W. F. HEBRANK.

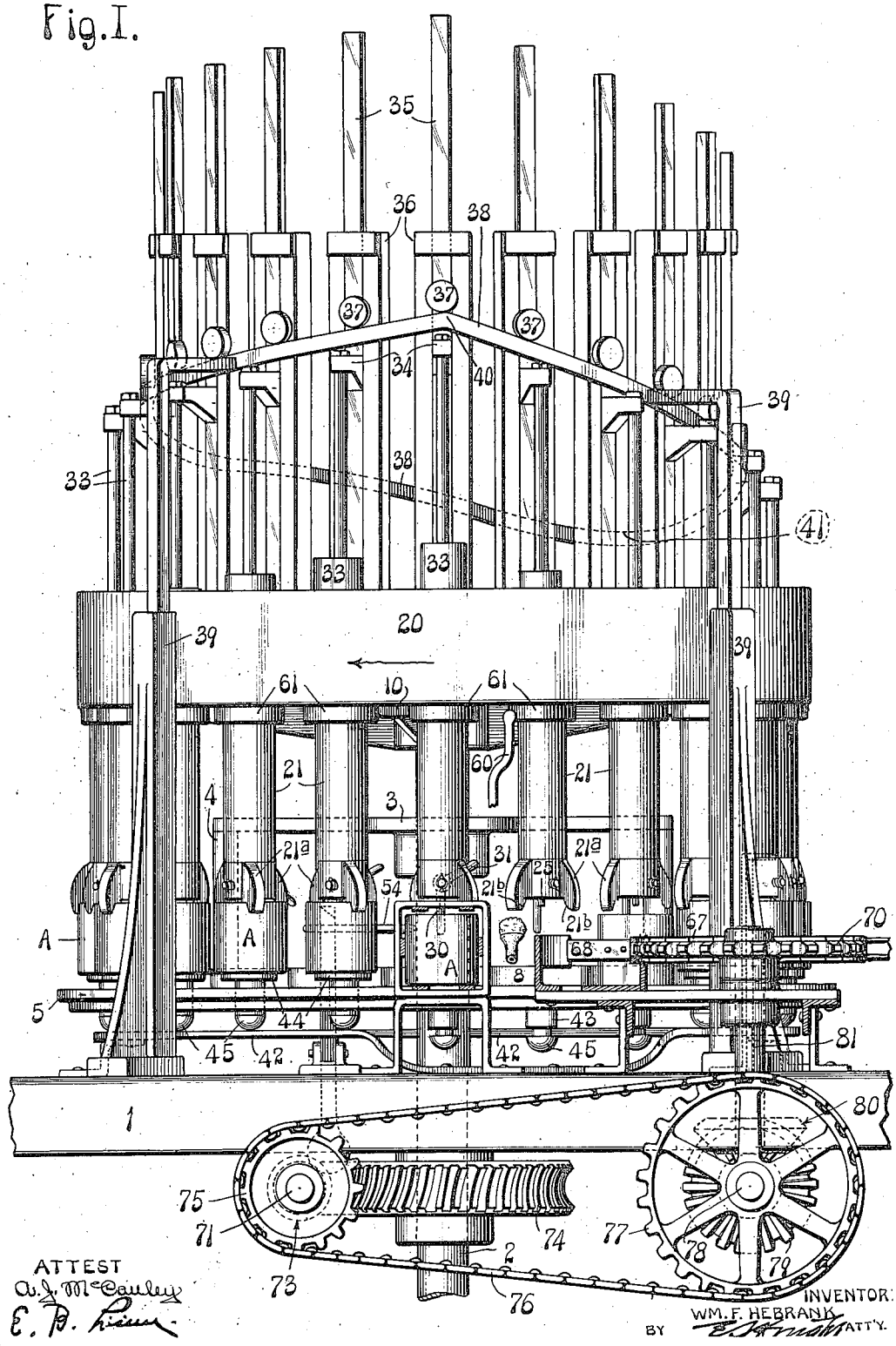
CAN FILLING MACHINE.

APPLICATION FILED NOV. 5, 1909.

961,408. Patented June 14, 1910.

5 SHEETS—SHEET 1.

Fig. I.



ATTEST

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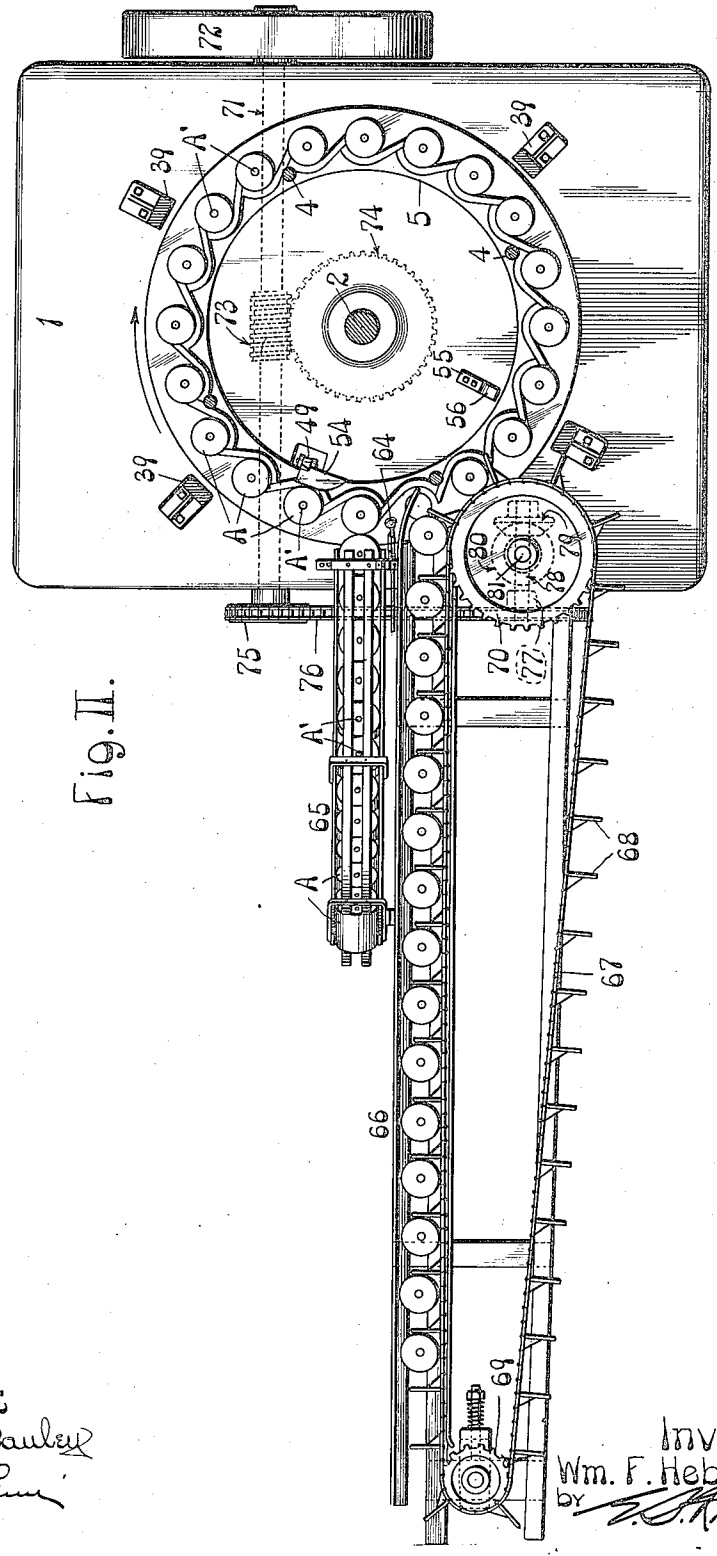

Fig. II.

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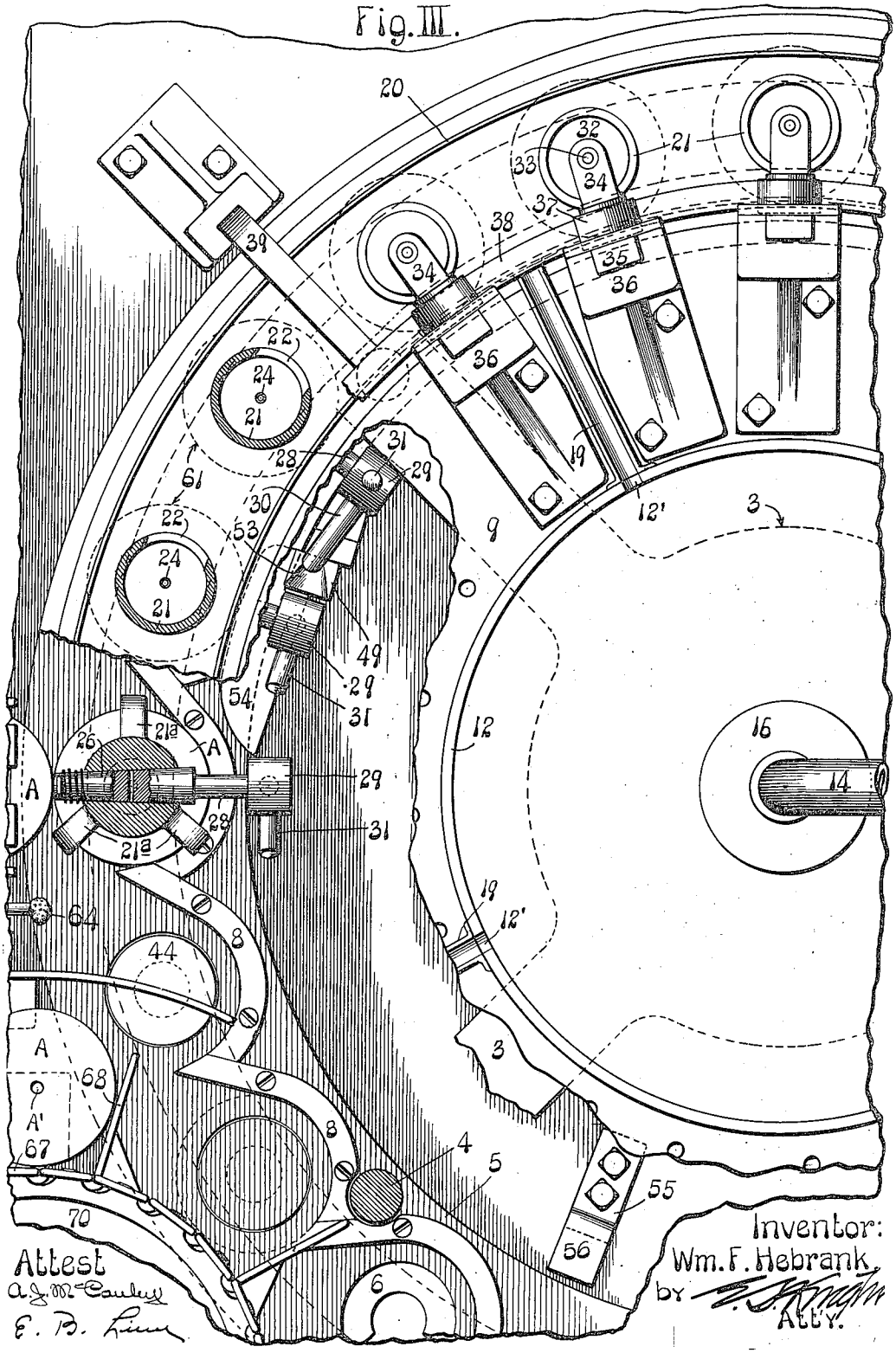
5 SHEETS—SHEET 3.

Fig. III.



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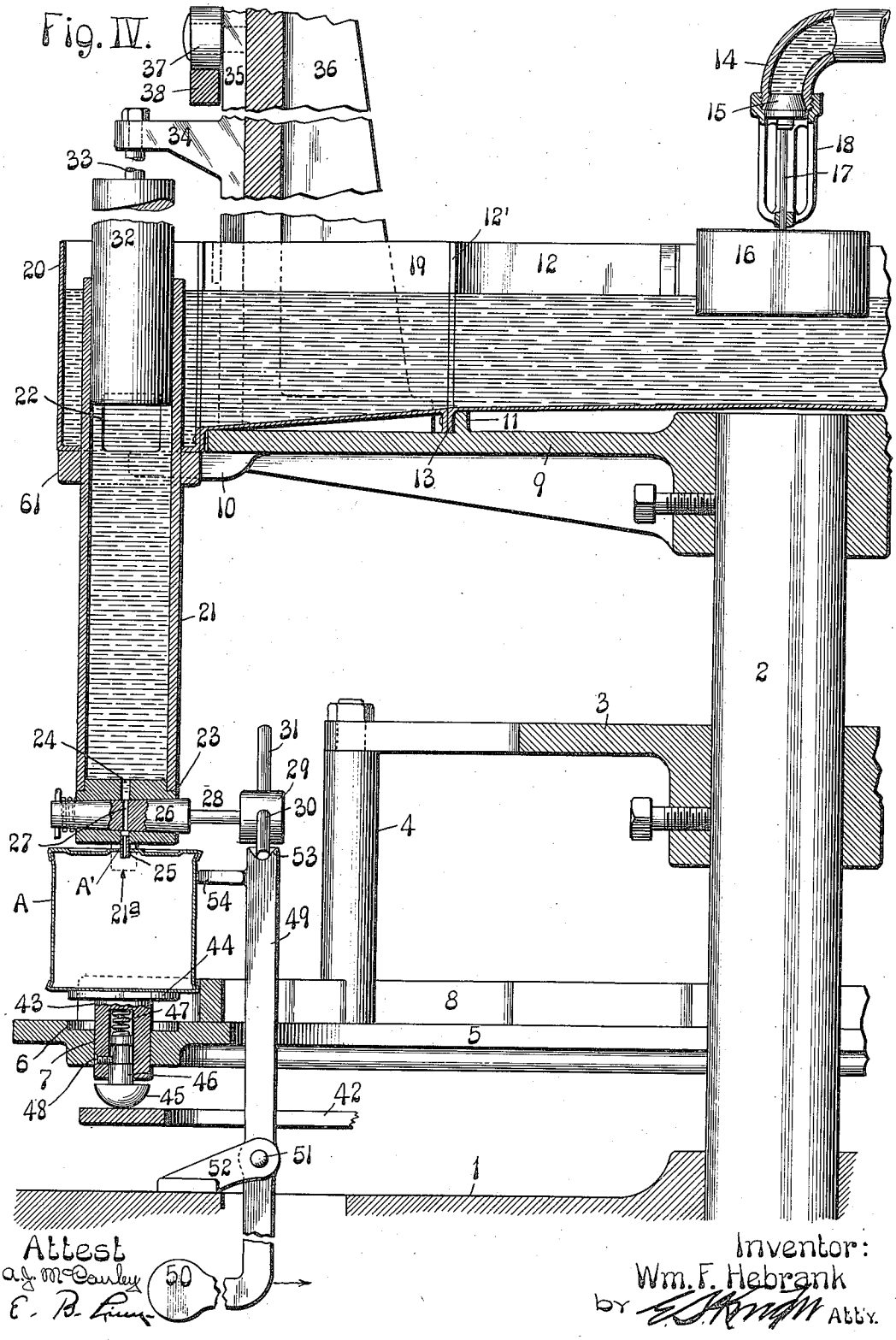
5 SHEETS—SHEET 4.

Fig. IV.



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5 SHEETS—SHEET 5.

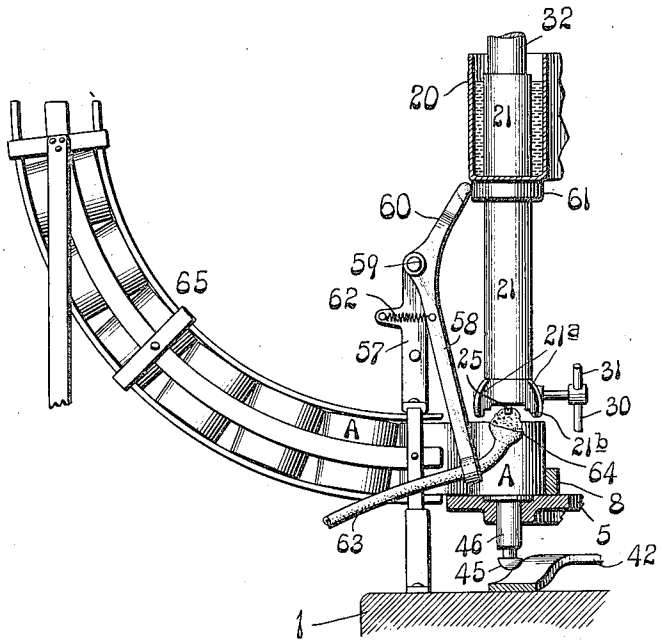
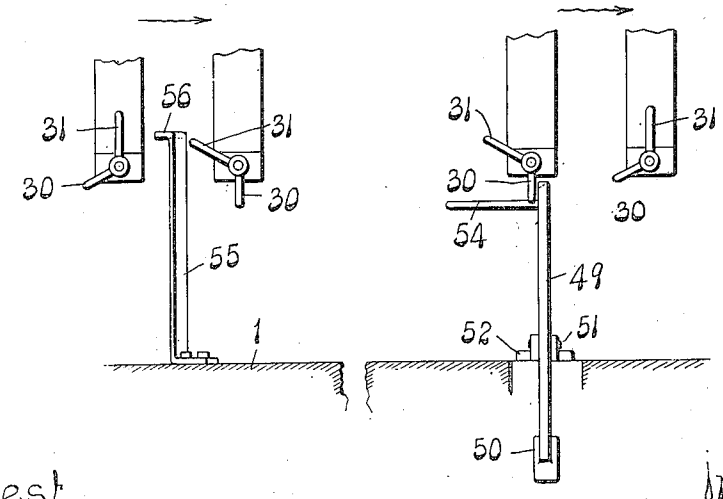


Fig. V.

Fig. VI.



Attest

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E. B. Linn

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UNITED STATES PATENT OFFICE.

WILLIAM F. HEBRANK, OF HIGHLAND, ILLINOIS.

CAN-FILLING MACHINE.

961,408. Specification of Letters Patent. Patented June 14, 1910.

Application filed November 5, 1909. Serial No. 526,380.

To all whom it may concern:

Be it known that I, WILLIAM F. HEBRANK, a citizen of the United States of America, residing at Highland, in the county of Madison and State of Illinois, have invented certain new and useful Improvements in Can-Filling Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a can filling machine, that is more particularly intended for use in filling cans with condensed milk, although of utility in filling cans with any liquid substance.

The object of the invention is to construct a can filling machine by the use of which sheet metal cans having small filling orifices may be automatically filled, the cans being automatically delivered to and discharged from the apparatus.

Figure I is an elevation of my can filling machine with the can delivery chute, discharge runway, and discharge conveyer in vertical cross section. Fig. II is in part a top or plan view of the lower portion of the machine, and in part a horizontal section taken beneath the filling devices of the machine. Fig. III is an enlarged view, in part in plan, and in part sections taken at different elevation. Fig. IV is an enlarged vertical section through the reservoir and filling devices. Fig. V is an elevation of the can delivery chute, one of the filling devices, the can gripping means, and the means for cleansing the nipples of the filling devices. Fig. VI is a diagrammatical view, illustrating the manner in which the valves of the can filling devices are automatically controlled to permit flow of liquid to the cans, and cut off such flow.

In the accompanying drawings:—1 designates the bed of my machine, through which extends a rotatable vertical shaft 2 that is located centrally with respect to the can fiilling devices supported in the main by said shaft and operable around its axis.

3 is a horizontally arranged spider fixed to the vertical shaft 2, the spider having suspended from its arms hanger rods 4.

5 is a can carrying ring that is supported by the hanger rods 4, and is horizontally positioned beneath the spider 3, the ring being provided at its upper face with pockets 6 and also with apertures 7 extending vertically therethrough at the locations of said pockets, in which certain members to be hereinafter more particularly referred to are operable.

8 are stop members mounted on the can carrying ring 5 and the outer faces of which correspond in contour to segments of cans that are to be filled in the use of my apparatus, and which are adapted to seat against said stop members, as seen in Figs. I and IV.

9 designates a platform fixed to the vertical shaft 2 at its upper end and rotatable with this shaft, the platform being provided at its outer edge with a plurality of arms 10 adapted to support a member to be hereinafter more particularly alluded to.

12 designates a reservoir supported by the platform 9 and located centrally thereon, the reservoir being held in a fixed position through the medium of a rib 11 extending upwardly from the platform and which is engaged by a flange 13 that extends downwardly from the outer edge of the reservoir, (see Fig. IV). Liquid that is to be delivered to cans to fill them in the use of my machine is emptied into the reservoir 12 from a delivery pipe 14 that leads to a point above the reservoir and is controlled by a valve 15 governed by a float 16 present in the reservoir. The float is connected to the valve by a valve rod 17, and the valve is operable in a cage 18. In the wall of the reservoir 12 is a series of outlets 12′, and at the location of these outlets are troughs 19, (see Figs. III and IV), extending outwardly from the reservoir and supported by the platform 9.

20 is an auxiliary reservoir surrounding the main reservoir 12 and which is concentric with said main reservoir, the auxiliary reservoir being arranged in communication with the main reservoir through means of the troughs 19, in order that the liquid that is delivered into the main reservoir may flow therefrom into the auxiliary reservoir. The auxiliary reservoir is supported by arms 10 of the platform 9, (see Fig. IV).

21 designates a plurality of vertically arranged receivers that extend downwardly from the auxiliary reservoir 20 and also upwardly into the auxiliary reservoir, each receiver being provided above the bottom of said reservoir with an inlet orifice 22 providing for passage of liquid from the auxiliary reservoir into the receiver at a point beneath the upper end of said receiver. The several receivers 21 are located above the

can carrying ring 5 and the parts so disposed that the centers of the receivers will be directly above the centers of the cans when the cans are seated on the ring to be filled. The lower end of each receiver is supplied with a closure 23, that contains a central escape duct 24 extending vertically therethrough, and in the bottom of each closure is a nipple 25. It should be here noted that the nipple 25 associated with the escape duct leading from each receiver is of small diameter, and is adapted to fit loosely into a small opening A′ in the top of the cans A to be filled in the use of the apparatus, (see Fig. IV), the small openings mentioned being provided in the cans in order that the cans may be closed more readily and less expensively than they can where larger inlet orifices therein are provided. The passage of liquid from the receivers 21 through the escape ducts 24 is controlled by valves 26 extending horizontally through the closures 23, and provided with ducts 27 adapted to be moved into and out of registration with the escape duct 24. The stem 28 of each valve 26 is supplied with a head 29 carrying a pair of arms 30 and 31 that are adapted to be engaged by members to be hereinafter particularly set forth, through the medium of which the valves are actuated to permit flow of liquid therethrough and discontinue such flow.

32 designates plungers operable in the receivers 21 and by which the liquid delivered to said receivers from the auxiliary reservoir 20 is forced therefrom through their escape ducts and the valve 26 into the cans to be filled. These plungers are preferably heavy cylindrical bodies that are snugly fitted in the receivers and are adapted to move therein, with only sufficient clearance between the plungers and the receivers to permit freedom of movement of said plungers. The plungers have upwardly extending supporting rods that are connected at their upper ends to arms 34 projecting over the plungers, (see Figs. I and IV), and which are carried by vertically disposed sliding bars 35 that are operable in guideways in the vertical guide posts 36 supported by the rotatable platform 9, (see Figs. I, III, and IV.

37 are track wheels carried by the slide bars 35.

38 is a cam track encircling the entire number of posts 36 and slide bars 35 operable therein, and which is supported by standards 39 which extend upwardly from the base 1. The cam track 38 is highest at the point 40, (see Fig. I), which is approximately directly above the point at which the cans to be filled are introduced into my apparatus preparatory to filling them, and it is inclined downwardly from this point in the direction in which the cans are carried during the filling operation, and which is indicated by the arrows Figs. I and II. The inclination of the cam track just referred to provides for the plungers 32 descending in the receivers 21, while the track wheels 37 are rolling downwardly on the cam track from the high point 40, in order that said plungers may force the contents from the receivers into the cans. It will be seen on referring to Fig. I that the cam track, after reaching a low point, indicated at 41, is again inclined upwardly to the point 40. It will, therefore, be apparent that the plungers 32 are permitted to descend in the receivers, while the track wheels 37 are moving from the point 40 to the point 41, and the said plungers are again elevated, while said track wheels are moving from the point 41 to the point 40.

42 designates a circular cam rail located beneath the can carrying ring 5, and which is provided with a depression opposite the point of delivery of the cans to the can carrying ring and discharge of the cans therefrom.

43 are the stems of jacks loosely fitted in the apertures 7 in the can carrying ring 5, and at the upper ends of which are heads 44 adapted to enter into the pockets 6 in the can carrying ring when the jacks are in lowered positions, in order that the cans may be readily slid into their proper places on the ring. The can lifting jacks also comprise traveler members adapted to ride upon the cam rail 42, the said travelers being preferably of the construction illustrated in the drawings, (see Figs. I and IV), in which they consist of rounded knobs 45 surmounted by stems 46 that are loosely fitted in the stems 43, and are in turn surmounted by cushion springs 47. The stems 46 are retained in the stems 43 by screws 48 operable in annular grooves in the traveler stems. As the can carrying ring rotates, each can lifting jack occupies for a period of time a lowered position, while traversing the depressed portion of the cam rail 42, this period being that at which cans are being delivered to and removed from the can carrying ring. Then as each jack is moved with the ring, its traveler rides upwardly onto the elevated portion of the cam rail, and the can that has been placed thereon is elevated to the position in which a can is shown in Fig. IV, and whereby the nipple 25 is caused to enter into the filling orifice in the top of the can. By providing the jacks with the spring controlled travelers, I make it possible for them to be elevated to lift the cans without any sudden shock or jar incident to the engagement between the jacks and the cam rail by which they are elevated to remain in an elevated position, until they have become filled and returned to the starting point previous to being moved off of the

can carrying ring 5. To provide for the cans being properly centered beneath the receivers 21, in order that the nipples 25 may enter into the cans through their inlet orifices, I furnish each receiver with centering fingers 21^a that are located at the lower ends of the receivers and which are provided at their lower ends with inclined inner faces 21^b, (see Fig. I), that are adapted to ride against the peripheries of the tops of the cans when said cans are elevated by lifting jacks beneath them. By referring to Figs. I and V it will be seen that these fingers also have shoulders adjacent their upper ends, the function of these shoulders being to space the cans away from the lower end of the receivers and thus provide for the escape of air from the cans while they are being filled.

I will next proceed with the description of the trip device by which the valves 26 are actuated to permit flow of liquid therethrough from the receivers 21 and to the cans to be filled, and also the trip device for actuating said valves to close them after the cans have been filled. The first mentioned of these devices is located in proximity to the point at which the cans are delivered to the can carrying ring 5, and comprises the following parts: 49 is a trip bar arranged in an upright position adjacent to the inner edge of the can carrying ring, and which is provided at its lower end with a counterbalance weight 50 offset laterally from the body of the bar. The trip bar is pivotally attached at 51 to a bracket 52, and it is provided at its upper end with a notch 53 adapted to receive the arms 30 carried by the heads of the valve stems 28. 54 is a cam extending laterally from the trip bar 49, near its upper end, and which is normally maintained in a position above the can carrying ring 5, due to the action of the counterbalance weight 50, which is located at the lower end of the trip bar. It will be obvious that the counterbalance weight 50 has a tendency to cause the upper end of the trip bar 49 to be moved outwardly so that the cam 54 is in the path of travel of the cans, while they are moving in a circular path upon the can carrying ring; and that if there is no can carried to said cam, the upper end of the trip bar will remain out of the path of travel of the arms 30 in order that the valves 26 will not be moved to open a discharge-way therethrough. Whenever, however, cans are brought into engagement with the cam 54, said cam is moved so that the notch 53 at the upper end of the trip bar is in the path of travel of the arm 30 associated with the valve 26 above the cam, as seen in Fig. IV, and the valve is rotated due to such engagement to establish the discharge-way therethrough to the can which remains established until the can has been filled. The actuation of the arm 30 by the trip bar 49 and the position of this arm before its actuation by said bar and immediately after such actuation is illustrated diagrammatically at the right hand in Fig. VI. The device for closing the valves comprises the post 55, (see Figs. I, III, and VI), which is provided at its upper end with an arm 56. The arm of this post is adapted to be engaged by the arms 31 associated with the stems of the valves 26 in common with the arms 30, whereby said arms 31 are depressed as they strike against the arm 56, and the valves are closed to shut off the discharge of liquid therethrough to the cans.

There is an interval between the discharge of the filled cans from the can carrying ring and the placing of empty cans thereon, and I have found it desirable to utilize means whereby the nipples 25 are cleansed, in order that they may not become clogged, which means is brought into service in the interval mentioned. This means, (most clearly shown in Fig. V, but appearing also in Figs. I and II), comprises the following parts: 57 is a post mounted adjacent to the path of travel of the receivers 21, and 58 is a lift lever pivoted at 59 to said post, the lever being provided with an arm 60 extending upwardly from the pivot 59 and inwardly toward the path of travel of parts 61 associated with the receivers 21. The parts 61 are preferably collars surrounding the receivers beneath the auxiliary reservoir 20. 62 is a spring connecting the lift lever 58 to the post 57 beneath the pivot point 59 and which normally exerts an influence upon said lift lever that tends to draw the lower end of the lever outwardly and hold the arm 60 inwardly toward the receivers 21, or between said receivers during their circular course of movement. 63 is a suction pipe supported by the lift lever 58 and in the mouth of which is a porous member 64, preferably a sponge. As each receiver 21 is moved to the device just described in the interval from the discharge of the filled cans from the carrying ring 5 and the placing of empty cans upon said ring, said receiver strikes against the arm 60 of the lift lever 57 and the lower end of said lift lever is moved inwardly and upwardly, so that the porous member 64 is carried to the nipple 25 of the receiver, and any substance present upon said nipple and therein is drawn by suction through the member 64 and into the pipe 63.

65 is a chute through which the empty cans are delivered singly to the can carrying ring 5, this chute, as shown in Figs. II and V, being a downwardly curved one whereby the cans are caused to automatically descend to the can carrying ring and be pressed thereonto without the necessity of handling them.

66 designates a runway through which the cans are conducted from the can carrying ring of the apparatus after they have been filled. 67 is a conveyer operable in said runway, and which is provided with flights 68 that are adapted in their course of movement to travel over the can carrying ring and discharge the filled cans therefrom into the runway 66, and also to conduct these cans through said runway. The conveyer 67 operates upon an idler 69 and upon a drive wheel 70.

The following is a description of the driving mechanism of my machine: 71 designates a main drive shaft provided with a belt wheel 72. This drive shaft carries a worm 73 that meshes with the worm wheel 74 fixed to the vertical shaft 2, and by which said vertical shaft is rotated. The drive shaft has fixed to it a sprocket wheel 75 on which an endless chain 76 is operable. This chain also operates upon a sprocket wheel 77 that is fixed to a shaft 78. The shaft 78 also has fixed to it a bevel wheel 79 that is in mesh with a bevel pinion 80 fixed to the shaft 81 to which the conveyer drive wheel 70 is secured.

I claim:—

1. In a can filling machine, a rotatable main reservoir, a rotatable auxiliary reservoir connected thereto, cylinders having their upper portions located in the auxiliary reservoir, each of said cylinders having an inlet opening below its upper end, plungers in said cylinders, means for elevating each of said plungers to a point above said inlet opening, and then allowing it to fall by gravity, a discharge nipple secured to the lower end of each of said cylinders, and a can carrier rotatably mounted below said discharge nipples.

2. In a can filling machine, a rotatable main reservoir, a rotatable auxiliary reservoir connected thereto, cylinders having their upper portions located in the auxiliary reservoir, each of said cylinders having an inlet opening below its upper end, plungers in said cylinders, a vertically movable bar connected to each of said plungers, a roller on each of said bars, a cam track arranged below said rollers for lifting the plungers to a point above said inlet opening and allowing them to fall by gravity, a discharge nipple secured to the lower end of each of said cylinders, and a can carrier rotatably mounted below said discharge nipples.

3. In a can filling machine, a rotatable main reservoir, a rotatable auxiliary reservoir connected thereto, cylinders having their upper portions located in the auxiliary reservoir, each of said cylinders having an inlet opening below its upper end, plungers in said cylinders, a cam for elevating each of said plungers to a point above said inlet opening and then allowing it to fall by gravity, a discharge nipple secured to the lower end of each of said cylinders, a can carrier rotatably mounted below said discharge nipples, inclined centering fingers on said cylinders, means for moving the cans into engagement with the inclined faces on said fingers to provide for the nipples entering the cans, each of said centering fingers being provided with a shoulder for spacing the can away from the bottom of said cylinders.

4. In a can filling machine, a movably supported receiver provided with a nipple, means for movement to said nipple for the removal of deposits therefrom, and means coöperable with said receiver for supporting said deposit removing means and moving it to and from said nipple.

5. In a can filling machine, a receiver provided with a nipple, a suction pipe for movement to said nipple for the removal of deposits therefrom, and means coöperable with said receiver whereby said suction pipe is moved toward and away from said nipple.

6. In a can filling machine, a movably supported receiver provided with a nipple, a suction pipe, an absorbent body in an end of said suction pipe adapted to be moved to said nipple for the removal of deposits therefrom, and means coöperable with said receiver whereby said suction pipe is moved toward and away from said nipple.

7. In a can filling machine, a movably supported receiver provided with a nipple, a suction pipe, an absorbent body in an end of said suction pipe adapted to be moved to said nipple for the removal of deposits therefrom, and a spring controlled lever supporting said suction pipe and arranged for engagement by said receiver whereby the suction pipe is moved toward the receiver to carry said absorbent body to said nipple.

WILLIAM F. HEBRANK.

In the presence of—
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AD. MEYER.