Aug. 27, 1957 R. D. COOKSLEY ET AL 2,804,102

AUTOMATIC PRESSURE CONTAINER VACUUMIZING, FILLING AND CHARGING MACHINE

Filed Aug. 9, 1954

8 Sheets-Sheet 1

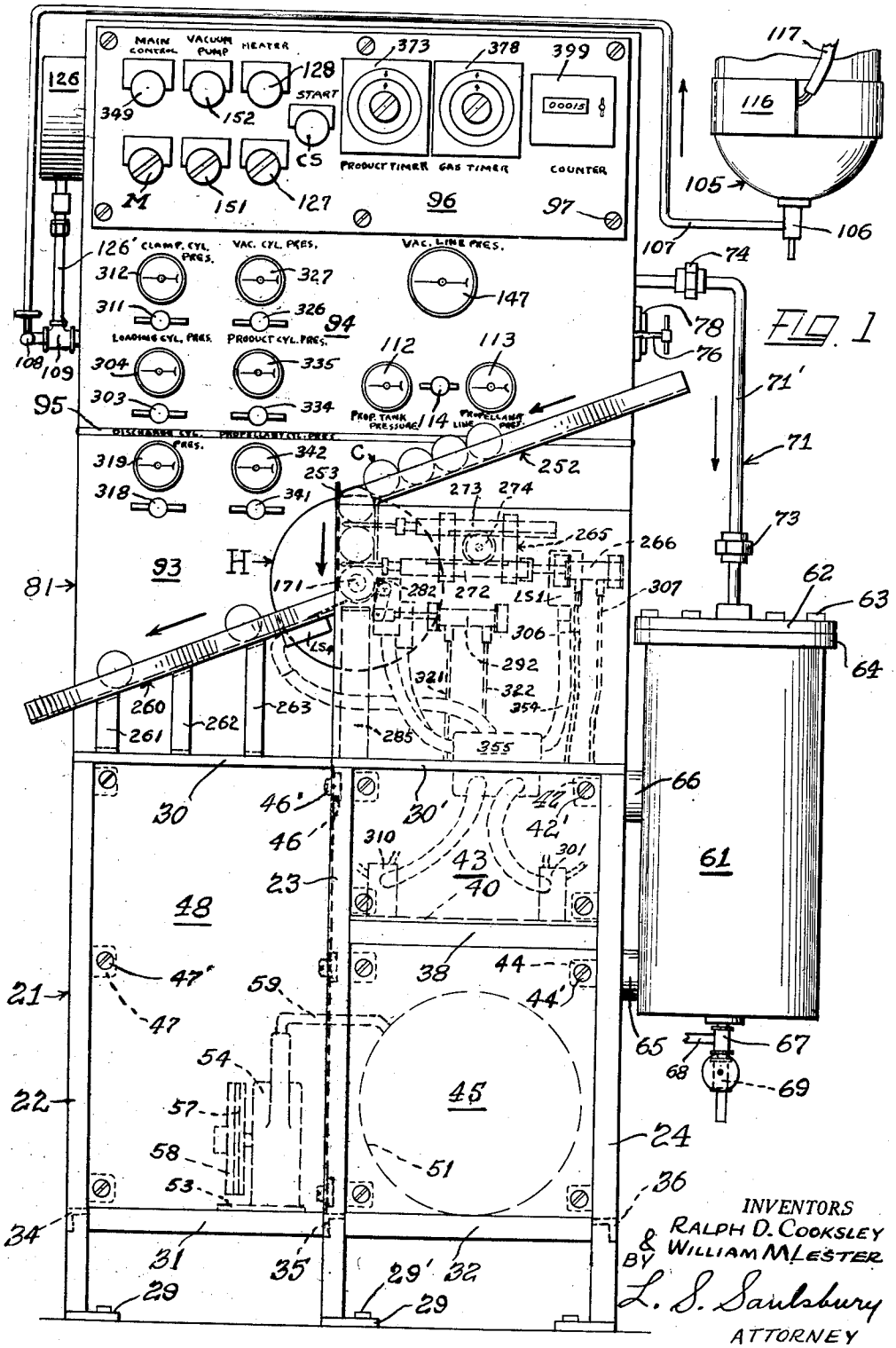


FIG. 1

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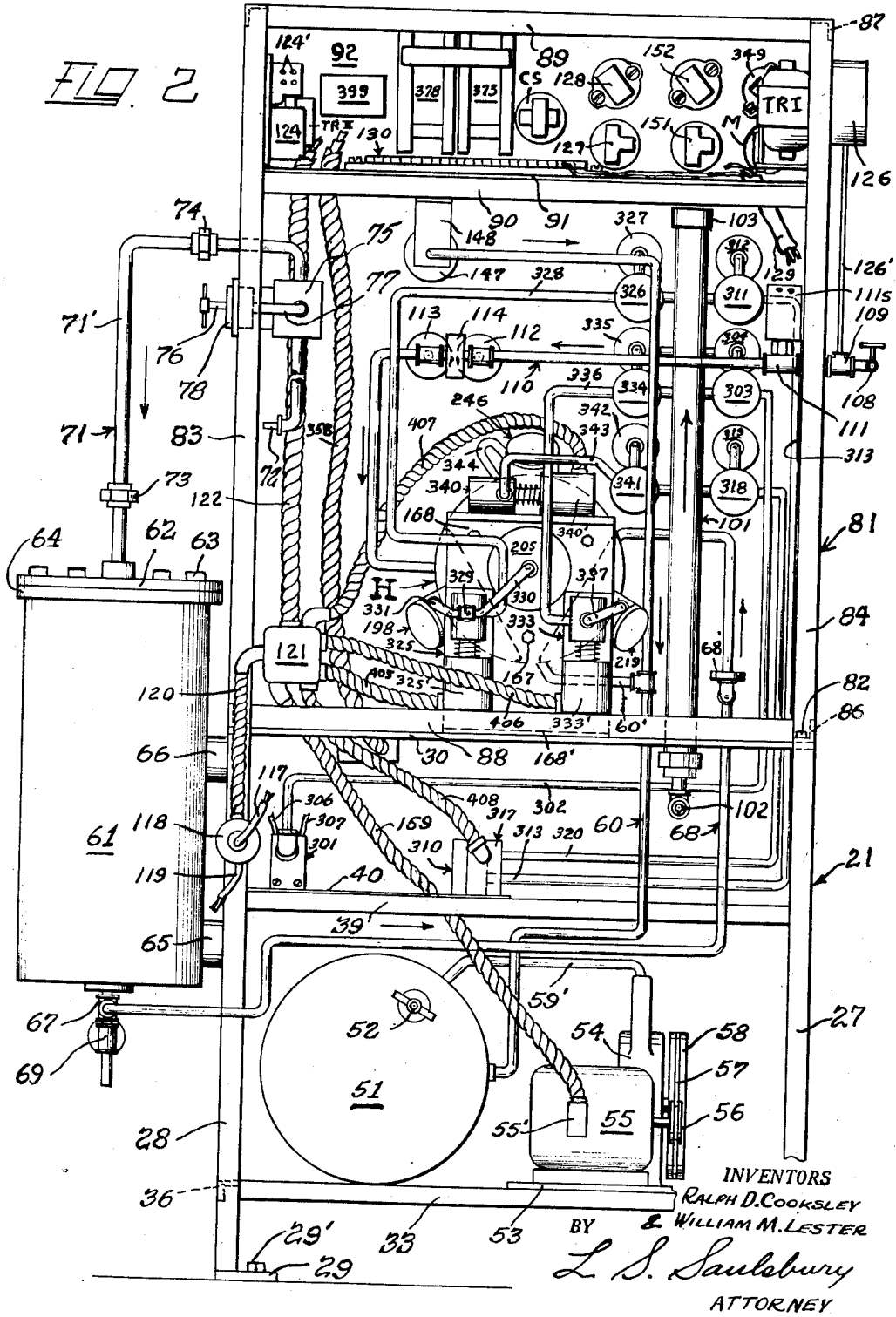
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FIG. 2



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FIG. 3

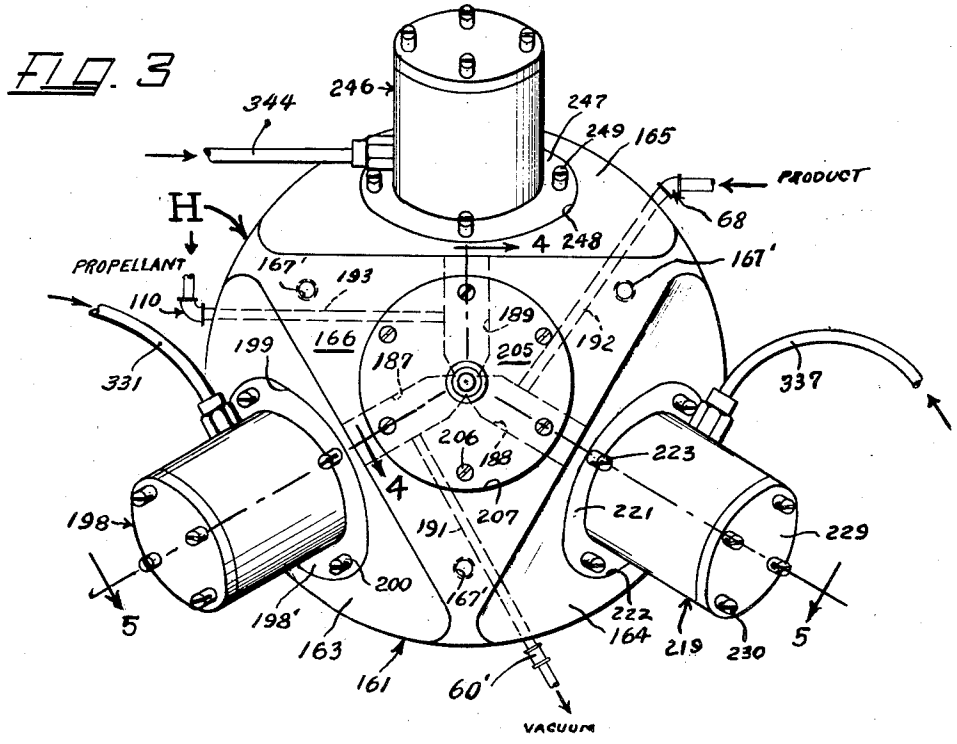
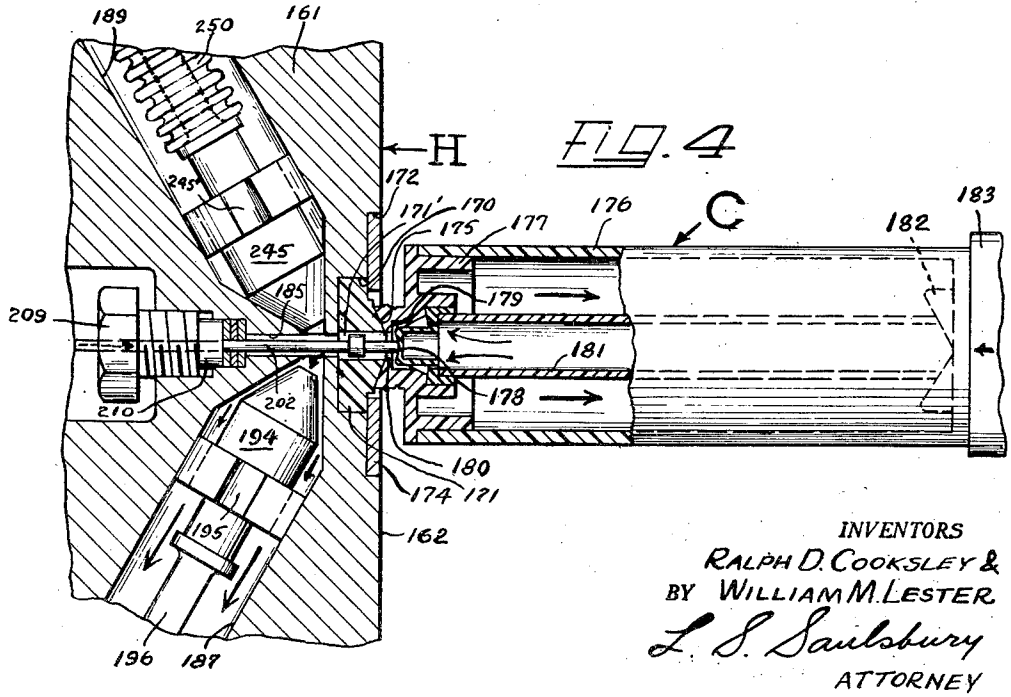


FIG. 4



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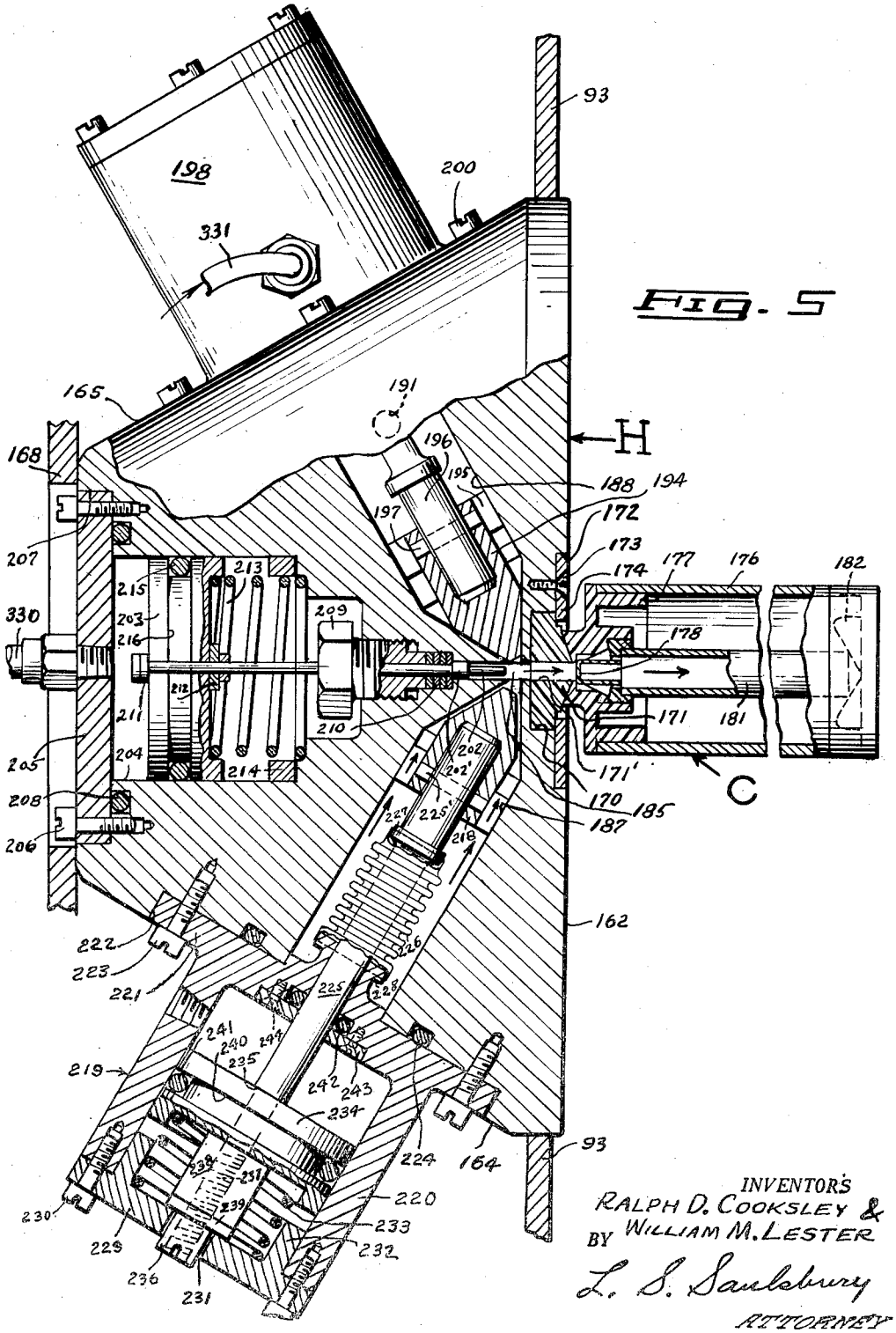


FIG. 5

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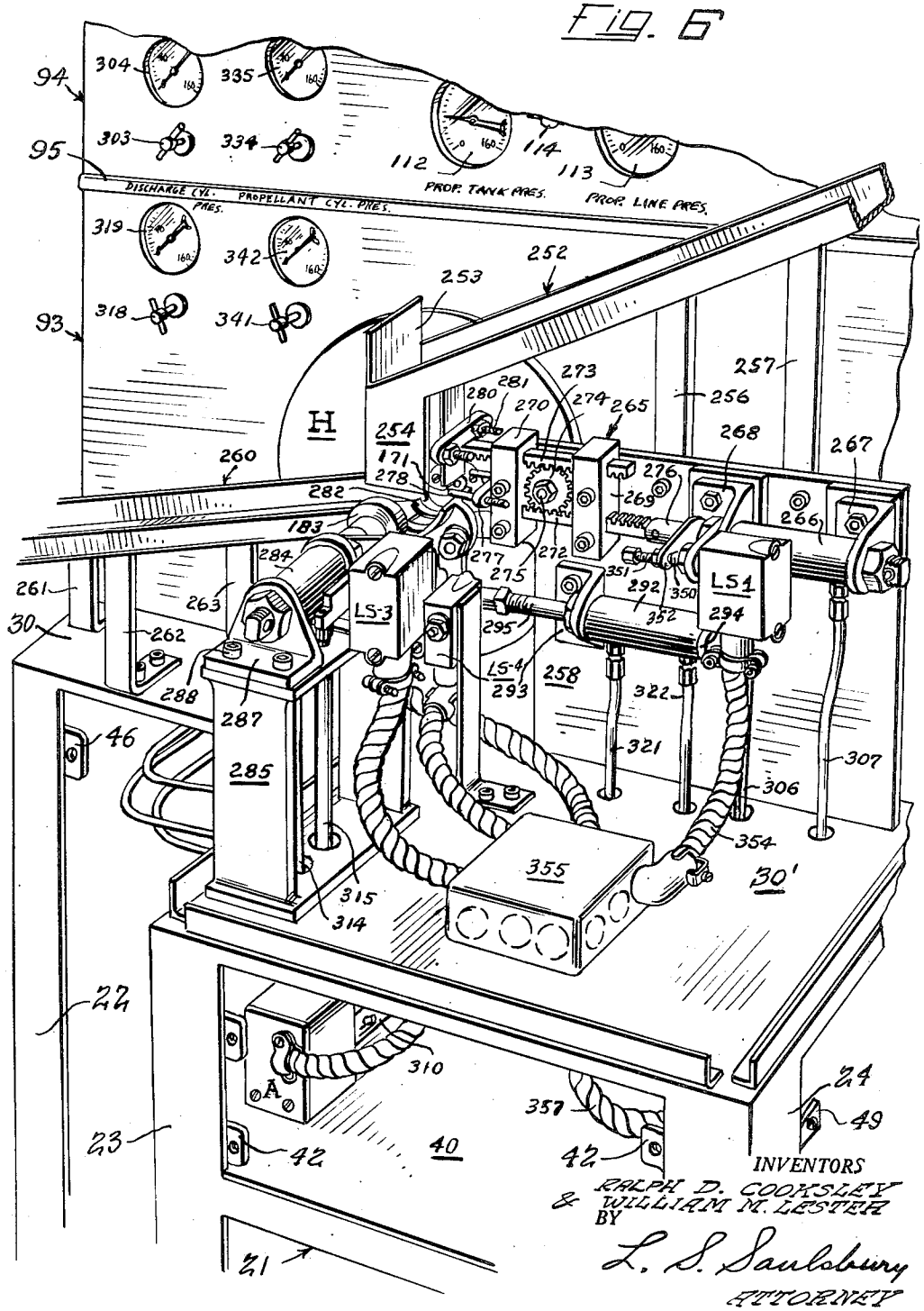
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Fig. 6



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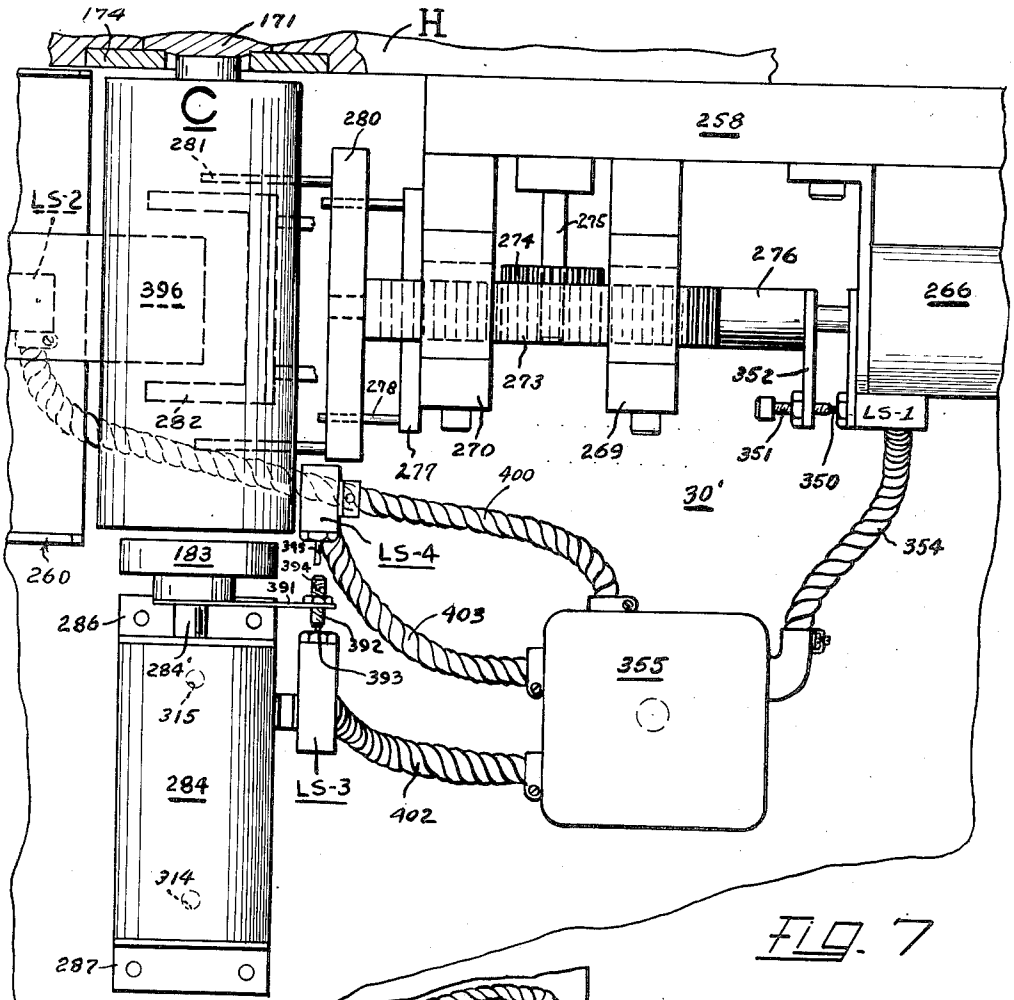


FIG. 7

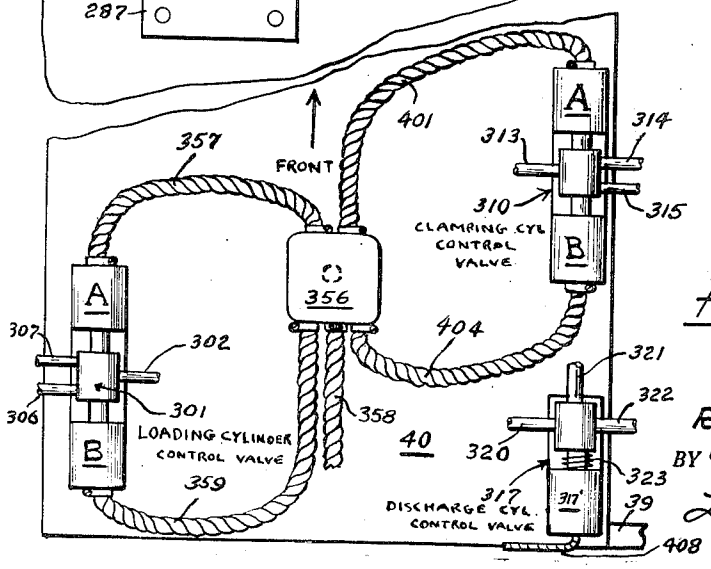


FIG 10

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FIG. 8

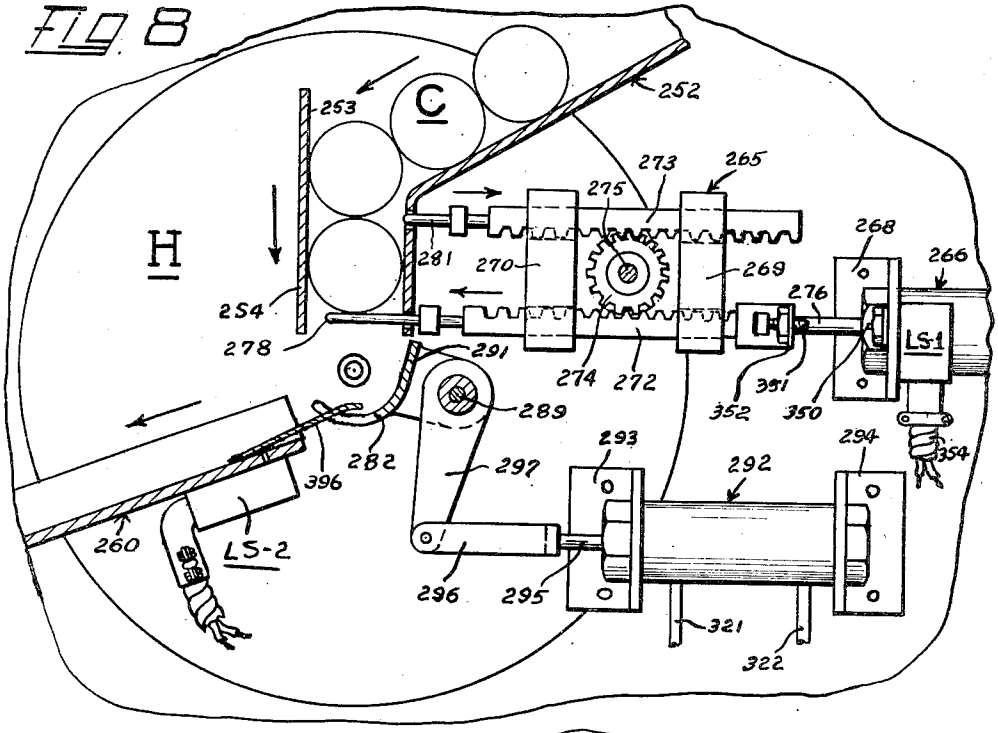
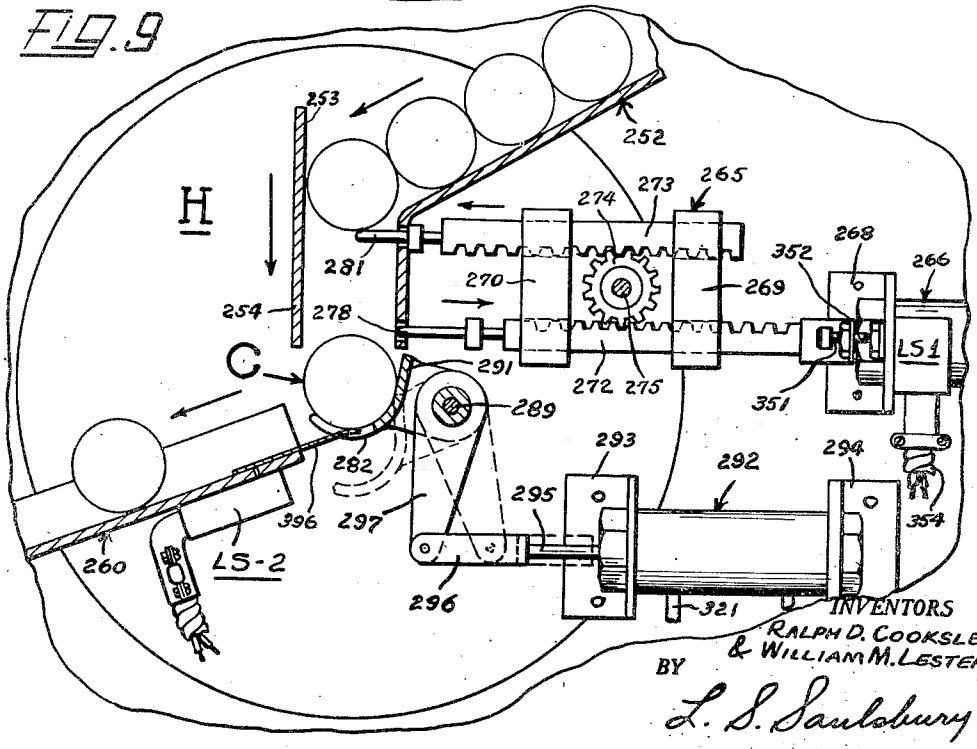


FIG. 9



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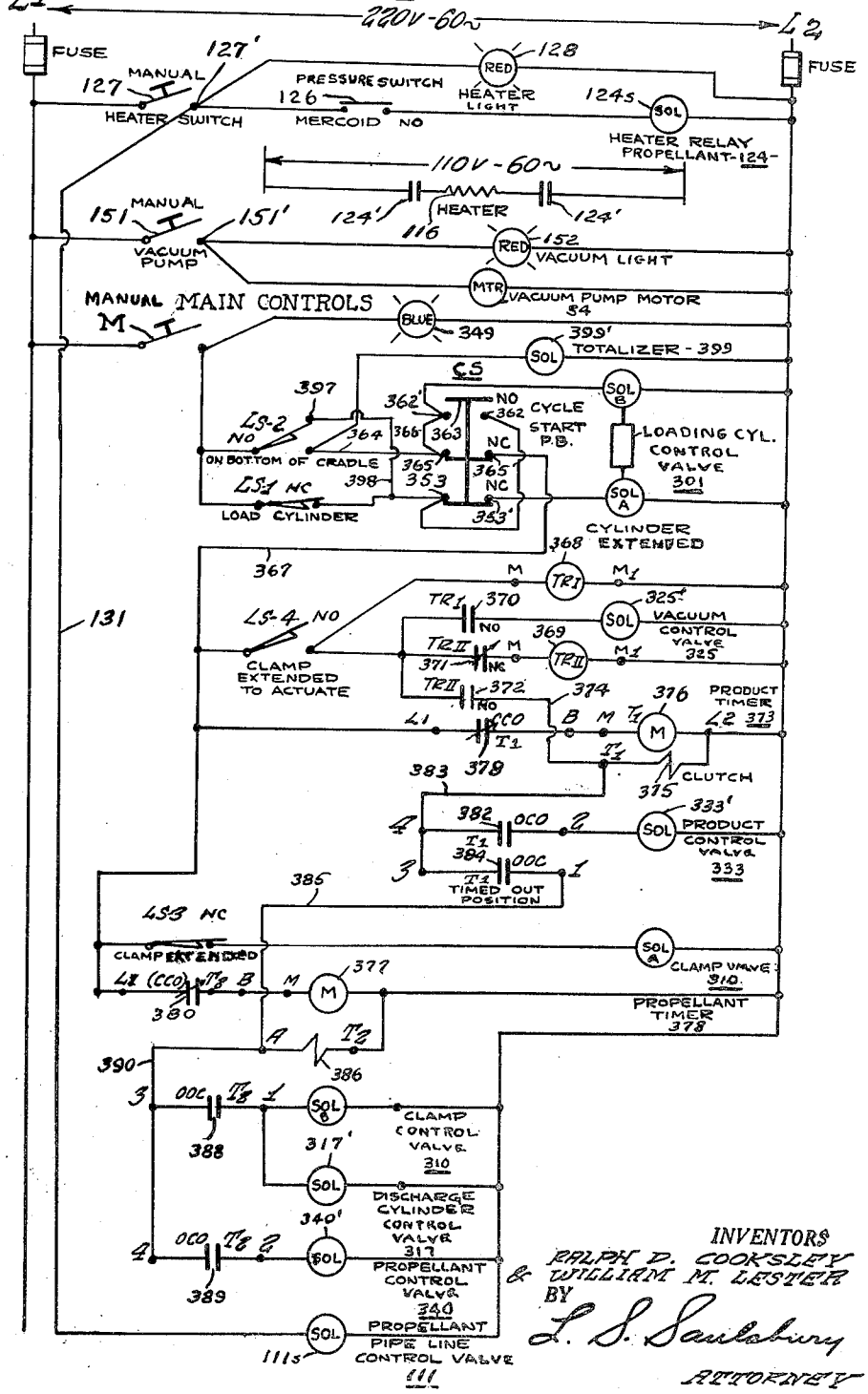
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Fig. 11



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Patented Aug. 27, 1957

2,804,102

AUTOMATIC PRESSURE CONTAINER VACUUMIZING, FILLING AND CHARGING MACHINE

Ralph D. Cooksley, Morristown, and William M. Lester, Mountainside, N. J.

Application August 9, 1954, Serial No. 448,584

16 Claims. (Cl. 141—20)

This invention relates to an automatic aerosol package or pressure container vacuumizing, filling and charging machine.

It is a principal object of the present invention to provide an aerosol package or pressure container filling machine wherein the evacuation of the air from the container, the charging with the product and the charging with the propellant are performed with the container nozzle held against the filling machine head throughout all of these operations in order to make possible the use of container valve structures that would normally not hold a vacuum for the filling operations if the container nozzle orifice were removed from the filling head of the machine and exposed to atmospheric pressure between the vacuumizing, product filling and propellant filling operations.

It is another object of the present invention to provide an aerosol package or pressure container filling machine in which filling and charging the containers is done under room temperature conditions and does not require that either the product or the gas propellant be refrigerated to fill the containers, whereby the expensive refrigerating equipment used heretofore with prior filling methods is dispensed with.

It is still another object of the invention to provide a small aerosol package or pressure container vacuumizing filling and charging machine that is relatively inexpensive to manufacture which will fill accurately pressure containers at a very high rate of speed automatically and without labor.

It is another object of the present invention to provide an aerosol package or pressure container vacuumizing, filling and charging machine which will automatically feed the containers one at a time to a single filling station and which, in response to and upon the arrival of each container at the station, will put into play the various devices that automatically effect in sequence the vacuumization of the container, the filling of the container with product, the charging of the container with volatile gas propellant and the discharge of the filled container from the filling station.

It is still another object of the invention to provide in an aerosol package or container filling and charging machine a simple container handling mechanism associated with loading chutes that will direct the container across the front of the machine and downwardly into axial alignment with the filling head nipple and upon a cradle support and after the filling operation and release of the container will move the cradle support to discharge the filled container from its filling position onto an inclined discharging chute that carries the loaded containers from the machine.

It is another object of the present invention to provide an automatic aerosol package or pressure container vacuumizing, filling and charging machine which will rapidly and accurately fill and charge the container, in correct proportions, with the product and the gas propellant and will thus discharge uniformly filled and pressured containers from its delivery chute.

It is another object of the invention to provide a machine that fills and charges an aerosol package or pressure container in such a manner that the minute the container leaves the machine, the container is fully pressurized and charged and time is not required to bring the container to the room temperature to test it or to put it into use.

It is another object of the invention to provide in an automatic aerosol package or pressure container filling machine a line pressure responsive electric heater control device for periodically heating the propellant at the bottled supply source whereby to automatically maintain the available propellant supply at the same required pressure at all times so that the propellant will always be accurately metered to the containers being filled and pressurized.

It is still another object of the invention to provide in an aerosol package or pressure container filling and charging machine, a magnetically-operated valve responsive to the operation of the heater control switch of the machine for disconnecting the filling head from the propellant supply source of the expensive gas propellant and to lessen the chance of loss thereof upon discontinuing the operation of the machine.

It is a further object of the invention to provide a filling head for aerosol package or pressure container filling and charging machine adapted to receive and dispense the product and the propellant through a small common feed chamber so that there is little loss of the product or of the propellant upon completion of the filling cycle and wherein the remaining slight amount of the propellant in the small chamber will be economically utilized to evacuate the chamber by its quick expansion from the chamber upon release of the container and free the chamber of product and propellant and leave the chamber clean for the next cycle of operation.

It is a still further object of the invention to provide in an aerosol package or pressure container filling machine, adequate air pressure gauges for showing the pressure of the air being utilized for the separate various air operated cylinders of the filling head and the cylinder devices for handling the pressure container in order that failure in operation of any of the cylinder devices can readily be detected, and to insure proper filling and handling of the containers.

It is a still further object to provide an aerosol package or pressure container filling and charging machine that can be easily changed over to fill different size containers and wherein the large size containers can be filled in less time than with prior equipment.

It is a further object of the present invention to provide in an aerosol package or pressure container filling and charging head having a small common feed chamber an air-operated pin that automatically opens the valve of the container as the vacuumizing of the container is effected.

It is a still further object to provide an aerosol package or pressure container filling and charging head wherein the valve that controls the expensive propellant has a minimum movement of only fifty thousandths of an inch to open the passage to full port size, is adjustable to change the stroke and is hermetically sealed from its operating air cylinder.

It is a still further object of the invention to provide an aerosol package or pressure container filling head made out of one piece of stainless steel with valve openings converging toward a common small feed chamber and separate, similarly constructed and self contained air-operated valve units which are quickly replaceable in the

event of a break down of any one unit without need of a skilled mechanic.

Still further objects of the invention are to provide an aerosol package or pressure container filling and charging machine having the above objects in mind which is of simple construction and compact, easy to operate, requires little expenditure of time to maintain, handles the containers automatically without further handling other than to place the same in the loading chute, consumes little power, operated by readily available compressed air and electric power sources, of pleasing appearance and efficient in operation.

For other objects and a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is a front elevational view of the aerosol package or pressure container vacuumizing, filling and charging machine embodying the features of the present invention;

Fig. 2 is a fragmentary rear elevational view of the machine;

Fig. 3 is an enlarged rear elevational view of the filling head by itself;

Fig. 4 is in enlarged fragmentary sectional view of the filling head and the container as viewed on line 4—4 of Fig. 3 and showng the vacuum and propellant central valves, the pin projected to open the container valve and the vacuum valve opened for evacuating the container;

Fig. 5 is an enlarged fragmentary top view of the filling head, with portions broken away, generally along line 5—5 of Fig. 3 showing the vacuum and product valves with product valve in its open position as when filling the container with the product and the container valve tending to be opened under the pressure of the product;

Fig. 6 is a fragmentary perspective view of the front of the machine and looking upon the container chutes, the loading, clamping and charging devices for controlling the flow of the containers to and from the filling head;

Fig. 7 is an enlarged fragmentary plan view of the loading and clamping devices and of a container positioned in front of the filling head and unclamped;

Fig. 8 is an enlarged fragmentary elevational view of the front of the machine looking upon the container chutes and the container loading and discharging devices with the lower fingers of the loading device extended into the chute to support the column of containers;

Fig. 9 is an enlarged fragmentary elevational view similar to Fig. 8 but with the upper fingers of the container loading device extended into the chute to support the column of containers;

Fig. 10 is a fragmentary top plan view of the magnetically-operated air valves for controlling the container loading, clamping and discharging devices; and

Fig. 11 is a schematic electrical wiring diagram of the machine.

Referring now particularly to Figs. 1 and 2, a bottom frame structure **21** is provided as the main support for the machine. This frame structure has three front legs **22**, **23** and **24** of angle section, the leg **23** lying intermediate the width of the structure. Side legs **24** and **24** lie forwardly of the side leg **22**. At the rear of the structure **21** are two legs **27** and **28** lying respectively in rear of the outer front legs **22**, **24**. On the lower side of each leg is a foot plate **29** through which a bolt **29'** is extended to secure the machine to the floor. Fixed to the upper ends of all of the legs is a thick metal horizontal top plate **30** which has a forwardly extending portion **30'** that is supported at its forward edge upon the upper ends of front legs **23** and **24**.

Extending between the lower portions of the front vertical legs **23** and **24** is a horizontal front short frame piece **32**. A similar horizontal front short frame piece **31** extends between front vertical leg **22** and a horizontal brace

35. Between the rear legs **27** and **28** is a long rear frame piece **33**. The front pieces **31** and **32** are at different forward locations. Horizontal braces **34**, **35** and **36** run fore and aft of the structure, Fig. 1.

Spaced above the front horizontal frame piece **32** is a horizontal shelf frame piece **38** and spaced above the rear horizontal frame piece **33** is a long horizontal shelf frame piece **39**. The frame pieces **38** and **39** support an intermediate shelf plate **40**. This shelf plate **40** serves as a support for the magnetically-operated air valves that control the loading, clamping and discharging devices, all of which to be later numbered and described.

On the forward front vertical legs **23** and **24** above the shelf plate **40**, an upper cover plate **43** is connected by screws **42'** to lugs **42** and below the shelf plate **40** are lugs **44** to which a lower cover plate **45** is connected by screws **44'**. On the intermediate forward front leg **23** are vertically-spaced lugs **46** and on the front leg **22** are vertically-spaced rearwardly extending lugs **47** to which a sheet metal cover **48** folded vertically at its intermediate rear corner is secured to the lugs **46** and **47** by screws **46'** and **47'** whereby to close off further the front of the bottor frame structure **21**. Similar lugs **49**, Fig. 6 are provided on the vertical legs at the sides of the frame **21** to similarly support side cover plates, not shown, so as to close off the sides of the machine. The front and sides of the bottom frame structure **21** are thus enclosed, while the rear of the frame structure is left open.

Extending end-to-end between the horizontal frame pieces **31** and **33** at the front and rear of the frame structure **21** is a cylindrically-shaped vacuum tank, **51** having on its rear end a vacuum control valve **52** adjusted to maintain the vacuum in the tank at approximately twenty-five inches, Fig. 2. Supported on a plate **53** beside the tank **51** is a vacuum pump **54** and an electric motor **55**. The motor **55** has a drive pulley **56** that drives a V-belt **57** and a large wheel pulley **58** of the vacuum pump **54**. The vacuum pump **54** lies forwardly of the motor **55**. A pipe **59** connects with the pump **54** to the tank **51**. Extending upwardly from the vacuum tank **55** is a riser pipe **60** that has a branch pipe **60'** which extends to filling head H for use in a manner to be later described.

On the right side of the frame structure **21**, as viewed in Fig. 1, is a high pressure product tank **61** closed at the bottom and having a top head plate **62** removably secured by fastening screws **63** to a flange **64** surrounding the upper end of the tank. On the side of the tank are welded vertically spaced round lugs **65** and **66** into which fastening bolts, not shown, on the frame structure **21** extend to secure the product tank **61** to the frame structure.

Depending from the product tank **61** is a T-fitting **67** from which extends product pipe line **68** and a drain valve fitting **69**. This product pipe line **68** extends to the filling head H to deliver the product thereto. A pressure gauge **68'** is provided in the line to determine the pressure of the product therein. By opening the drain valve fitting **69**, the tank **61** and the pipe **68** may be drained.

The product tank **61** is charged with compressed air through a pipe line **71** having an end nipple **72** to which an air hose leading from an air pressure source may be connected. The pipe line **71** has break away couplings **73** and **74** which permit a removable section **71'** of the pipe line **71** to be taken away so that the head plate **62** may be removed for the purpose of refilling the tank with more of the same product or of some other product. The pipe line **71** has an air regulating valve **75** with an adjusting knob **76** easily accessible to the operator of the machine to regulate the product pressure. Connected to the air regulating valve **75** at one side thereof is a short pipe **77** that leads to a pressure gauge **78** which can be easily read from the side of the machine. In lieu of compressed air to maintain the product pressure, the product tank **61** may be removed from the machine and elevated so that the product may be gravity fed to the filling head H.

To the main or bottom supporting structure **21** and the main elements disposed thereupon, the description has thus far been directed. A description of the upper frame structure and the front panel will now be made. This upper structure is indicated generally at **81** and is secured upon the top plate **30** of the bottom structure **21** by fastening bolts **82**. It has two side frames **83** and **84**, each of which is made of vertical side frame pieces of angle section joined to one another by short bottom and upper frame pieces **86** and **87**, Fig. 2. The fastening bolts **82** extend through the plate **30**. The lower ends of the side frames are joined by front and rear horizontal frame pieces **88** and upper ends of the side frames are joined by top, front and rear horizontal frame pieces **89**. Near the upper ends of side frames **83** and **84** but downwardly spaced from the top frame pieces **89** are intermediate front and rear horizontal pieces **90** that support a shelf plate **91** above which is an electrical compartment **92** housing various time control and switch devices to be later named and numbered. The sides and top of the upper structure **81** are closed off by cover plates, not shown.

On the front of the upper frame structure **81** and extending across the front vertical supports are lower and upper panels **93** and **94** joined by an intermediate beading **95** and bent at their side ends for connection with the side frames **83** and **84** of the upper structure **81**. These panels have appropriate openings through which extend the filling head H, various gauges, regulating valves, timing and switch devices to be later named and described. The upper panel has a large upper opening over which extends a sub-panel **96** that carries the timing and switch devices and is separable, upon removal of its retaining screws **97**, to provide access to the wiring within the compartment **92** that houses these devices and from the front of the machine.

Projecting upwardly from the top plate **30** is an upstanding air supply pipe **101** on the lower end of which is a nipple fitting **102** to which an air hose is connected to supply air under pressure thereto. This pipe **101** provides a separate air supply for the other parts of the machine and independent of the air pressure supply line **71** used for the product tank **61**. This supply pipe **101** is closed at its upper end by cap **103** and various pipe lines lead laterally therefrom, in a manner to be later described.

A volatile propellant, such as freon, is delivered to the machine from a high pressure bottle source **105** supported from a nearby wall in an inverted manner. This bottle has a valve **106** from which a line pipe **107** extends to a valve fitting **108** that connects through a T-fitting **109** to a propellant pipe line **110**. This pipe line **110** has a magnetically-operated control valve **111** operated by a heater control switch **127** that closes off the line when the machine is not in use, and two pressure gauges **112** and **113** with a pressure regulating valve **114** therebetween that extend through the upper panel **94**. The pipe line **110** leads to the filling head H to supply the propellant thereto. Reading of the propellant pressure in the supply bottle **105** and in the filling head H may thus be separately taken from the two gauges **112** and **113**.

An electric heater **116** surrounds the lower end of the propellant bottle **105** to heat the propellant from time to time in order to maintain a constant liquid propellant operating pressure and to insure proper metering of the propellant to pressure containers C. A cable **117** extends from the heater **116** and is plugged into a receptacle **118** fixed to rear leg **28** of the bottom frame structure **21**, Figs. 1 and 2. A 110-volt alternating current supply is delivered to the receptacle **118** through a cable **119**. The wires of cable **119** lead upwardly through armored tube **120**, wire box **121**, armored tube **122**, and connect with contacts **124'** of a magnetic heater relay **124**, Figs. 2 and 11. Return wires from contact **124'** lead downwardly through tube **120**, box **121** and tube **120** to the receptacle

118 in which the heater cable **117** is plugged. When the heating relay **124** is energized, movable contacts **124'** close so that current is supplied to the heater **116** and the liquid propellant is brought to the desired pressure.

The instant the supply pressure of the propellant falls below the desired amount, a normally opened pressure-responsive switch **126** mounted upon one end of the upper structure **81** connected by a tube **126'** with the T-fitting **109** in the propellant supply line **110**, is closed whereby to energize the solenoid **124*s*** of the relay **124** so that the heater **116** is turned on. As soon as the desired pressure of the propellant is reached, the pressure responsive switch **126** will be opened, the relay solenoid **124*s*** de-energized and the heater **116** turned off. With a great variance in temperature only a slight change in pressure is had. By adjustment of the switch a wide range of control pressures may be provided thereby to make possible the use of different propellants with this same machine.

Upon starting the machine, the heater **116** is turned on so as to heat the propellant bottle and bring the propellant to the desired operating pressure. The heater switch **127** on the sub-panel **96** is turned to the "on" position. This will be indicated by a red light from a lamp **128** in the circuit with the switch **127**.

A 220-volt three-wire cable **129** is led to the machine to provide a separate independent electric source for the operation of the vacuum pump motor **55** and the various controls. One of the wires of the cable **129** is grounded to the machine. The other two wires are as indicated respectively lines L1 and L2 of the multiple-terminal connector block **130** supported upon shelf **91** of electrical compartment **92** in rear of the sub-panel **96** and to which through this connector block, the various electric connections for the controls are made. The pressure switch **126**, the heater relay **124** and manual heater switch **127** are in series with each other and are placed across the line wires L1 and L2, Fig. 11. At the same time, the propellant heater is turned on by heater switch **127**, the solenoid **111*s*** of the magnetic propellant line control valve **111** is energized and the valve is opened. This is effected through the following circuit starting line L2, heater switch **127** contact **127'** on heater switch **127**, line **131**, solenoid **111*s*** and line L1.

The vacuum supply line **60** leading from the vacuum tank **51** extends upwardly to a vacuum pressure gauge **147** that is supported from a depending bracket **148** secured to the horizontal shelf frame piece **90**. The gauge **147** extends through the upper panel **94** so that it can be viewed from the front of the machine to determine vacuum pressure at all times. The vacuum pump motor **55** and vacuum pump **43** are continuously run to maintain the vacuum in the tank **51** and pipe line **60** according to the adjustment of tank valve **52**.

By closing vacuum pump switch **151** that lies adjacent the heater switch **127** on the sub-panel **96**, the pump motor **54** is started. A lamp indicator **152**, with a red light, above the switch **151** will be lighted. The switch **151** and lamp **152** are in series with one another and lie across the feed lines L1 and L2, Fig. 11. Lamp **152** is connected between contact **151'** of vacuum pump switch **151** and line L1.

Referring now particularly to Figs. 3, 4 and 5, a description of the triple filling head H will be made. This head is formed of a stainless steel casting or body **161**, having a circular front face **162** that projects through the lower panel **93** and is accessible from the front of the machine. On the rear of the casting **161** are three bevelled faces **163**, **164** and **165** inclined forwardly from a vertical rear face **166**. The filling head H is secured by three fastening screws **167** to a vertically-extending bracket plate **168** having a bottom foot **168'** that is fixed to the top plate **30** of the bottom frame structure **21**. The fastening screws **167** enter threaded holes **167'** in the vertical rear face **166** of the casting **161**.

In the center of the front face 162 is a circular recess 170 that contains a plastic nipple 171 that has a feed hole or orifice 171'. Concentric with this recess is a counterbored recess 172. By means of screws 173, a retaining plate 174 is secured in this recess 172 around the nipple 171 to hold the nipple in its recess 170. The end of the nipple 171 is tapered and engages depressed conical seat 175 of a plastic container C constructed according to the recently filed patent application, Serial No. 442,134, of the present inventors. The container C generally comprises a hollow container body 176, a cover 177 tightly fitted to the body 176 and which has a seat 175, a flexible springless valve 178 that is held against seat 179 about the container filling and discharge opening 180 and a syphon tube 181 that depends into the container body and is supported on raised projections 182 in the bottom of the body. The container C is held against the nipple by a clamp plate 183, the operation of which will be later described.

Drilled into the casting 161 is a small diameter feed chamber 185 with which the nipple hole or orifice 171' is aligned and radially inclined and converging upon this feed chamber are three cylindrical openings or chambers 187, 188 and 189 leading respectively from the respective bevelled faces 163, 164 and 165 of the casting 161. Each of these openings are tapered at their inner ends to provide valve seats and lead into the chamber at an acute angle with their narrow widths in a common circumferential line whereby the chamber can have a minimum diameter. These openings 163, 164 and 165 respectively have passages 191, 192 and 193 leading to them from the exterior of the casting 161 respectively with which the respective vacuum, product and propellant pipe lines 60, 68 and 110 communicate.

Axially movable in the vacuum opening 188 is a tapered vacuum valve element 194. This valve element 194 has parallel slots 195 to permit the air to be exhausted past the valve element when the valve is retracted from its seat. The valve element 194 is secured to the end of a piston rod 196 by a retaining pin 197. The piston rod 196 extends from an air-operated valve unit 198 secured in a large diameter recess 199 on the beveled face 163 by its flange 198' and fastening screws 200. There are three air-operated valve units, all similar, and a detailed description of one will be later made.

Operable in the feed chamber 185 is a container valve opening pin 202 of slightly less diameter and partially filling the chamber. This pin 202 when thrust forward passes through the nipple opening 171' and unseats the valve element 178 in the container C so that the container may be vacuumized. The pin 202 is operated simultaneously with the opening of the vacuum valve element 194. The pin 202 has a stop collar 202' that slides along the wall of the feed chamber and enters the nipple opening 171' when opening the container valve 178.

Fixed to the outer end of the operating pin 202 is a large diameter air-operated piston 203 that is movable in a large cylindrical opening 204 in the rear of the casting 161 and covered by closure plate 205 secured by fastening screws 206 in a recess 207 in the rear face 166 of the filling head casting 161. A sealing ring 208 prevents air leakage from the cylindrical opening 204. The pin 202 is slidable through a packing nut 209 that is threaded into the casting 161 and retains packing rings 210 adjacent the rear end of the feed chamber 185. The piston 203 is secured to the pin 202 by locking collars 211 and 212.

The piston 203 is moved forward by compressed air fed from a pipe line against action of compression spring 213 until piston engages stop ring 214 in forward end of the cylindrical opening 204. This piston has a sealing ring 215 in an external annular groove 216. The small feed chamber 185 is thus hermetically sealed from the cylindrical opening 204 and the atmosphere.

Movable within the cylindrical product supply opening 187 is a valve element 218 of an air-operated valve unit 219, Fig. 5. This valve unit 219 has a casing 220 with a flange 221 that fits into a recess 222 on the beveled face 164 of the casting 161 and is secured therein by fastening screws 223. A sealing ring 224 is provided in the recess 222 for engagement by the inner face of the casing 220 so as to prevent leakage of product between the recess and the casing. The valve element 218 is secured to a piston rod 225 by a pin 225' and the piston rod is slidable through the forward part of the casing 220. In order to prevent leakage of the product along the piston rod, and into the casing 220, it is surrounded with an expansible bellows 226 that is secured at one end to a flange 227 on the piston rod and at the other end to the flange 228 on the casing.

The rear of the casing 220 is closed by a closure plate 229 and fastening screws 230. The closure plate 229 has a central opening 231 and a cylindrical forwardly extending sleeve portion 232 into which a compression spring 233 extends. A large diameter piston 234 is secured upon the piston rod 225 and against a shoulder 235 by a nut 236 on a threaded portion 237 of the piston rod and spacing sleeves 238 and 239. The spring 233 reacts against the piston to normally retain the valve 218 in its closed position within the tapered end of the opening 187. The spacing sleeve 239 is adjacent the nut 236 and can be removed when a greater amount of opening movement of the valve 218 is desired as when the machine is used for filling large size containers. The piston 234 has an annular groove 240 in which is a piston ring 241 to prevent the leakage of air rearwardly past the piston.

Further sealing about the piston rod is provided by a sealing ring 242 that is held in a recess within the casing 220 by a retaining ring 243 and screws 244. This sealing ring 242 prevents the leakage of air along the piston rod while the bellows serve to prevent the passage of the product along the piston rod. The vacuum unit 198 above generally mentioned is constructed in this manner except for the bellows.

Within the propellant opening or chamber 189 is a tapered valve element 245 that is connected to a propellant air-operated valve unit 246, Fig. 4. The valve element 245 has slots 245' for the flow of propellant past the valve when it is opened. This unit has a flange 247 that is fitted into a recess 248 in the bevelled face 165 of the casting 161 and is retained therein by fastening screws 249. This unit 246 is constructed and operated the same as the product unit 219. It has a bellows 250 to prevent the leakage of the expensive propellant along its piston rod to its casing.

Referring now particularly to Figs. 1, 6, 7, 8 and 9, a description will be made of the devices for handling the container. On the front of the machine adjacent the front face of the filling head H and extending from one side thereof is an upper inclined chute 252 having at its lower end a vertical stop 253 and a depending or vertical end portion 254 for delivering the containers C to a station in axial alignment with the filling nipple 171 in the center of the filling head H. This inclined chute 252 is supported on vertical members 256 and 257 extended upwardly from a vertical plate support 258 that is fixed to the top plate 30 of the bottom frame structure 21. A lower inclined chute 260 extends from beneath the filling nipple 171 and is supported on vertical members 261, 262 and 263 extended upwardly from the top plate 30 of the bottom frame structure 21. The containers C will be discharged from the lower end of the lower chute which extends to the opposite side of the machine.

A container loading device 265 is horizontally aligned with the vertical end portion 254 of the upper chute 252. This loading device 265 includes a double-acting air cylinder 266 that is secured by its end heads 267 and 268 to the vertical plate support 258. Laterally spaced guide supports 269 and 270 mounted on the plate support 258

slidably carry opposing rack bars 272 and 273 with which reverse idler gear 274 meshes. The idler gear 274 is journaled on a pin 275 projected from the plate support 258. The lower rack bar 272 is worked by piston rod 276 of the cylinder device 266. The upper rack 273 is thus moved in a reverse direction to the movement of the lower rack bar 272, as the cylinder 266 is operated. The lower rack bar 272 has a transverse portion 277 with spaced fingers 278 projecting therefrom. The fingers are projected into the vertical end portion 254 as the lower rack bar 272 is moved toward the portion 254 and supports a full column of containers. The upper rack bar 273 has a transverse portion 280 with spaced fingers 281 thereon which are retracted as the lower fingers 278 are moved into the portion 254. Upon reverse movement of the lower rack bar 272 the lower fingers 278 are retracted and the upper fingers 281 are projected into vertical end portion 254 to hold the column of containers while the lowermost container is dropped onto a supporting cradle 282 in axial alignment with filling nipple 171.

When the container is on the supporting cradle 282 and ready to be filled, a clamping cylinder device 284 is actuated to move the clamping plate 183 against the bottom end of the container C so as to tightly hold the conical seat 175 on the cover of the container in sealing engagement with the tapered end of the plastic nipple 171 and ready the container for the vacuumizing and filling operations.

The clamping cylinder device 284 is supported upon an upstanding shelf structure 285 on the forward portion 30' of the bottom frame structure 21 and extends normal to the front face of the filling head. End heads 286 and 287 of the cylinder device 284 are secured to the shelf 285 by fastening screws 288. When the container C has been filled, the clamping cylinder device 284 releases the clamping plate 183 and the container C is made free of the nipple 171.

With the container free upon the supporting cradle 282, it can then be picked or discharged into the lower chute 260 by the cradle itself, Figs. 8 and 9. This cradle is pivotally connected to a pin 289 projecting outwardly from the vertical plate support 258. The cradle has a raised back portion 291 that kicks the filled container C toward the chute 260 as the cradle is pivoted downwardly, as illustrated in dotted lines in Fig. 9. A discharge cylinder device 292 is connected by its end heads 293 and 294 to the vertical plate support 258 below the reversing rack bars. This cylinder device 292 has a piston rod 295 that is coupled by a clevis 296 to lower end of an operating arm 297 depending from the supporting cradle 282. When the piston rod 295 is at the end of its stroke, the supporting cradle 282 is held in its normal position to support the container C, Fig. 8. Upon the piston rod 295 being retracted to the dotted line position shown in Fig. 9, the cradle is lowered and the container is discharged to the chute 260.

The air distributing system for the different magnetically-operated valves for controlling the container handling cylinder devices and the filling head valves will now be described. The first air cylinder device to be operated is the reverse rack bar loading cylinder device 265. On the lower shelf 40 there is mounted a magnetically-operated two-way valve 301, Figs. 1, 2 and 10. Air under pressure is delivered to this valve 301 by an air pipe line 302 which extends from an air pressure regulating valve 303 on the upstanding air supply pipe 101. A pressure gauge 304 extends from the regulating valve 303 through the panel 93 to be read therefrom. From the valve 301 there extend two pipe lines 306 and 307 that respectively connect with the opposite ends of the loading air cylinder 266 of the container rack bar loading device 265.

Also mounted on the shelf 40 is another magnetically-operated two-way valve 310 serving to control the supply of air to the clamping cylinder device 284. Air is delivered to this valve 310 from the air supply pipe 101 through an air pressure regulating valve 311, to which a pressure gauge 312 is connected, and air pipe line 313 that leads to the valve 310. Two pipes 314 and 315 lead from the valve 310 to the respective opposite ends of the clamp cylinder device 284.

Still another magnetically-operated two-way valve 317 is mounted on the shelf 40 to control the operation of the discharge cylinder device 292. This valve is supplied from the air supply pipe 101, through an air regulating valve 318, to which a pressure gauge 319 is attached, and air pipe line 320. Two pipes 321 and 322 respectively lead to the respective opposite ends of the discharge cylinder device 292. The valve 317 is spring biased in one direction by a spring 323.

On the rear face of the vertical bracket support 168 is a spring-biased magnetically-operated valve 325, Fig. 2, for effecting the simultaneous operation of pin 202 that opens the container valve and the air-operated vacuum control valve unit 198. Air under pressure is delivered from the supply pipe 101, through air pressure regulating valve 326, to which a pressure gauge 327 is connected, and air pipe line 328. On the valve 325 is a T-fitting 329 from which a branch pipe 330 leads to a pin piston closure plate 205 and a branch pipe 331 leads to the air-operated vacuum valve unit 198.

Also, there is mounted on the bracket support 168 another spring-biased magnetically operated valve 333 for controlling the operation of the air operated product valve unit 219. Air under pressure is delivered through an air pressure regulating valve 334, to which a pressure gauge 335 is connected, and an air pipe line 336. An outlet pipe 337 leads from the magnetically operated valve 333 to the product valve unit 219.

Extending horizontally on the top of the vertical bracket support 168 is a spring-biased magnetically operated valve 340 for controlling the air supply to the air operated propellant unit 246. Air under pressure is delivered to this valve 340 through a pressure regulating valve 341, from which a pressure gauge 342 extends, and a pipe line 343. An outlet pipe 344 extends from the valve 340 to the propellant valve unit 246. All of the air pressure regulating valves that connect with the upstanding air pipe 101 and their gauges extend through the front panels 93 and 94 so as to be accessible and readable from the front of the machine.

To start the automatic operation of the machine after the manual heater and vacuum pump switches have been closed, main control switch M is turned on and blue lamp 349 is lighted to finally indicate the machine is ready for operation. On the cylinder head 268 of the loading cylinder 265, Fig. 6, is a limit switch LS–1 which has a push button 350 that is engaged by an adjustable screw 351 carried on an arm 352 extending laterally from the piston rod 276. This limit switch LS–1 is normally closed so that when main control switch M is turned on a solenoid A of the valve 301 is energized to operate valve 301 to cause air to flow from valve 301 through pipe line 307 to cylinder 266 whereby to have the fingers 278 extend into the chute end portion 254 and to retract fingers 281 to advance the column of containers C in chute 252 and to place the lower container in position ready to be dropped on the supporting cradle 282. With the main control switch M closed, current passes from line L1 through main switch M, Fig. 11, limit switch LS1, contacts 353 and 353' of push button cycle, start switch CS, solenoid A of magnetic valve 301 to line L2. This places and keeps the fingers 278 within the end portion 254 to support the containers C. The wires from the limit switch LS–1 pass through armored tube 354 to upper wire box 355 on the top of plate portion 30', lower wire box 356 connected to the underface of the portion 30' and armored tube 357 to solenoid A of the valve 301, Fig. 10. Electric current is supplied to the wire boxes

356 and 355 through an armored tube 358 leading downwardly from the electrical control compartment 92.

With the cycle start press button CS depressed, the circuit through contacts 353 to solenoid A of the valve 301 is opened and current then passes through jumper wire 361 to a contact 362, movable contact member 363 of the cycle start switch CS, contact 362' and through solenoid B to line L1. Solenoid A is thus de-energized and solenoid B is energized to operate the valve 301 so that air now passes through pipe line 306 to the cylinder 266 so that the piston rod 276 and the lower fingers 278 are retracted and the first container C is dropped into the cradle 282. Armored tube 365 leads from the lower wire box 356 to the solenoid B of valve 301 through which the control wires extend. The pressing of the cycle start press button thus deposits the first container upon the supporting cradle 282.

Once the container has been deposited upon the container supporting cradle 282, a single-throw, double pole limit switch LS–2 on the upper end of lower chute 260 is operated by the container C so that solenoid B of the load cylinder control valve 301 initially operated by the cycle starting button is sustained by current passing through limit switch LS–2, wire 364, contact 365, jumper wire 366, contact 362' and solenoid B to line L–2. Limit switch LS–1 will be opened as the lower rack bar 272 and the fingers 278 are retracted and adjustable screw 351 on the piston rod 276 presses button 350 of limit switch LS–1. Wire 367 delivers the current from contacts 365 and 365' to limit switch LS–3 which is normally closed and solenoid A of clamping device 284 so that automatically upon the dropping of the container C upon the supporting cradle 282 and operating limit switch LS–2, clamp plate 183 is brought into engagement with the bottom end of the container C to force its seat 175 into tight sealing engagement with the nipple 171 of the filling head H. Air is delivered upon operation of solenoid A through pipe line 314 to the outer end of the clamping device 284 so that the clamping plate 183 is extended to clamp the container C against the nipple 171.

Simultaneously, as clamping plate 183 is extended, limit switch LS–4 is closed so as to start pneumatic time delay electric relays TR–I and TR–II. The solenoids of these relays are indicated respectively at 368 and 369 and are both simultaneouusly energized as limit switch LS–4 is closed. The relay TR–I has its solenoid 368, its terminals M and M–1, shunted across the wire 367 and line L–2, while its normally open contacts 370 are put in series with solenoid 325' of the magnetically-operated vacuum control valve 325. The relay TR–II has its solenoid 369, its terminals M and M–1 and normally closed contacts 371 in series and extend with limit switch LS–4 across the wire 367 and line L–2. The relay TR–II also has normally open contacts 372 that close later than contacts 370 of relay TR–I to set off product timer 373 after the container C has been vacumed. These relays TR–I and TR–II are set for different periods so that a delay is effected between the time container C drops onto the crade 282 and the contacts 370 are closed and the time solenoid 325' of the vacuum control valve 325 operates. This is to be certain that the clamping device has been operated to clamp the container before a vacuum is applied to the container. The vacuum operation will continue over a predetermined period of time depending upon the setting of the time relay TR–II. Once the vacuum operation has been completed, contacts 371 will be opened and the contacts 372 closed so that the current will pass through contacts 372 and wire 374 to operate clutch 375 of product timer 373.

Upon the establishing of the circuit upon the line L–1 through the cradle limit switch LS–2, wire 367, motor 376 of product timer 373 and motor 377 of propellant timer 378 will have been started. The product timer motor 376 is in series with timer contacts 379 that are normally closed; thereafter closed and opened, and they are placed across the wire 367 and line L–1 along with product timer terminals L–1, B, M. and L–2. Likewise, the propellant timer 378 has its motor 377, its contacts 389, which are likewise normally closed and thereafter closed and opened along with its terminals L–1, B, M, and L–2 across the wire 367 and line L–2.

With both timers now running, the sequence of operation of the control contacts of the timers will be described. On the product timer 373 are open, closed and open contacts 382 that are connected through their terminals 4–2 with solenoid 333' of the product control valve 333. The closing of the contacts 372 of the time relay TR–II energizes the clutch 375 of the product timer to engage with a part on the operating motor 376 of the product timer to close the contacts 382 of the product control timer so that product is delivered to the filling head. Current passes from terminal T–1 on wire 374 to wire 383 to timer terminals 4–3. While the normally open contacts 382 are closed, the normally closed contacts 379 remain closed and normally open contacts 384 connected between terminals 3–1 of product control timer 333 will remain open. After a predetermined time period used for effecting the filling of the container with the product timer contacts 379 and 382 open to discontinue the operation of the product timer 373 and the contact 384 closes to establish a circuit through wire 385 with the propellant timer 378. The product timer 373 when its contact 379 opens will momentarily have its motor 376 shut off but shortly thereafter the circuit through the motor is automatically re-established. The starting and stopping of the motor 376 of the product timer makes for a better operation of the timer and a more sensitive timing period.

With the product now in the container and the circuits prepared for the operation of the propellant timer 378, current is delivered through wire 385 to terminal A, cluch coil 386, terminal L–2 of the propellant timer whereby the clutch will engage with a movable part of its motor 377 so that contacts 380, 388 and 389 are operated. The contacts 380 continue to be closed upon the energization of the clutch 386 while the contacts 388 remain open on the first operation of the clutch. When the timed out period occurs, the contacts 389 will close so that current from wire 390, contact terminals 4–2 and solenoid 340' of the propellant control valve 340 so that propellant is delivered to the container under pressure. When the period has been completed on the propellant timer 378 contacts 380 and 389 will be opened so that the propellant timer motor 380 will cease to operate and so that solenoid 340' of the propellant control valve 340 is de-energized and the flow of the propellant is discontinued.

Simultaneously upon the discontinuation of the propellant charge, contacts 388 become closed to permit current to be passed through solenoid B of the clamping cylinder control valve 310 and solenoid 317' of discharge cylinder control valve 317. The clamping plate 183 is thus released from the container C, and the container is discharged from the supporting cradle. To operate the clamping cylinder device 284, air is passed from control valve through pipe line 315 to retract the clamping plate 183.

The clamping device 284 has on its piston rod 284' a laterally extending plate 391 which carries an adjustable screw 392 that engages press button 393 of limit switch LS–3 to thereafter close limit switch LS–3 so that solenoid A of the clamping valve 310 can be again energized on the next dropping of a container on the supporting cradle. The laterally extending plate 391 has a second adjusting screw 394 that engages switch button 395 of limit switch LS–4 when the clamping plate goes forward to close the limit switch LS–4 to start the vacuum, product and propellant timers in operation.

The cradle limit switch LS–2 being a double-throw,

single-pole switch will, when the container is removed therefrom, have its contact plate 396 elevated so as to cause engagement with a contact 397, Fig. 11, from which leads a jumper wire 398 to allow current to be passed directly to contacts 353, 353' of the cycle start switch CS and solenoid A of loading cylinder control valve 301 so that the operation of the next cycle is automatically effected. Also connected with the limit switch LS-2 is solenoid 399' of a totalizer or counter 399 whereby the number of containers passing over the cradle 282 will be automatically counted.

An armored tube 400 leads from the limit switch LS-2 on the upper end of the chute 260 to the wire box 355 to accommodate wires extending to and from the limit switch LS-2, Fig. 7. From the wire box 356 an armored tube 401 extends to solenoid A of clamping cylinder control valve 310, Fig. 10, and from the limit switch LS-3 there extends an armored tube 402 to wire box 355 through which other wires extends. An armored tube 403 extends from the wire box 356 to the solenoid B of clamping cylinder control valve 310. On the rear of the machine and leading from wire box 121 there are armored tubes 405, 406 and 407 that respectively lead to the respective solenoids 325', 333' and 340' of the respective magnetic vacuum, product and propellant control valves 325, 333 and 340. An armored tube 408 extends from the wire box 121 to the solenoid 317' of the discharge cylinder control valve 317. These armored tubes accommodate the appropriate wires for completing the control circuits.

It should now be apparent that there has been provided a machine having a filling head at which pressure containers are positioned for vacuumizing, filling with product and charging with a volatile propellant without the need of expensive refrigerating equipment. The containers to be filled are guided to the head and clamped against a nipple in the center thereof and after being filled, the container is released and discharged onto another chute to be guided away from the machine.

It should be particularly apparent that by having all the operations performed at the one station, container valve structures may be used which normally would not hold a vacuum, if separated from the filling head, once the container has been vacuumized.

It should be further apparent that an automatic control of the desired pressures of vacuum, product and propellant are maintained at all times while the machine is operating so that an effective and accurate metering of the product and the propellant and proper filling of the container results, the propellant having its pressure controlled and maintained by a heater by a pressure responsive switch operated upon decrease of pressure in the propellant supply line.

It should also be apparent that the filling head has been designed to permit the filling of different size containers and such that little loss of product or propellant is had.

While various changes may be made in the detail construction and operation of the machine, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. A machine for filling and charging pressure containers having a valve end for charging and dispensing a liquid product and a volatile propellant, comprising a filling head having a main body, orifice means in said body through which the product and propellant are dispensed to a container, means for positioning a container with its valve end adjacent said orifice, said filling head body having a small feed chamber adjacent to said orifice means and a plurality of supply chambers in communication with said small feed chamber, valve means associated with each of said supply chambers for controlling the flow of fluid between each supply chamber and said small feed chamber, means for supplying the liquid product under pressure to one of said supply chambers, means for supplying the propellant under pressure to another of said supply chambers, means for successively actuating the valve means of said supply chambers, said small feed chamber being of cylindrical shape and leading to said orifice means, said supply chambers nested about and converging toward the feed chamber, said supply chambers further extending radially and at an inclined angle to the axis of said feed chamber.

2. A machine for filling and charging pressure containers having a valve end for charging acid dispensing a liquid product and a volatile propellant, comprising a filling head having a main body, orifice means in said body through which the product and propellant are dispensed to a container, means for positioning a container with its valve end adjacent said orifice, said filling head body having a small feed chamber adjacent to said orifice means and a plurality of supply chambers in communication with said small feed chamber, valve means associated with each of said supply chambers for controlling the flow of fluid between each supply chamber and said small feed chamber, means for supplying the liquid product under pressure to one of said supply chambers, means for supplying the propellant under pressure to another of said supply chambers, means for successively actuating the valve means of said supply chambers, each of said supply chambers being of cylindrical shape throughout its length but having a conical end seat lying immediately adjacent to said feed chamber and each of said valve means having a valve element slidable through the cylindrical chamber and a conical end face cooperable with said conical end seat of the supply chamber, and said valve means further including an air cylinder casing secured to the main body, a piston rod slidable through said casing and extending into said supply chamber, said valve element carried by said piston rod, said piston rod being threaded on the end of the rod opposite from the valve element and having a shoulder, a piston mounted on said rod within the casing and against the shoulder, spacing members surrounding the threaded end of the rod and engageable with the rear end of the air cylinder casing to limit the opening stroke of the valve and to control the amount of fluid permitted to pass thereby, and a securing nut fixed to the threaded end of the piston rod to affix the piston and the spacing members upon the piston rod, at least one of said spacing members being removable to alter the length of stroke of the valve element.

3. A machine for filling and charging pressure containers having a valve end for charging and dispensing a liquid product and a volatile propellant, comprising a filling head having a main body, orifice means in said body through which the product and propellant are dispensed to a container, means for positioning a container with its valve end adjacent said orifice, said filling head body having a small feed chamber adjacent to said orifice means and a plurality of supply chambers in communication with said small feed chamber, valve means associated with each of said supply chambers for controlling the flow of fluid between each supply chamber and said small feed chamber, means for supplying the liquid product under pressure to one of said supply chambers, means for supplying the propellant under pressure to another of said supply chambers, means for successively actuating the valve means of said supply chambers, said supply means for the volatile propellant including a supply line, a magnetically-operated valve in said supply line, electrical devices for controlling the valve means for the product and the propellant and a manually-operated electric switch for the machine common to the magnetically operated valve and the electrical devices whereby as switch for the machine is turned off, the supply line for the volatile propellant will be automatically closed.

4. A machine for filling and charging pressure con-

tainers having a valve end for charging and dispensing a liquid product and a volatile propellant, comprising a filling head having a main body, orifice means in said body through which the product and propellant are dispensed to a container, means for positioning a container with its valve end adjacent said orifice, said filling head body having a small feed chamber adjacent to said orifice means and a plurality of supply chambers in communication with said small feed chamber, valve means associated with each of said supply chambers for controlling the flow of fluid between each supply chamber and said small feed chamber, means for supplying the liquid product under pressure to one of said supply chambers, means for supplying the propellant under pressure to another of said supply chambers, means for successively actuating the valve means of said supply chambers, said means for positioning the container including a filling station, an inclined chute for guiding the containers to a station adjacent the orifice means, a loading device disposed along the chute for delivering containers one at a time to the station, a clamping device engageable with the container to hold it against said orifice means, a second inclined chute leading from the station and a device for discharging the filled containers from said station onto said second inclined chute.

5. A machine for filling and charging pressure containers as defined in claim 4, and said first-mentioned chute having a vertical end portion overlying the station and said loading device projecting into the vertical end portion.

6. A machine for filling and charging pressure containers as defined in claim 4, and said discharge device including a support at the station onto which the containers are fed, said support being movable to discharge the filled container into the second chute.

7. A machine for filling and charging pressure containers as defined in claim 4, and means actionable by the container being fed to the station to actuate the clamping device.

8. A machine for filling and charging pressure containers as defined in claim 4, and said clamping device for holding the container against the orifice including a clamping plate adapted to engage the end of the container, an air-operated cylinder for moving the clamping plate into and out of contact with the end of the container, an air valve for alternately supplying air to the opposite ends of the cylinder, and electrical elements associated with said air valve and actionable by a container being fed to the filling station to move the air valve to cause the clamping plate to be moved into contact with the container and said supply means for the propellant having time control devices, and said supply time control devices serving to actuate said valve of the air cylinder in the opposite direction to actuate the cylinder and to move the clamping plate out of contact with the container and release it from the orifice.

9. A machine for filling and charging pressure containers having a valve end for charging and dispensing a liquid product and a volatile propellant, comprising a filling head having a main body, orifice means in said body through which the product and propellant are dispensed to a container, means for positioning a container with its valve end adjacent said orifice, said filling head body having a small feed chamber adjacent to said orifice means and a plurality of supply chambers in communication with said small feed chamber, valve means associated with each of said supply chambers for controlling the flow of fluid between each supply chamber and said small feed chamber, means for supplying the liquid product under pressure to one of said supply chambers, means for supplying the propellant under pressure to another of said supply chambers, means for successively actuating the valve means of said supply chambers, said container positioning means adjacent to said orifice means including a loading device for delivering the containers one at a time to said orifice means, a releasable clamping device actionable to clamp the container against the orifice means and a container supporting and discharging device for receiving the container and discharging the container after it has been filled and automatic timed-controlled means for operating in sequence the loading and clamping devices to load and clamp the container, the valve means for supplying the product, the valve means for supplying the propellant, the clamping device to release the container and the device to discharge the container.

10. A machine for filling and charging pressure containers having a valve end for charging and dispensing a liquid product and a volatile propellant, comprising a filling head having a main body, orifice means in said body through which the product and propellant are dispensed to a container, means for positioning a container with its valve end adjacent said orifice, said filling head body having a small feed chamber adjacent to said orifice means and a plurality of supply chambers in communication with said small feed chamber, valve means associated with each of said supply chambers for controlling the flow of fluid between each supply chamber and said small feed chamber, means for supplying the liquid product under pressure to one of said supply chambers, means for supplying the propellant under pressure to another of said supply chambers, means for successively actuating the valve means of said supply chambers, said container positioning means including a chute for delivering containers to the orifice means and loading device having vertically spaced opposing rack bars and a reversing pinion in mesh with the rack bars, fingers on each rack bar adapted to be extended into the chute, a cylinder connected to one of said rack bars to reciprocate the same whereby the finger of the respective rack bars will be alternately extended into the chute to segregate the lowermost container from the remaining containers traversing the chute.

11. A machine for vacuumizing pressure containers with a liquid product and a volatile propellant, said container having a valve through which the liquid product and volatile propellant may be charged and from which the mixture of product and propellant may be dispensed, said machine comprising a filling head having orifice means against which the container is positioned with the valve adjacent the orifice means, said filling head including a small feed chamber in communication with said orifice means and a plurality of supply chambers in communication with said small feed chamber, each of said supply chambers extending radially from the small feed chamber, valve means in each of said supply chambers adjacent to the small feed chamber for controlling the flow of fluid from the supply chamber to the small feed chamber, means for positioning a container at a common filling station adjacent to the orifice means preparatory to the filling of the same, means extendible through the orifice means for opening the valve in the pressure container, means for supplying a vacuum to one of said supply chambers, means for supplying liquid product under pressure to another of said supply chambers, means for supplying the volatile propellant to still another of said supply chambers, means for discharging the containers from its filling station after being filled, and automatic time-controlled means for operating in sequence the positioning means, the container valve opening means and the different valve means for the vacuum, product and propellant supply chambers and the discharge means in the order named, whereby the product and propellant filling operations are performed upon the container at the same station at which it was vacuumized.

12. A machine for vacuumizing pressure containers with a liquid product and a volatile propellant as defined in claim 11 and said automatic timed-controlled means including a vacuum timing element responsive to the operation of the container positioning means and operable upon the container valve opening means and the

vacuum valve means for controlling the timing of the vacuumizing operations, a product timing element responsive to the operation of the vacuum timing element and operable upon the product valve means for controlling the timing of product filling operation, and a propellant timing element responsive to the operation of the product timing element and operable upon the propellant valve means and the container discharge means for controlling the timing of the propellant filling operation and the operation of the container discharge means to discharge the container from the machine.

13. A machine for filling and charging pressure containers having valve ends for charging and dispensing a liquid product and a volatile propellant, comprising a filling head having a main body, orifice means in said main body through which the product and the propellant are charged into a container, means for positioning a container with its valve end adjacent said orifice, said positioning means including a plurality of vertical guide members adapted to align a column of containers with said orifice, a first reciprocating guide member disposable below a container adjacent said orifice and a second reciprocating guide member disposable above such a container and means for alternately reciprocating said first and second guide members, a feed chamber adjacent said orifice means, a plurality of supply chambers in communication with said feed chamber, valve means associated with each of said supply chambers for controlling the flow of fluid into said feed chamber, means for supplying liquid product under pressure to one of said supply chambers, means for supplying propellant under pressure to another of said supply chambers, and means for actuating said supply chamber valve means.

14. A machine for filling and charging pressure contiuers with a liquid product and a volatile propellant as defined in claim 13, and said orifice means comprising a nipple detachably secured to said filling head, said nipple being formed of plastic material and having a conical end face, whereby a pressure tight seal will be obtained between a container and said orifice means.

15. A machine for filling and charging pressure containers with a liquid product and a volatile propellant as defined in claim 13, wherein each of said supply chambers is of cylindrical shape throughout its length and has a conical seat adjacent said feed chamber and each of said valve means has a valve element slidable through the cylindrical chamber and a conical end face cooperable with said conical end seat of said supply chamber, and said valve means further including an air cylinder casing mounted on the main body in an air tight manner, a piston operable in the casing, a piston rod extending from the piston, through the casing and into the supply chamber and said valve element carried by said piston rod to be operated by the same, and bellows sealing means secured between the casing and the piston rod to prevent the leakage of fluid along the piston rod and between the supply chamber and the air cylinder casing.

16. A machine for filling and charging pressure containers having a valve at one end for charging and dispensing a liquid product and a volatile propellant, comprising a filling head having a main body, orifice means in said main body through which the product and the propellant are charged into a container with its valve end adjacent said orifice, said positioning means including a plurality of vertical guide members and adapted to align a column of containers with said orifice and means for presenting the lowermost of the column of containers to said orifice, a feed chamber adjacent said orifice, a plurality of supply chambers in communication with said feed chamber, valve means associated with each of said supply chambers for controlling the flow of fluid between said supply chambers and said feed chambers, means for supplying liquid product under pressure to a second supply chamber, means for supplying propellant under pressure to a third supply chamber and means for successively actuating said supply chamber valve means.

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