

Aug. 5, 1952

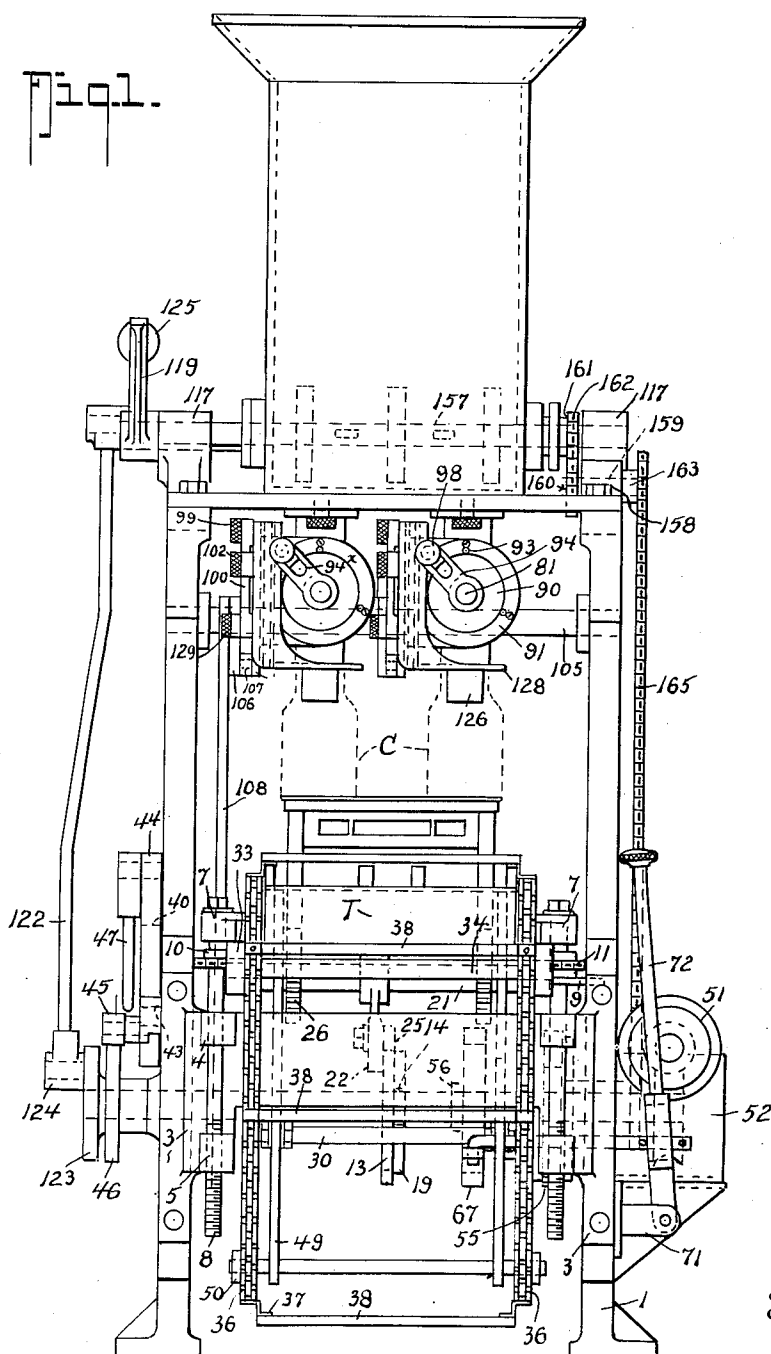
E. W. BRIDGE

2,605,948

MACHINE FOR FILLING CONTAINERS WITH SEMILIQUID PRODUCTS

Filed July 14, 1947

8 Sheets-Sheet 1



Inventor,

Edward W. Bridge,

By Albert E. Dieterich,

Attorney.

Aug. 5, 1952

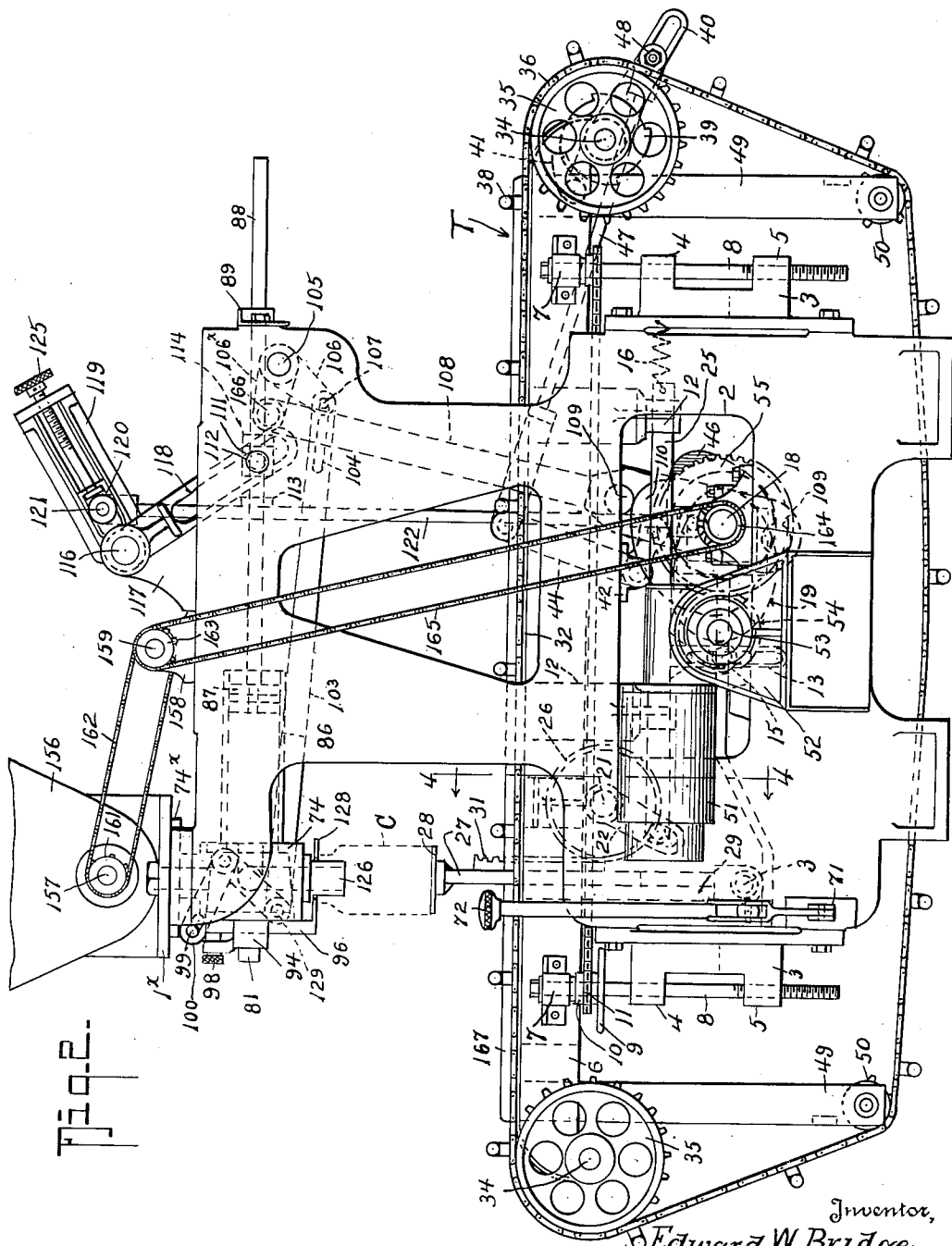
E. W. BRIDGE

2,605,948

MACHINE FOR FILLING CONTAINERS WITH SEMILIQUID PRODUCTS

Filed July 14, 1947

8 Sheets-Sheet 2



Inventor,
Edward W. Bridge,

By Albert E. Dieterich,

Attorney.

Aug. 5, 1952

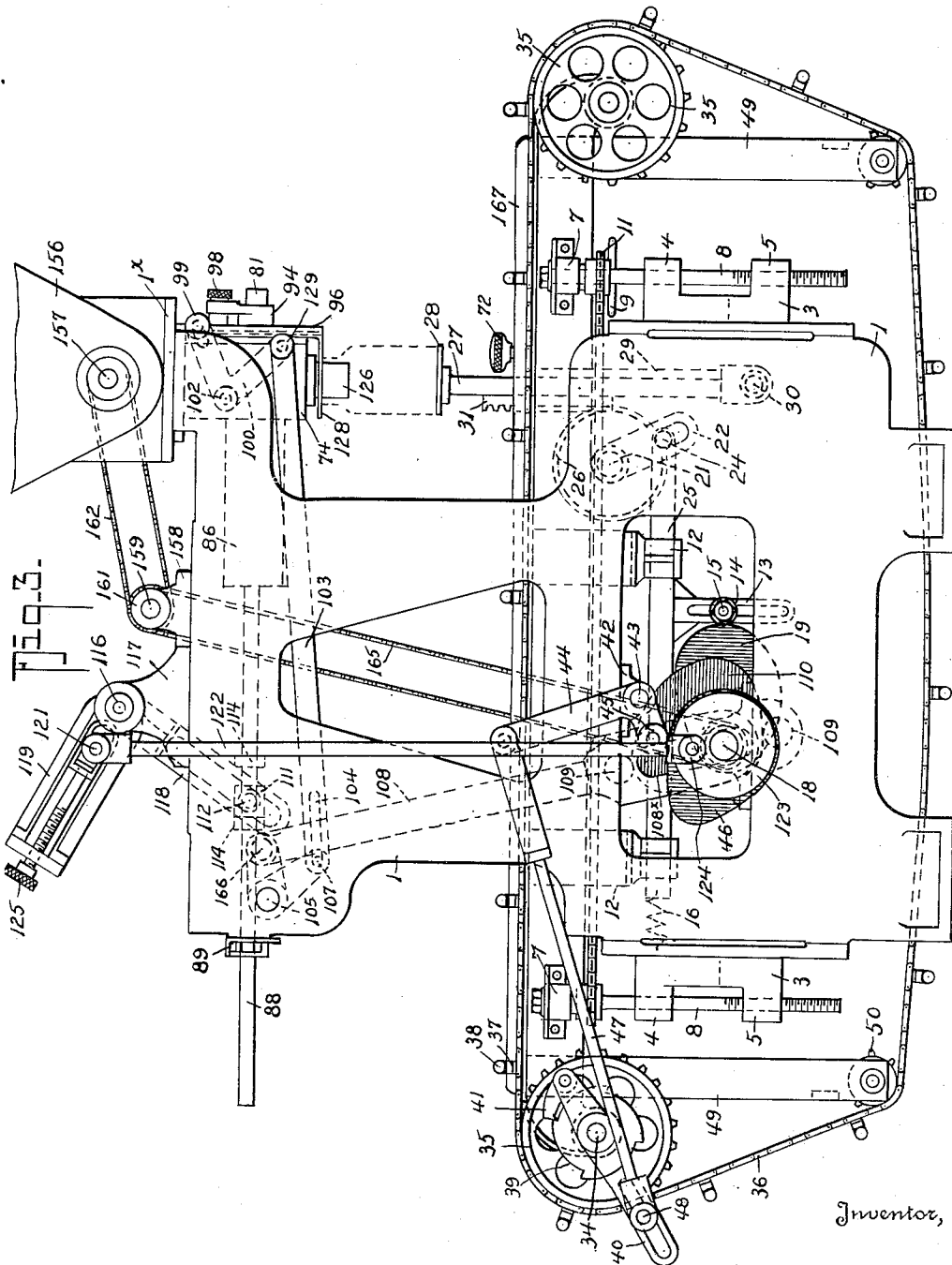
E. W. BRIDGE

2,605,948

MACHINE FOR FILLING CONTAINERS WITH SEMILIQUID PRODUCTS

Filed July 14, 1947

8 Sheets-Sheet 3



Inventor,

Edward W. Bridge,

334

Albert E. Dieterich,

Attorney.

Aug. 5, 1952

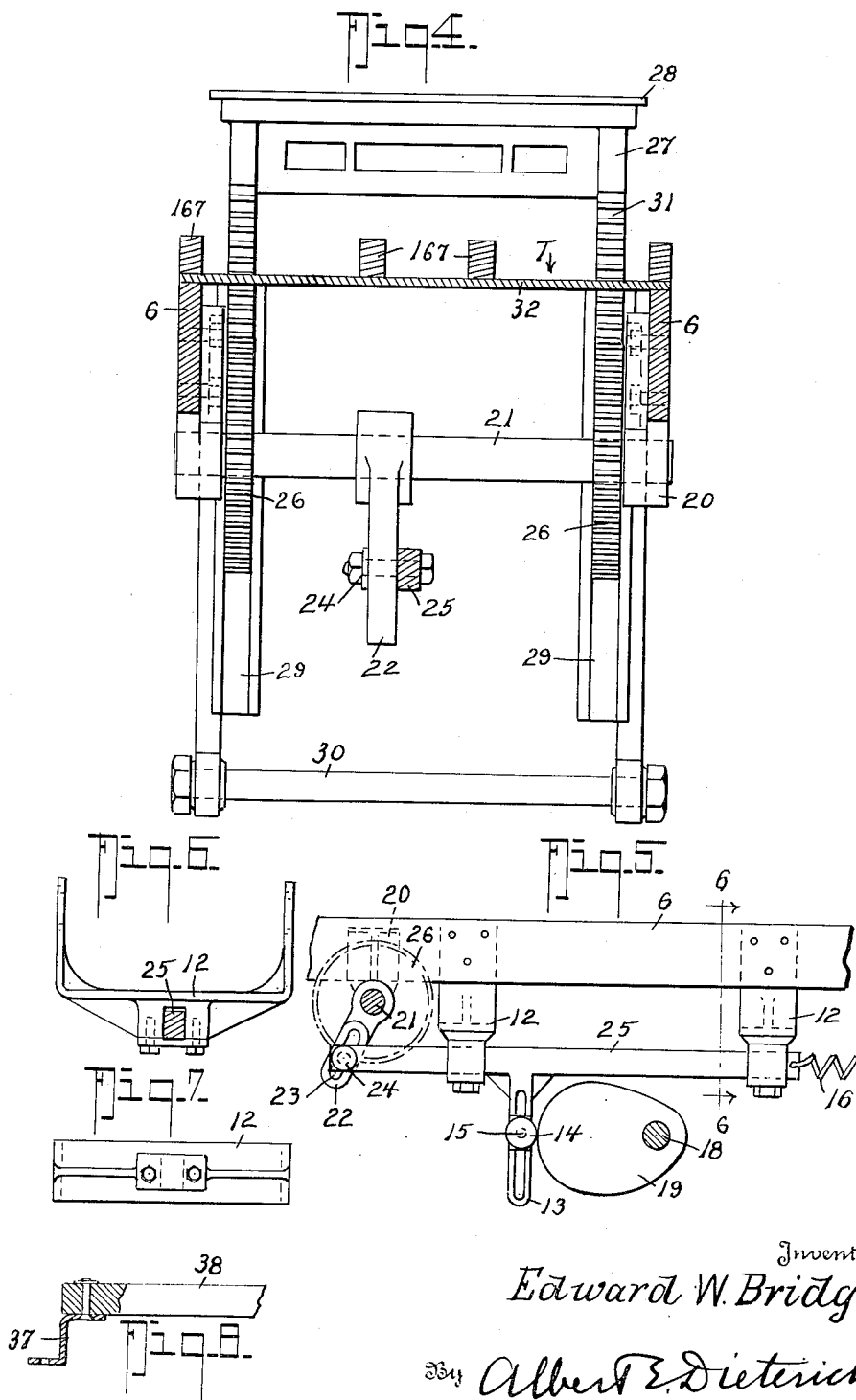
E. W. BRIDGE

2,605,948

MACHINE FOR FILLING CONTAINERS WITH SEMILIQUID PRODUCTS

Filed July 14, 1947

8 Sheets-Sheet 4



Aug. 5, 1952

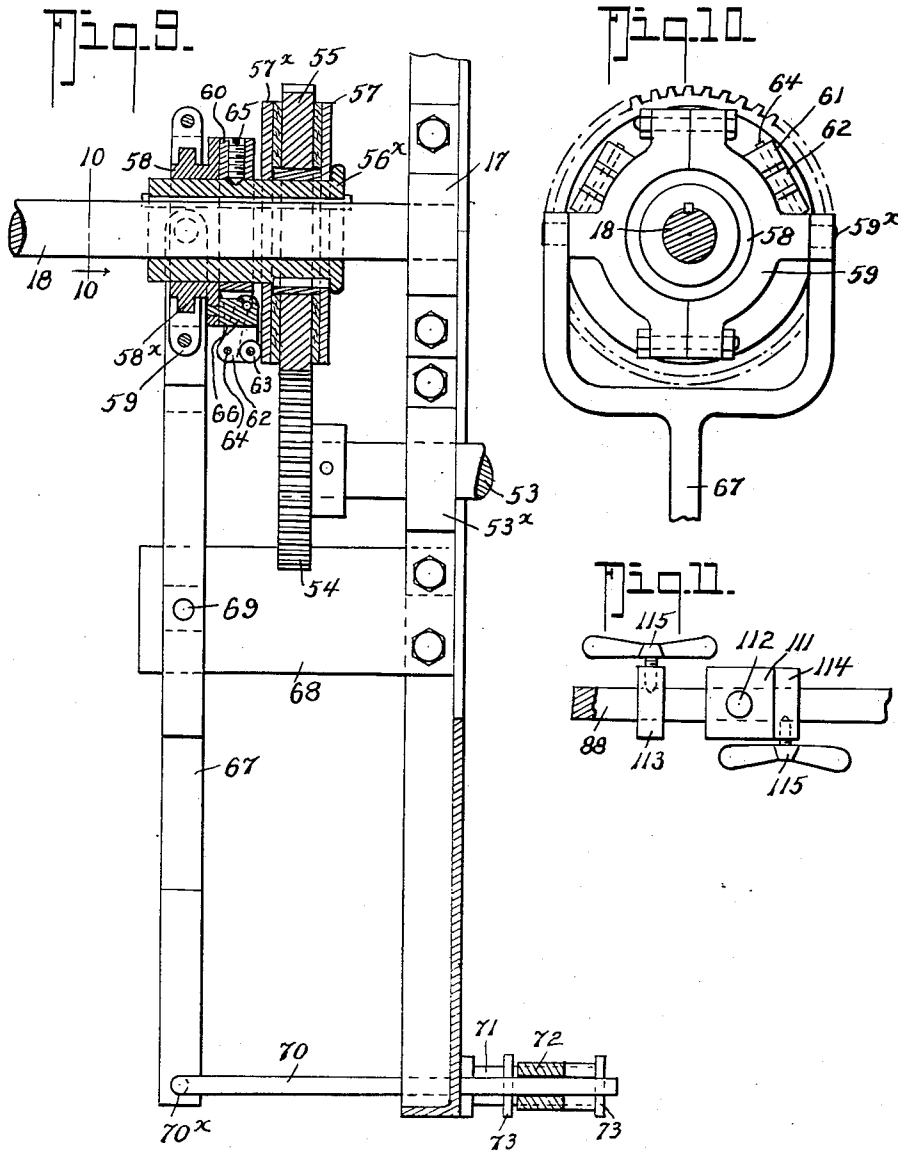
E. W. BRIDGE

2,605,948

MACHINE FOR FILLING CONTAINERS WITH SEMILIQUID PRODUCTS

Filed July 14, 1947

8 Sheets-Sheet 5



Inventor,
Edward W. Bridge,
By *Albert E. Dieterich,*
Attorney.

Aug. 5, 1952

E. W. BRIDGE

2,605,948

MACHINE FOR FILLING CONTAINERS WITH SEMILIQUID PRODUCTS

Filed July 14, 1947

8 Sheets-Sheet 6

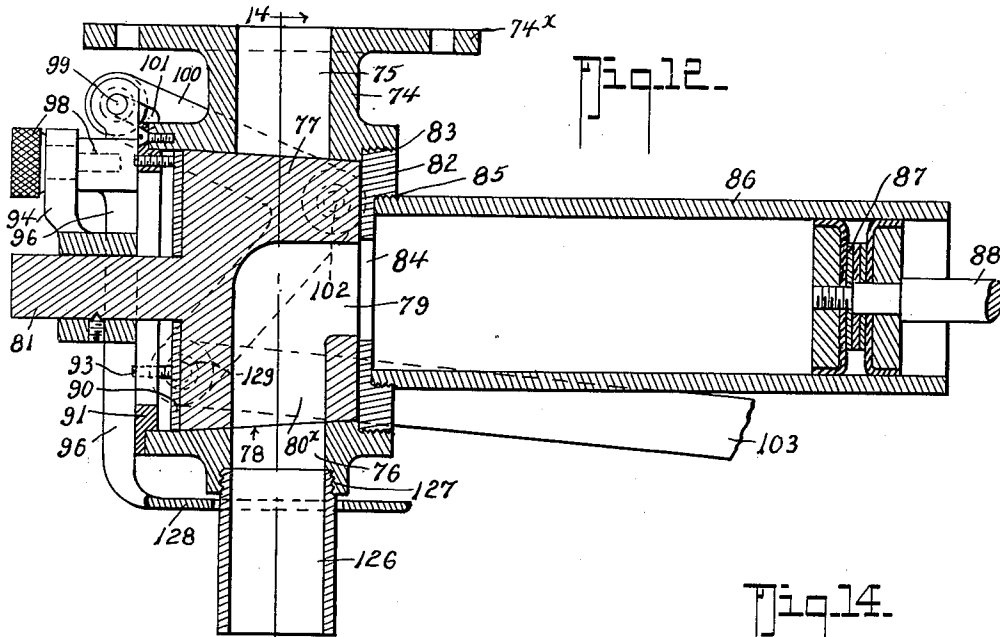


Fig. 12--

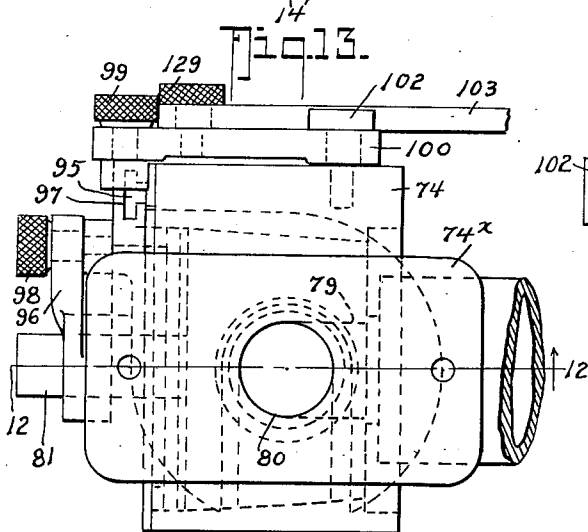


Fig. 13--

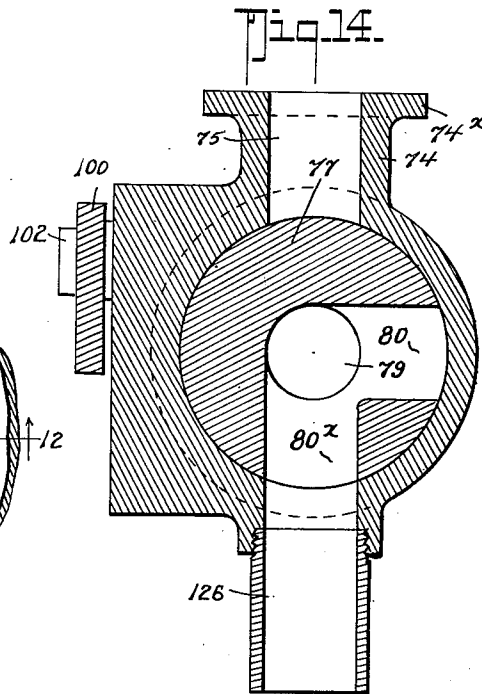


Fig. 14--

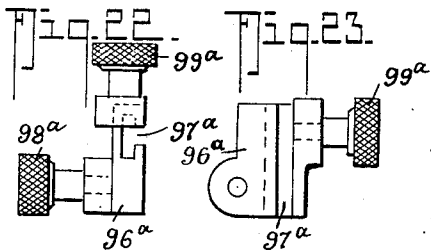


Fig. 22--

Fig. 23--

Inventor,
Edward W. Bridge,
By *Albert E. Dittich,*
Attorney.

Aug. 5, 1952

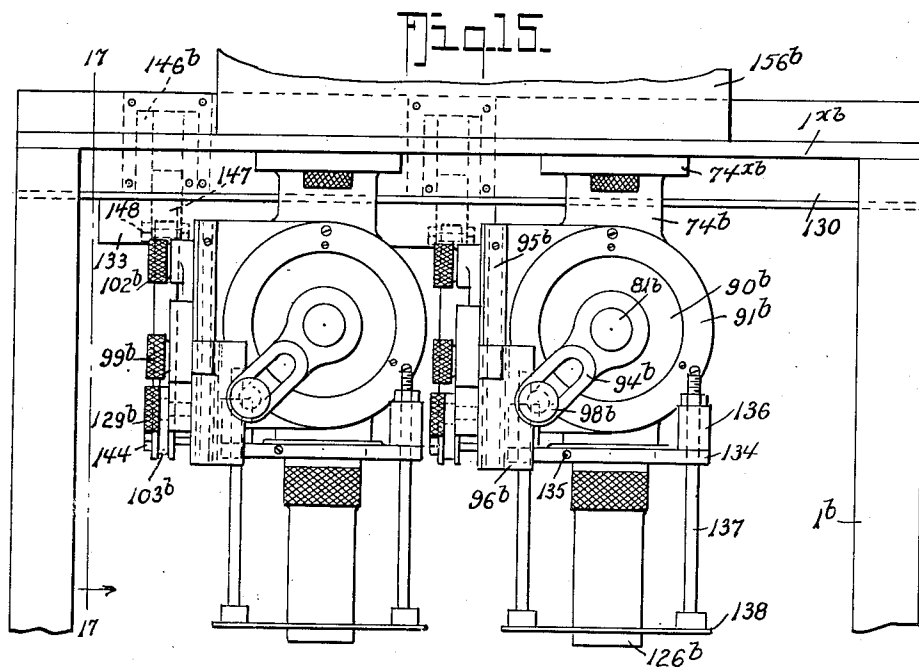
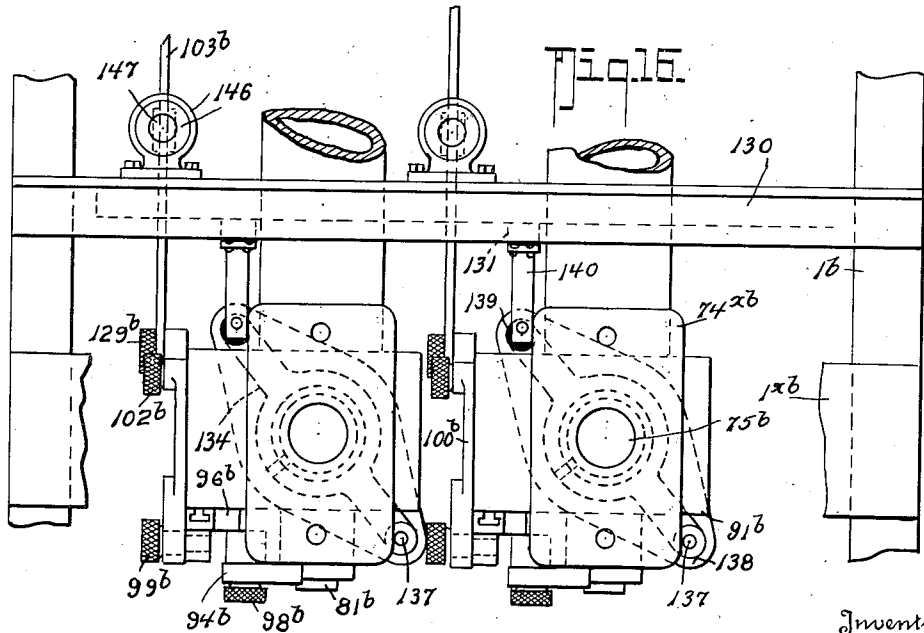
E. W. BRIDGE

2,605,948

MACHINE FOR FILLING CONTAINERS WITH SEMILIQUID PRODUCTS

Filed July 14, 1947

8 Sheets-Sheet 7



Inventor,
Edward W. Bridge,

By Albert B. Duterich,

Attorney.

Aug. 5, 1952

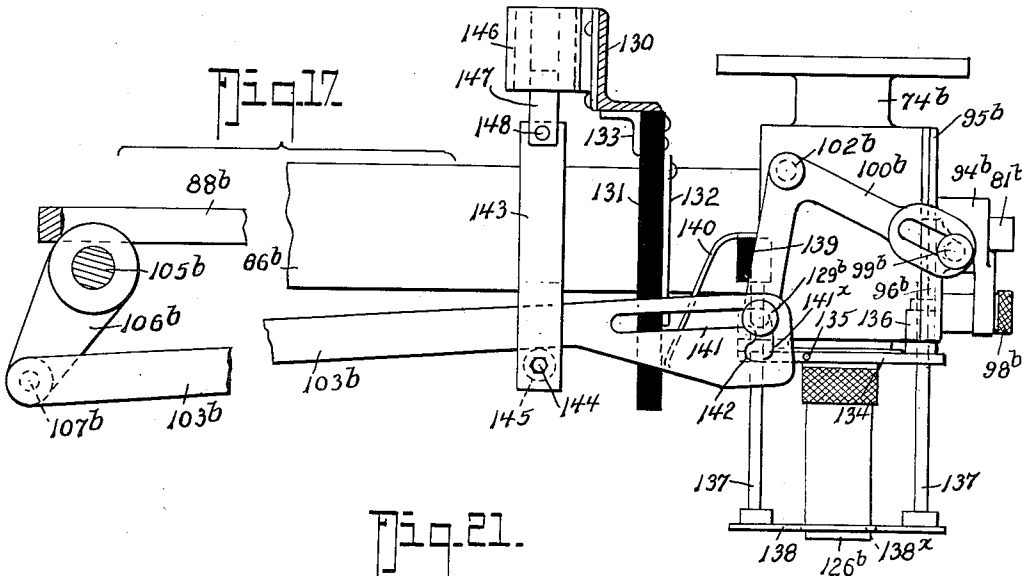
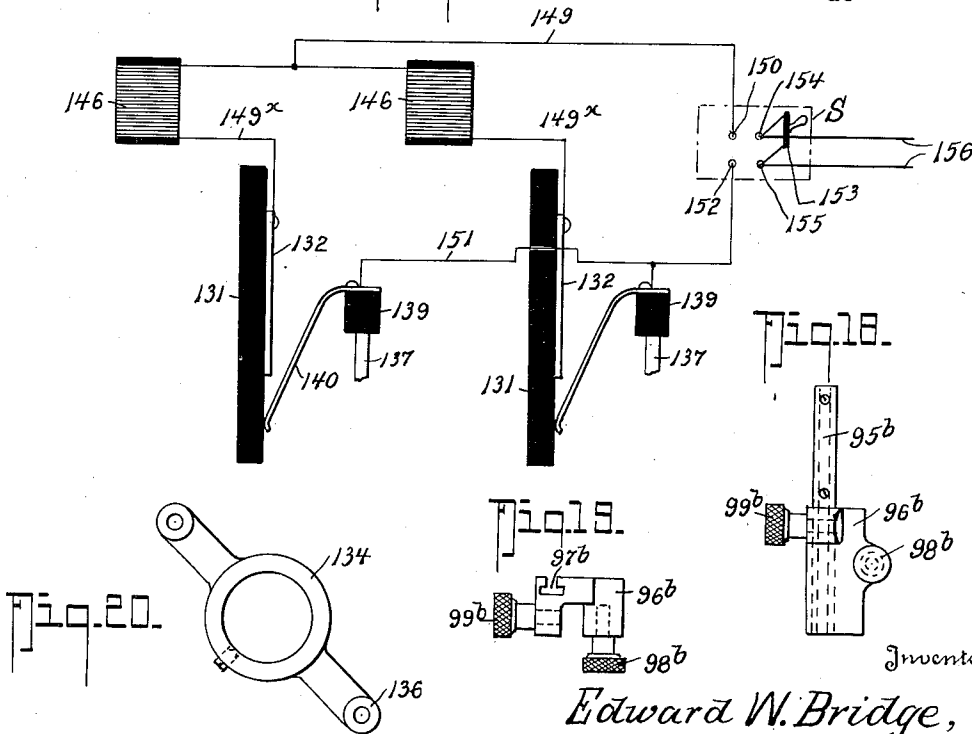
E. W. BRIDGE

2,605,948

MACHINE FOR FILLING CONTAINERS WITH SEMILIQUID PRODUCTS

Filed July 14, 1947

8 Sheets-Sheet 8



Inventor,
Edward W. Bridge,
By Albert E. Dieterich,
Attorney.

UNITED STATES PATENT OFFICE

2,605,948

MACHINE FOR FILLING CONTAINERS WITH SEMILIQUID PRODUCTS

Edward W. Bridge, Philadelphia, Pa.

Application July 14, 1947, Serial No. 760,750

9 Claims. (Cl. 226—107)

1

My invention, which relates generally to machines for filling portable receptacles, more particularly seeks to provide a machine for filling paper bags and soft boxes, as well as the more rigid containers of glass, tin or strong paper.

The invention has for its further objects to provide:

1. A machine by means of which containers of tin, glass, and strong paper can be filled automatically.

2. A machine on which the automatic feature may be replaced by manual control for filling receptacles of soft paper, such as soft boxes, waxed or cellulose paper bags; etc.

3. A machine in which the containers themselves govern the automatic filling operation of the machine.

4. A machine in which containers of different heights may be filled under the automatic procedure.

5. A machine in which containers of different horizontal dimensions can be automatically filled.

6. A machine having two or more sets of measuring valves and pumps receiving material from a common hopper and separately delivering the material to individual containers.

7. A machine whose valves are so designed that, regardless of the number of valve and pump units in bank that may be employed in the machine, any one or more of the valves and pump cylinders can be effectively cleaned without disturbing the others.

8. A machine whose pumps are all operated simultaneously but whose respective valves are so constructed that only the valve or valves under which the receptacles pass to be filled will dispense the product, the pumps of the remaining valve units simply drawing in the material from the supply hopper and returning the material to the hopper without dispensing it.

9. A machine in which measuring valve units of the plug-valve type are used and in which the pumps are disposed co-axially with the valve plugs, the ports of the valve plugs being disposed to pass the material from a hopper having a discharge outlet whose axis is normal to that of the plug and co-incidental with the discharge spout of the valve unit, the smaller end of the valve plug being adjacent the discharge end of its pump so that by removal of the plug direct access to the valve housing and seat and to the pump barrel is had for cleaning purposes.

10. A machine in which a larger number of

2

valve units per hopper may be placed side by side without interfering with one another, such as occurs in machines heretofore on the market and with which I am familiar, and without preventing easy withdrawal of the valve plugs for cleaning the valve unit parts, and without having to disconnect the valve bodies from the hopper.

11. A machine having a stationary table over which an endless conveyor carries the receptacles to and beneath the discharge nozzles, and away from the nozzles when the receptacles are filled, the table having a movable section (hereinafter called the rising table) beneath the nozzles, which movable section is raised and lowered at predetermined intervals to carry the receptacles up to the valves to be filled and back down again after filling, the conveyor operating on the step-by-step principle.

12. A machine which can easily and quickly be changed over from an automatically operating one to one which is manually controlled.

Other objects will in part be obvious and in part will be pointed out hereinafter.

To the attainment of the aforesaid objects and ends the invention also resides in the novel details of construction, combinations and arrangements of parts, all of which will first be fully described and then will be specifically pointed out in the appended claims, reference being had to the accompanying drawings in which:

Fig. 1 is a front elevation of the machine which embodies my invention.

Fig. 2 is a side (right) elevation of the same.

Fig. 3 is a side (left) elevation of the same.

Fig. 4 is a detail cross section, on an enlarged scale, on the line 4—4 of Fig. 2.

Fig. 5 is a detail elevation, parts being broken away, showing the rising-table elevating mechanism, on the scale of Figs. 1 to 3 inclusive.

Fig. 6 is a detail section on the line 6—6 of Fig. 5, the table part 6, shown in Fig. 5 being omitted.

Fig. 7 is an inverted plan view of the rising table slide bar bearing frame per se.

Fig. 8 is a detail view of a portion of a conveyor slat and its chain-bracket.

Fig. 9 is an enlarged detail horizontal section showing the clutch and its shifting yoke.

Fig. 10 is a detail sectional view on the line 10—10 of Fig. 9.

Fig. 11 is a detail view, on the scale of Figs. 1 to 3 inclusive, of a portion of a pump rod and its adjustable stops and slide block.

Fig. 12 is an enlarged central vertical longi-

tudinal section of a measuring valve and pump unit, taken on the line 12—12 of Fig. 13.

Fig. 13 is a top plan view of the same, parts being broken away.

Fig. 14 is a section on the line 14—14 of Fig. 12.

Fig. 15 is a front elevation of a modification, parts being broken away.

Fig. 16 is a top plan view of the same, parts being broken away.

Fig. 17 is a detail section on the line 17—17 of Fig. 15.

Fig. 18 is a detail front elevation of one of the T-plate guides and the valve lift which slides thereon.

Fig. 19 is a top plan view of the parts shown in Fig. 18.

Fig. 20 is a top plan view of one of the yokes shown in Figs. 15, 16, and 17.

Fig. 21 is a diagrammatic view of the electrical circuit arrangement used in the second embodiment of my invention.

Fig. 22 is a plan view of the valve-lift adapter used with the embodiment of Figs. 1 to 3 when the automatic operation is to be dispensed with.

Fig. 23 is a front elevation of the same.

Referring now to the accompanying drawings, in which like letters of reference indicate like parts in all the figures, 1 represents the frame of the machine, which has an opening 2 in which is mounted the bearings 17 for the cam shaft 18 and the bearing 53* for the driving shaft 53.

The frame includes cross braces 3 having bearing lugs 4 and threaded lugs 5 for table raising and lowering screws 8. The screws 8 are swivelly mounted in brackets 7 on the sides of the table T. One of the screws 8 has a hand wheel 9 and each screw has a sprocket 10. And endless chain 11 passes over the sprockets 10 of all four screws 8, so that by turning the hand wheel 9 the table can be raised or lowered at will.

Secured rigidly to and between the side bars 6 of the adjustable table T are two slide bar bearings 12, best shown in Figs. 2 and 3 and 5 to 7 inclusive. These bearings support a slide bar 25 which has a slotted arm 13 that carries, adjustably, a stud 15 on which is a roller 14 that is engaged by a rising-table cam 19 on the cam shaft 18. The bar 25 is pivoted to a pin 24 which works in a slot 23 in a rising-table-gear-operating arm 22. The arm 22 is carried by a shaft 21 that is journaled in bearing brackets 20 that are rigidly secured to the side bars 6 of the table T. A return spring 16 continuously tends to keep roller 14 in contact with cam 19.

The adjustable table includes a cover 32 which has a removable section 28 that is carried by a rising-table frame 27, to which gear racks 31 are secured. The frame 27 is slidably mounted in guides 29 mounted on the table T and cross braced as at 30. The shaft 21 has gears 26 which mesh with the racks 31 to effect the rise and fall of the rising-table frame 27.

At each end of the adjustable table T is mounted, in suitable bearings 33, a conveyor shaft 34, carrying sprockets 35, over which endless chains 36 pass. The chains also pass under idler sprockets 50 on supports 49 that are secured to and between the side bars 6 of the table T.

At equal intervals the chains 36 carry brackets 37 that have cross bars or slats 38 secured to them, which slats serve to push the containers along the table top to and past the filling nozzles.

The conveyor is given a step-by-step movement

by means of a ratchet 39 on one of the shafts 34. The ratchet has a number of teeth, which number is an equal divisor of the number of links in the chain. Mounted on the same shaft is a pawl-carrying crank 40 which carries a pawl 41 that engages the ratchet 39 and is slotted, adjustably to receive a pivot 48 to which one end of a connecting rod 47 is connected. (See Fig. 3.)

The rod 47 is also pivoted to one arm 44 of a bell-crank lever which is pivoted on a stud 43. The stud is carried by a block 42 mounted on the frame. The other arm 44* of the bell-crank lever carries a cam-engaging roller 45 that engages a cam 46 on shaft 18.

A driving motor 51 imparts its power through a transmission gearing 52 to the shaft 53. The shaft 53 has a pinion 54 that meshes with a driving gear 55 that runs on the sleeve 56 of a clutch device that is best shown in Figs. 9 and 10, by reference to which it will be seen that the sleeve 56 is suitably keyed to the shaft 18 and carries two clutch plates 57, 57*.

The plates 57, 57* are keyed to turn with the sleeve, and at least one of the plates is slidable along the sleeve. The gear 55 is free to rotate on the bushing 56* between the clutch plates when released. A sliding yoke 58 is carried on the sleeve 56 and has a flange 58* on which freely turns a trunnion ring 59. The trunnion ring 59 carries a set of fingers 66 which engage pins 64* on levers 62 that are pivoted at 64 between pairs of ears 61 carried by an adjusting plate 60. The plate 60 is secured to sleeve 56 by a set screw 65. The levers 62 carry rollers 63 which engage the adjacent clutch plate 57*.

A clutch yoke lever 67 is pivoted at 69 to a support 68 and is connected to the trunnions 59* on the trunnion ring 59.

Mounted on a bracket 71 that projects from the frame 1, is a clutch shifting lever 72. The lever 72 is slotted to pass a connecting rod 70 one end of which connects to lever 67 as at 70*. Stop pins 73 pass through rod 70 at opposite sides of lever 72 (see Figs. 1 and 9).

Referring now particularly to Figs. 1, 12, 13, and 14, the construction of the measuring valve and pump units will be understood. Each unit comprises a valve body 74 having a flange 74* mounted on the cross plate 1* that is secured to the top of, and forms part of the frame 1. The valve body has a tapered valve seat 78 for the valve plug 77. It also has an inlet passage 75 and a discharge passage 76, the passages 75 and 76 being co-axial and normal to the axis of the valve plug 77. The valve plug has an axially disposed port 79 entering from the smaller end of the plug and communicating with an angle passage composed of two parts 80 and 80*, the part 80 serving to effect communication between port 79 and passage 75 when the plug 77 is in one position, while the part 80* serves to effect communication between port 79 and passage 76 when the plug is in another position.

The valve body 74 has a counter-bore, internally threaded as at 83, to receive the cylinder adapter 82. The adapter 82 has a bore 84 that registers with port 79 and a counter-bore internally threaded as at 85 to receive one end of a pump cylinder 86. The valve body 74 has a counter-bore threaded at 127 to receive a discharge nozzle 126.

A pump piston 87 works in the cylinder 86 and is carried on a piston rod 88 of square cross-section, the rod passing through a steadying rest

89, secured to the frame 1. The axis of the cylinder and that of the plug coincide. The stem 81 of the plug 77 passes through a stop plate 90 which is held in contact with the larger end of the plug by adjustable screws 93 carried by a ring 91 that is held in place on the valve body 74 by screws 92. A crank 94 is suitably secured on the valve stem and has an elongated slot 94^a slidably to receive a stud 98 mounted on a valve-lift 96.

The valve-lift 96 has a T-slot 97 to slidably fit the T-bar 95 that is secured rigidly to the front face of the valve body 74 in any suitable way. The valve-lift 96 also has a stud 99 to which is pivoted one end of a bell-crank lever 100 that is fulcrumed on a stud 102 secured to the side of the valve body 74. The other end of the bell-crank lever is pivoted at 129 to one end of a connecting rod 103. The lever 100 has a slot 101 in which the stud 99 works.

As best shown in Figs. 2 and 3, the rod 103 has its other end slotted as at 104 to receive the connecting pin 107 on an arm 106 which is secured to a rock shaft 105 journaled in the frame 1. A second arm 106^a is secured to shaft 105 to which arm a cam yoke and connecting rod member 108 is pivoted as at 166. The yoke part of the member 108 is slotted as at 108^a to straddle shaft 18 and carries two cam-engaging rollers 109 to co-operate with a valve operating cam 110 on shaft 18.

Two adjustable stop blocks 113, 114 are secured to the pump rod 98 by long-wing nuts 115. Between the stops 113 and 114 is located a slidable trunnion block 111 having trunnions 112 to work in a slotted arm 118 that is secured to a rock shaft 116 journaled in bearings 117 mounted on the frame 1. Another slotted arm 119 is secured to shaft 116 at approximately right angles to arm 118. A piston stroke adjusting block 120 is mounted in the arm 119 and is adjustably held in position by a screw 125. The block 120 has a stud 121 to which is pivoted one end of a connecting rod 122 whose other end is pivoted to a crank 124 on a disc 123 that is secured to the cam shaft 18 (see Fig. 3).

In the automatically operating embodiment of my invention the valve-lift 96 includes a bifurcated foot plate 128 that straddles the nozzle 126 (see Figs. 12 and 13) for a purpose that will presently be understood. When used without the automatic feature, the valve-lift 96 is replaced by a connector 96^a, of like construction as the valve-lift 96 except that the portion below the lug 98 is left off. The connector is shown in Figs. 22 and 23 where those parts which correspond to similar parts in Figs. 3, 12, and 13 bear the same reference number plus the index letter "a," and need not be further described herein.

The second automatic embodiment of my invention embodies the same mechanism as the first embodiment of the invention with the following exceptions. Instead of the mechanism for mechanically opening the measuring valves through the engagement of the valve-lift shown in Figs. 12 and 13, with the container to be filled, I provide the mechanism shown in Figs. 15 to 21 inclusive. By reference to these figures it will be seen that those parts shown which are like corresponding parts in the first embodiment bear the same reference number plus the index letter "b," and need not be re-described.

In the present embodiment I secure an angle iron 130 to the frame 1^b and mount on the iron 130, by brackets 133, vertical insulators 131, one

for each measuring valve unit. To each insulator is secured a stationary contact plate 132. A yoke 134 is secured, in any suitable way as by a set screw 135, to each valve body 74^b in a diagonal position (see Fig. 16). The yoke has bearings 136 for two rods 137 that are secured to a lifter plate 138 that is apertured, as at 138^a, to pass freely along the nozzle 126^b. Nuts 137^a limit the drop of the lifter plate. The lifter plate 138 and its rods are preferably made of very light material, such as aluminum, and the rods have a free-sliding fit in the bearings 136. One of the rods 137 of each unit is provided with an insulated cap or button 139 to which is secured a springy wiper-contact 140 that normally engages the insulator 131 adjacent to it. When plate 138 is raised, contact 140 will engage contact 132 to complete an electric circuit, later again referred to.

The connecting rod 103^b, instead of being slotted at the rear end which connects to arm 106^b, is slotted at its front end. The front end slot is of L-shape in elevation and has a long leg 141 and a short leg 141^a, and a seat portion 142. The stud 129^b works in the slot 141, 141^a. The slot has its longer leg 141 running parallel to the length of the rod 103^b and its shorter leg 141^a extended downwardly, as shown in Fig. 17, the seat 142 being at the lower end of the slot.

With the valve closed, the parts are positioned as in Figs. 15 and 16. When in this position the rod 103^b may be operated without opening the valve. In order operatively to connect rod 103^b to lever 100^b the front end of the rod must be lifted to bring seat 142 in register with lug 129^b. This is accomplished by providing a pair of parallel bars 143 which straddle the rod 103^b and carry, beneath the rod 103^b, a roller 145 on a connecting bolt 144. The bars 143 are connected at 148 to the core 147 of a solenoid magnet 146 that is mounted on the angle iron 130, there being a solenoid, etc., for each bar 103^b.

All solenoids 146 are electrically connected, as at 149, to one terminal 150 of a switch S. All wiper-contacts 140 are connected, as at 151, to a terminal of a switch S'. The line wires 156 respectively connect to the terminals 154 and 155 of the switch S. Each solenoid 146 is connected by a wire 149^a to its corresponding contact plate 132. When the switch is closed by the blades 153 of the movable member 154 of the switch and a contact 140 is raised to engage its plate 132, the circuit through the corresponding solenoid 146 will be closed and rod 103^b will be lifted thereby. Then when rod 103^b moves forwardly, lever 100^b will effect the opening of the corresponding measuring valve.

In all embodiments of my invention, there is provided a hopper 156 that is mounted on the top plate 1^a of the frame and is provided with a suitable agitator whose shaft 157 has a sprocket 161 over which, and over a similar sprocket 160 on a counter-shaft 159, passes an endless chain 162. The shaft 159 is journaled in a bearing 158 and carries a second sprocket 163 over which, and over a sprocket 164 on the cam shaft 18, runs an endless driving chain 165. The agitator, it will be seen, runs continuously while the machine is in operation. One hopper 156 communicates with one or more measuring valves, as may be desired and as the size of the hopper will permit.

Operation

In operating my machine automatically, the containers to be filled are placed on the table between longitudinally disposed container-posi-

tioning cleats 167 and are engaged by the cross bars 38 which push a transverse row of containers onto the rising-table top 28. When the containers have been pushed onto the rising-table the conveyor stops and the rising-table is raised or elevated, whereupon the containers will engage the plates 128 (or 138, as the case may be) to effect the opening of the respective measuring valves, i. e., to bring valve plug passages 80* into communication with valve passages 76 and close ports 75. Pump pistons then operate to expel measured amounts of material into the respective containers. As the containers are filled, rising-table 27 will be lowered and rods 103 (or 103^b) will be operated to again close the measuring valves, i. e., close off passage 76 and open ports 75.

Should a container be missing when table 27 is raised, the valve corresponding to the place on the table where no container is present will not be operated, due to the presence of the slot 104 (or 141-142, as the case may be).

When containers of relatively stiff materials are to be filled, a machine like that of the first-described embodiment will operate satisfactorily, but when thin-walled containers, such as paper boxes and bottles, the embodiment according to Figs. 17 to 21 inclusive is preferred.

By diagonally the plate 138 its ends will rest on the corners of square containers where the maximum strength is present.

The machine of the last-described embodiment of my invention may be adapted for manual control, if desired, by simply removing the parts 137, 138, 139, and 140, and connecting wire 151 to plates 132, and using switch S to open and close the solenoid circuits at will.

When any measuring valve remains closed while another is open, the pump of the closed valve unit will simply suck in material from the hopper and expel it back into the hopper, which will assist the agitation of the material in the hopper.

By making the number of links in the conveyor chain a multiple of the number of teeth on the ratchet, in order to feed containers of different horizontal lengths it is only necessary to lift the chains from the sprockets 35 and advance or retract the chains one or more teeth on the sprockets. A change of ratchets is not then necessary.

For containers of different heights, the table T can be raised or lowered accordingly, care being taken however to adjust the position of roller 14 so as always to line up horizontally with shaft 18, so that the lift of the table 27 above table T will always be the same.

From the foregoing description it will be obvious that when the automatic feature of my invention is dispensed with the valves must be opened by hand, but the closing is still accomplished mechanically.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, operation, and advantages of my invention will be clear to those skilled in the art.

What I claim is:

1. In a container-filling machine wherein there is provided means for dispensing material from a hopper and conveying containers beneath said means for dispensing, the improvement which comprises: a dispensing valve that includes a valve body having an inlet passage in communication with the hopper and having an

outlet passage, and having a rotary valve seat whose axis is normal to the axis of said inlet passage; a valve plug in said body and engaging said seat, said plug having an axially disposed port entering from one end and an angle passage having two branches and being in constant communication with said axially disposed passage, one of said branches being designed to register with said inlet passage when the valve plug is in one position and the other of said branches being designed to register with said outlet passage when the valve plug is in another position; a pump connected to said valve body in register with said axially disposed port for drawing material from the hopper via said inlet port and valve plug, and for dispensing the material via said valve plug and said outlet passage; means to operate said pump; container-controlled means to operate said plug to turn it to dispensing position; and means operating to turn said plug to non-dispensing position at times.

2. In a receptacle-filling machine wherein receptacles to be filled are conveyed along a table past a measuring valve and pump unit located above the table, the improvement which includes: a valve having a valve body that is provided with a straight-through passage intersected by an annular valve plug chamber having a plug-seat surface; a valve plug in said chamber with its axis located normal to that of said straight-through passage and dividing the passage into an inlet portion and an outlet port when the plug is in place, said plug having an axially disposed port entering from one end of the plug and having an angle passage constantly in communication with said axially disposed passage, one end of said angle port cooperating with said inlet portion and the other end of said angle port cooperating with said outlet portion; means on said valve body for holding said plug to its seat; a valve stem on said plug; an arm on said valve stem, said valve body having a pivot lug on its side; a lever pivoted on said lug; an operative connection between said lever and said arm; means to rock said lever to close the valve; and means separate from said valve for alternately drawing material from a source of supply through said valve and dispensing the material through the valve into a receptacle being filled.

3. The improvement of claim 2 wherein the means to rock said lever to open the valve includes a foot plate operatively connected to said lever and operated by the receptacle to be filled.

4. The improvement of claim 2 wherein the means to open and close said valve includes a mechanically reciprocated rod having a pin and slot connection with said lever and normally acting to close said valve, and means controlled by the receptacle to be filled for operatively effecting said pin and slot connection to effect the opening as well as the closing of said valve.

5. The improvement of claim 2 wherein said means to draw and dispense material includes a pump having a cylinder, a piston and a piston rod, a pair of adjustable spaced-apart stops on said piston rod, a slide block on said piston rod between said stops, and cam-actuated means to move said slide block back and forth along the axis of said piston rod to reciprocate the same.

6. The improvement of claim 2 wherein said means to draw and dispense material includes a pump having a cylinder, a piston and a piston rod, a pair of adjustable spaced-apart stops on said piston rod, a slide block on said piston rod

between said stops, cam-actuated means to move said slide block back and forth along the axis of said piston rod to reciprocate the same, said cam-actuated means including a rock shaft, a slotted arm on said shaft and operatively connected to said slide block, a second arm on said rock shaft, a piston-stroke-adjusting block on said second arm, means to adjust said adjusting block toward and from said rock shaft, a rotating shaft having a crank, and a connecting rod between said crank and said adjusting block.

7. In a filling machine having containers to be filled conveyed over a table beneath a single material dispensing hopper positioned above the table, the improvement which comprises a plurality of measuring valves having aligned inlet and outlet passages with the inlet passage of each valve communicating with said hopper, each of said valves having a tapered valve seat with its axis arranged at right angles to the axis of said passages, a valve plug positioned in each of said valves in cooperative relation with said tapered valve seat, means to retain each of said valve plugs on its seat, each of said valve plugs having an axially disposed passage entering from one end of the plug, each of said valve plugs having a port in continuous communication with said axially disposed passage and adapted to register with either said inlet or outlet passage as the valve plug is actuated, a pump comprising a cylinder having a piston therein mounted on each of said valves in axial alignment with the valve plug of said valve with one end of the cylinder communicating with said axially disposed passage, means to operate the piston in each of the cylinders, means for operating each of said valve plugs independently of one another, comprising, a stem on each of said valve plugs, a slotted crank on each of said stems, a bell crank lever pivoted to each of said valves, a valve lift reciprocally mounted on each of said valves and operatively connected to its respective slotted crank and bell crank lever.

8. In a filling machine having containers to be filled conveyed over a table beneath a single material dispensing hopper positioned above the table, the improvement which comprises a plurality of measuring valves having aligned inlet and outlet passages with the inlet passage of each valve communicating with said hopper, each of said valves having a tapered valve seat with its axis arranged at right angles to the axis of said passages, a valve plug positioned in each of said valves in cooperative relation with said tapered valve seat, means to retain each of said valve plugs on its seat, each of said valve plugs having an axially disposed passage entering from one end of the plug, each of said valve plugs having a port in continuous communication with said axially disposed passage and adapted to register with either said inlet or outlet passage as the valve plug is actuated, a pump comprising a cylinder having a piston therein mounted on each of said valves in axial alignment with the valve plug of said valve with one end of the cylinder communicating with said axially disposed passage, means to operate the piston in each of the cylinders, means for operating each of said valve plugs independently of one another, comprising,

a stem on each of said valve plugs, a slotted crank on each of said stems, a bell crank lever pivoted to each of said valves, a valve lift reciprocally mounted on each of said valves and operatively connected to its respective slotted crank and bell crank lever, mechanically actuated means for operating each of said valve lifts to close its respective valve independently of the other valves and means controlled by containers to be filled for actuating each of said valve lifts independently of one another for opening each of said valves independently of one another.

9. In a filling machine having containers to be filled conveyed over a table beneath a single material dispensing hopper positioned above the table, the improvement which comprises a plurality of measuring valves having aligned inlet and outlet passages with the inlet passage of each valve communicating with said hopper, each of said valves having a tapered valve seat with its axis arranged at right angles to the axis of said passages, a valve plug positioned in each of said valves in cooperative relation with said tapered valve seat, means to retain each of said valve plugs on its seat, each of said valve plugs having an axially disposed passage entering from one end of the plug, each of said valve plugs having a port in continuous communication with said axially disposed passage and adapted to register with either said inlet or outlet passage as the valve plug is actuated, a pump comprising a cylinder having a piston therein mounted on each of said valves in axial alignment with the valve plug of said valve with one end of the cylinder communicating with said axially disposed passage, means to operate the piston in each of the cylinders, means for operating each of said valve plugs independently of one another, comprising, a stem on each of said valve plugs, a slotted crank on each of said stems, a bell crank lever pivoted to each of said valves, a valve lift reciprocally mounted on each of said valves and operatively connected to its respective slotted crank and bell crank lever, mechanically actuated means for operating each of said valve lifts to close its respective valve independently of the other valves and means controlled by containers to be filled for actuating at least one of said valve lifts for opening one of said valves.

EDWARD W. BRIDGE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
Re. 15,460	Geyer	Sept. 26, 1922
1,127,822	Sturtevant	Feb. 9, 1915
1,327,463	Larson	Jan. 6, 1920
1,343,696	Urie	June 15, 1920
1,461,707	Hanson et al.	July 10, 1923
1,695,501	Opitz	Dec. 18, 1928
1,993,367	Geyer	Mar. 5, 1935
2,037,691	Baldwin	Apr. 21, 1936
2,106,492	Adams	Jan. 25, 1938
2,152,339	Anderson	Mar. 28, 1939
2,245,287	Minard	June 10, 1941
2,336,355	Hollead et al.	Dec. 7, 1943