in view the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this specification wherein like characters denote corresponding parts in the several views, and in which—

Figure 1 illustrates a top plan view of a filling machine embodying the invention;

Figure 2 illustrates a side elevation thereof partly in section and with certain parts omitted;

Figure 3 illustrates a rear end view of the machine;

Figure 4 illustrates a front view thereof,

parts being in elevation and parts being in section;

Figure 5 illustrates an enlarged detailed view showing the intake and discharge ports of the pump with parts associated therewith;

Figure 6 illustrates an enlarged sectional view of the intake and discharge ports and valves at right angles to the position in which they are shown in Fig. 5;

Figure 7 illustrates a sectional view on the line 7—7 of Fig. 5;

Figure 8 illustrates a perspective view of the table rotating mechanism omitting the ratchet wheel or sleeve;

Figure 9 illustrates an enlarged detailed view of the pump controlling mechanism;

Figure 10 illustrates an enlarged detailed view partly in section of the pump operating mechanism;

Figure 11 illustrates a sectional view on the line 11—11 of Fig. 10;

Figure 12 illustrates an enlarged detailed view of the delivery head and nozzles;

Figure 13 illustrates a sectional view on the line 13—13 of Fig. 12;

Figure 14 illustrates a sectional view on the line 14—14 of Fig. 12;

Figure 15 illustrates a top plan view of the drip collector;

Figure 16 illustrates a side elevation thereof;

Figure 17 illustrates a sectional view on the line 17—17 of Fig. 15;

Figure 18 illustrates an enlarged detailed view of the can table;

Figure 19 illustrates a sectional view on the line 19—19 of Fig. 18;

Figure 20 illustrates a sectional view on the line 20—20 of Fig. 4;

Figure 21 illustrates a sectional view on the line 21—21 of Fig. 4;

Figure 22 illustrates a perspective view of one of the brake jaws;

Figure 23 illustrates a sectional view of the pump piston showing the packing; and

Figure 24 illustrates a detailed view of the pump adjusting block.

In these drawings 30 denotes a frame which is here shown as formed of sectional tubing, and as sectional tubing frames can be made in so many different sizes and configurations, it is obvious that any appropriate frame which will support the operating parts of the mechanism might be employed as a support for the mechanism to be

described. It is desirable, however, that the frame be supplied with wheels or casters 31 so that the machine can be moved from one mixing tank to another or transferred from one position to another, according to the desires of the operator.

One of the posts of the frame at the front has a guide or bearing 32 attached to it in which a worm shaft 33 is rotatable, the worm of the shaft being threaded in a block 34 which is also attached to one of the posts of the frame. The shaft 33 may be rotated by a wheel or handle 33^a. It is the purpose of the inventor that the shaft 33 shall be rotated for elevating or lowering the shaft and that after the adjustments desired have been attained, the shaft may be held against accidental movement by means of the brake shoes or clamps 35 each of which has one end pivotally anchored to the post, the opposite ends of the said braking elements being connected by springs 36 which maintain the pressure of the braking elements on the shaft, it being understood that the braking elements shall be held sufficiently tight to prevent the shaft from rotating under ordinary conditions, but permit the rotation of the shaft upon application of force to overcome friction of the braking elements.

The shaft 33 has a collar 37 which constitutes a support for the elongated ratchet wheel 38 which ratchet wheel is rotatable on the shaft, and it carries a turntable 39 on which cans are supported and carried as the said turntable is rotated, as will presently appear.

The cans are held on the table in certain positions with relation to the radius of the turntable by a spider 40, the arms 41 of which are curved on mathematical lines so that those surfaces of the arms which engage the cans and form guides for them, so engage the can as to hold the center of its open end in such position that the can will be presented to the filling nozzle (to be presently described) at the longitudinal axis of the said nozzle and this relation of parts is attainable regardless of the sizes of the cans to be carried, within predetermined limits, it being seen by the drawing that the turntable has a series of apertures 42 which may receive a set pin 43 extending through an arm, thereby making it possible to adjust the arm to operate in conjunction with cans of different sizes. The dotted line positions of the circles in Fig. 18 will illustrate how small or large cans may have their peripheries or outer surfaces engaged to maintain the relation of parts just described. The spider is, of course, free of the shaft and may be moved to different positions with relation to the turntable so that it will move or be carried by the turntable.

A bell crank lever 44 has a hub 45 mounted on a stud 46 of the frame and the said bell

crank lever has a dog 47 pivoted on one end, which dog engages the teeth of the ratchet wheel in its oscillation and serves to rotate the said ratchet wheel the distance of one tooth at each cycle of operation of the filling machine, as will presently appear. The end of the bell crank lever remote from the dog has a knuckle 48 pivoted on it which knuckle is connected to an arm 49 of the eccentric strap 50 which eccentric strap engages an eccentric 51 associated with the pump operating mechanism, as will presently appear, so that the turntable is moved synchronously with the pumping impulses. The dog is held operative by a spring 47^a.

Now reverting to details of the can filling machine with which the can carrying member is associated, it will be seen that the frame constitutes a support for a tank 52 to which paint may be delivered from a mixing vat or the like in any appropriate way, the said tank having a strainer 53 at the bottom to which a pipe 54 is connected leading to the intake valve casing 55 of the pump cylinder 56, the said pump cylinder having a head 57 at its outer end so constructed that ports 58 and 59 are formed, one of which may be termed the intake port and the other the discharge port of the pump. The valve casing 55 is removably secured to the head so that it may communicate with the intake port, and the said valve casing has a valve seat 60, the said valve casing being connected to the head by a sleeve 61 which is threaded on the valve casing and on an annular flange 62 depending from the said head. The valve casing and seat may be said to be formed as a part of a plug or closure 63 and it is removable in order that access may be had to the interior of the said head.

The valve 64 of the intake port has a stem 65 slidable in a guide 66 formed integral with a valve cage 67, the said valve cage being apertured to permit the passage of paint, and there being a spring interposed between the interior of the valve cage and a part of the valve structure, which spring is operative to hold the valve normally seated. The valve cage is threaded on the interior of that portion of the device having the valve seat and all of these parts may be disconnected when desired.

The upper end of the cylinder head has a plug 68 threaded in it in order that access to the interior may be had and this cap has a hollow boss 69 forming a guide for the valve stem 70. The valve 71 is carried by the valve stem and it controls the port 59, said valve being held on its seat by a spring 72 encircling the said valve stem and interposed between the cap and a portion of the assembly of the valve and stem. The head also has an apertured lug 73 constituting a guide for the lower end of the valve stem 70, and the upper end of the valve stem 65

has a shoulder 74, the lower end of the valve stem 70 and the said shoulder being engaged by fingers 75 and 76 respectively, carried by the arm 77 which arm is mounted on a pivot 78 of the lug 79 on the interior of the head. The oscillation of the arm is limited in its downward movement by a finger 80 and in its upward movement by a finger 81, either of which will strike the interior wall of the head if undue motion is imparted to the said arm. Provision is made for rotating the pivot 78 and to that end a handle 82 is attached to the pivot at its outer end where it projects through the head so that an operator may manipulate the arm to unseat the valves when the cylinder head is to be drained.

The head of the cylinder has a hollow arm or pipe 83 terminating in a head 84 which head has an upwardly extending hollow branch 85 to which a pipe 86 is connected leading to a location over the tank 52.

A distributor head 87 has a large nozzle 88 and a small nozzle 89, here shown as being oppositely disposed and this distributor head is rotatably mounted on the head 84 by the stud 90 which stud projects from the face of the head 84. The outer end of the stud has a spring bearing against the distributor head to hold it in intimate contact with the head 84 to produce a leakproof joint between these elements, and the distributor head may be moved so that the large nozzle 88 is in communication with the pump, or the said distributor head may be moved so that the small nozzle 89 is in communication with the pump, depending upon whether a large or small volume of paint is to be delivered at each cycle of operation of the said pump. The distributor head has a port 91 which might be termed a by-pass extending transversely of the said head as compared with the nozzles 88 and 89, and the ends of the port 91 are intended to be moved into registry with the conduit from the pump and into registry with the passage leading to the pipe 86 so that when the pump is operated, fluid would be taken into the pump at the intake valve and discharged therefrom through the pipe 86 so that the fluid would flow into the tank and back through the pump to remove paint deposits. Any suitable fluid which will dislodge the paint could be circulated.

A drip pan or collector 92 has an arm 93 with a hollow boss 94 which hollow boss is mounted on a pivot 95, the said pivot being in such position that when the arm is oscillated, the drip collector may be moved under or clear of a discharge nozzle, according to the cycle of operation of the mechanism. The collector has a drain opening 96 which may discharge into a receptacle 97 supported on the frame. The end of the arm remote from the collector has a hollow boss 98 to which a rod 99 is pivoted, the rear end

of the said rod having a wheel 100 mounted on it, engaging a cam 101 by which reciprocating motion is imparted to the said rod. The rod is slidable in guides 102 and 103 against which latter a spring 104 bears to urge the wheel 100 into engagement with the cam, it being understood that the rod has an adjustable block 105 thereon against which the opposite end of the said spring abuts. It will be apparent that under the influence of the cam and the spring that at each rotation of the shaft on which the cam is carried, the said rod will be moved forwardly and rearwardly to carry the drip collector as heretofore described.

The drip collector is of peculiar construction in that the bottom has an upwardly extending lip 106 at its open end and the outer edge 107 is raised or thickened so that its upper surface is inclined and on a higher plane than the upper edge of the lip. A plate which might be said to constitute a guard 108 is applied to the inclined surface and it overlies the lip, it being the purpose of the inventor that the plate shall constitute a cut-off for paint which may be suspended from the nozzle, and the said plate will therefore catch the drippings and direct them to the interior of the collector. In practice, it has been found that these drippings have a tendency to fall to the outside edge of the collector and if repeated drops are so collected they would fall on the turntable or on to the cans being filled, so that much of the benefit of the collector would be impaired were it not for a provision here made for returning those drops of paint which have been collected, to the interior of the collector and this is accomplished by having the opening between the upturned lip 106 and the said plate through which the drippings may gravitate, the tenacious character of the paint being sufficient to cause it to adhere to the under surface of the plate and flow down without dropping outside of the collector.

The cylinder 56 has a piston 109 therein to which a piston rod 110 is connected which is mounted to slide in a bracket 111 supported in any appropriate way from the frame.

The piston is preferably made up of a plurality of elements including the sectional cylinder heads 112 and 113 which are preferably recessed in their opposite faces and are secured back to back on the piston rod. In operating on paint it is preferable to have the peripheries of the pistons faced with yieldable material such as leather, and to that end, disks 114 and 115 of leather are interposed between the sectional heads, the said disks being oppositely flanged so that the flange 116 of the disk 114 and the flange 117 of the disk 115 respectively, embrace the peripheries of the sections 112 and 113. The sections of the pistons have peripheral

grooves 118 and 119 respectively, forming seats for piston rings 120 and 121 respectively, which serve to exert pressure on the flanges to force the flanges into contact with the cylinder wall.

The sectional heads and disks are held on the piston rod by fastenings 122 such as a nut, a nut 123 being employed as a backing against which the sections of the piston are compressed.

The piston rod has a pitman 125 adjustably connected to it through the medium of the coupling 126 and the said pitman has a wrist pin connection 127 with a slidable block 128 which slidable block is guided in a yoke 129 which yoke is mounted on a hollow bearing 130 through the means of a flanged collar 131, the said collar having a slot 132 for a key extending through it which extends into an annular slot 132^a formed in the hollow bearing and the yoke rotates on the said hollow bearing. The yoke carries either as integral parts thereof or as removably applied parts, the cam 101 and eccentric 51 as well as a gear wheel 133 which is driven through power transmitting means, as will presently appear. The bearing 130 is secured by a bracket 133^a to the frame and a rod 134 is rotatably mounted in it, the said rod having an operating wheel or handle 135 at its outer end by which it may be manually rotated to effect an adjustment of the block 128, as will presently appear. The bracket 133^a extends from a sleeve 133^b from which arms 133^c and 133^d depend, the said collar being secured on the frame as shown in Fig. 3.

The block has a threaded aperture 136 in which a screw 137 is rotatable, the said screw having trunnioned ends as shown at 138 and 139 which are journaled in the end plates 140 and 141 respectively, of the yoke so that as the screw is rotated the block is moved to different positions with respect to the yoke in order that the motion or throw imparted to the pitman and the piston rod may be increased or diminished according to the stroke which is to be imparted to the piston to move a greater or less volume of paint at each cycle of operation, according to the sizes of the cans to be filled. One side of the yoke has graduations 142 which may be provided with indicia to indicate the amount of paint delivered when the block is at the different positions of adjustment. As this indicia will depend upon the size of the cylinder and the degree of movement imparted to the piston, it must be determined upon completion of the machine or mathematical calculations based on the proportions.

The screw 137 has a beveled pinion 143 secured to it and the said pinion is in mesh with a pinion 144 secured on the rod 134 so that as the rod is rotated in one or the

other direction, the block will be moved outwardly or inwardly on the screw 137 to attain the adjustments described.

The trunnion 139 of the screw is extended beyond the plate 141 and it is threaded to receive a lock nut 145 which is mounted so that it will bear against the plate 141 and frictionally retain the screw against accidental rotation which might dislodge or move the block out of its set position.

A motor 146 is mounted on the frame and it is coupled to operate a train of differential gearing 147, which gearing may be of any conventional type for increasing or diminishing the drive from the motor to the gear wheel 133, the requirement being, in so far as the embodiment in this machine is concerned, that the shaft 148 which is suitably journaled in operative relation to the said gear wheel 133, shall have an elongated spur wheel 149 on it, the said spur wheel being in mesh with the gear wheel 133 so that it can slide across the face of the said gear wheel while retaining the engagement necessary to impart the motion of the shaft 148 to the said gear wheel.

No attempt has been made to follow the points of engagement of the transmitting wheels for, as stated, any suitable speed increasing and diminishing transmission can be employed in this connection, it being understood that a shifting lever 150 may be employed for changing the positions of the wheels by which the power is transmitted.

It is to be understood, of course, that the parts are to be so set and proportioned as to cause the drip collector to move away from the nozzle when the piston is moving inwardly to expel paint from the interior of the cylinder, and that immediately upon the completion of the stroke of the piston and its initial movement in the opposite direction, the said drip pan will be moved under the nozzle. During the rearward stroke of the piston, the parts will operate to rotate the can carrying table the distance of one tooth so as to bring an unfilled can into position to receive paint, when the piston is again advanced to present paint from the cylinder.

A drain pipe 151 is connected to the valve casing 55 in order to effect communication through the pipe 54 with the tank so that surplus fluid or fluid used for cleaning the tank may be drained therefrom at the end of a run.

It is believed that a résumé of a complete operation of the machine is unnecessary in view of the fact that the action of the elements of the device heretofore described has been given in connection with a description of the said elements, and the functions of the elements and their coaction with other parts has likewise been quite fully stated.

I claim:

1. In a can filling machine, a table having a depending vertical shaft, means for rotatably mounting the shaft, means for vertically adjusting the shaft in its mounting, an elongated ratchet sleeve on the shaft of the table and movable vertically with it, a pawl engaging the ratchet in its different adjustments, means for oscillatably mounting the said pawl, and means for actuating the pawl when in engagement with the ratchet sleeve to impart rotary motion to the said ratchet sleeve.

2. In a can filling machine, a table having a depending vertical shaft, means for rotatably mounting the shaft, means for vertically adjusting the shaft in its mounting, an elongated ratchet sleeve on the shaft of the table and movable vertically with it, a pawl engaging the ratchet in its different adjustments, means for oscillatably mounting the said pawl, means for actuating the pawl when in engagement with the ratchet sleeve to impart rotary motion to the said ratchet sleeve, a nozzle positioned to discharge into receptacles carried by the table, means for forcing material from the nozzle

into the receptacles, and means for operating the material forcing means and the ratchet in timed relation.

3. In a can filling machine, a filling nozzle, means for delivering fluid thereto, a table, a depending shaft carrying the table vertically adjustably and rotatably mounted thereunder, an elongated ratchet sleeve connected to the said shaft, a pawl engaging the ratchet sleeve, means for oscillatably mounting the said pawl, and means for actuating the said pawl.

4. In a can filling machine, a can carrying table, a shaft on which the table is rotatable, means for adjusting the shaft vertically, means for holding the shaft at different positions of adjustment, a ratchet sleeve rotatable on the shaft and connected to the said table, a pawl with relation to which the ratchet sleeve is vertically adjustable, means for oscillatably mounting the pawl for engagement with the ratchet sleeve, means for operating the said pawl, and connections between the pawl actuating means and the delivery means for operating the said elements in timed relation.

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