June 7, 1955 E. F. CHANDLER 2,710,115

AUTOMATIC CAN HANDLING AND LIQUID DISPENSING MACHINE

Filed July 13, 1949 3 Sheets-Sheet 1

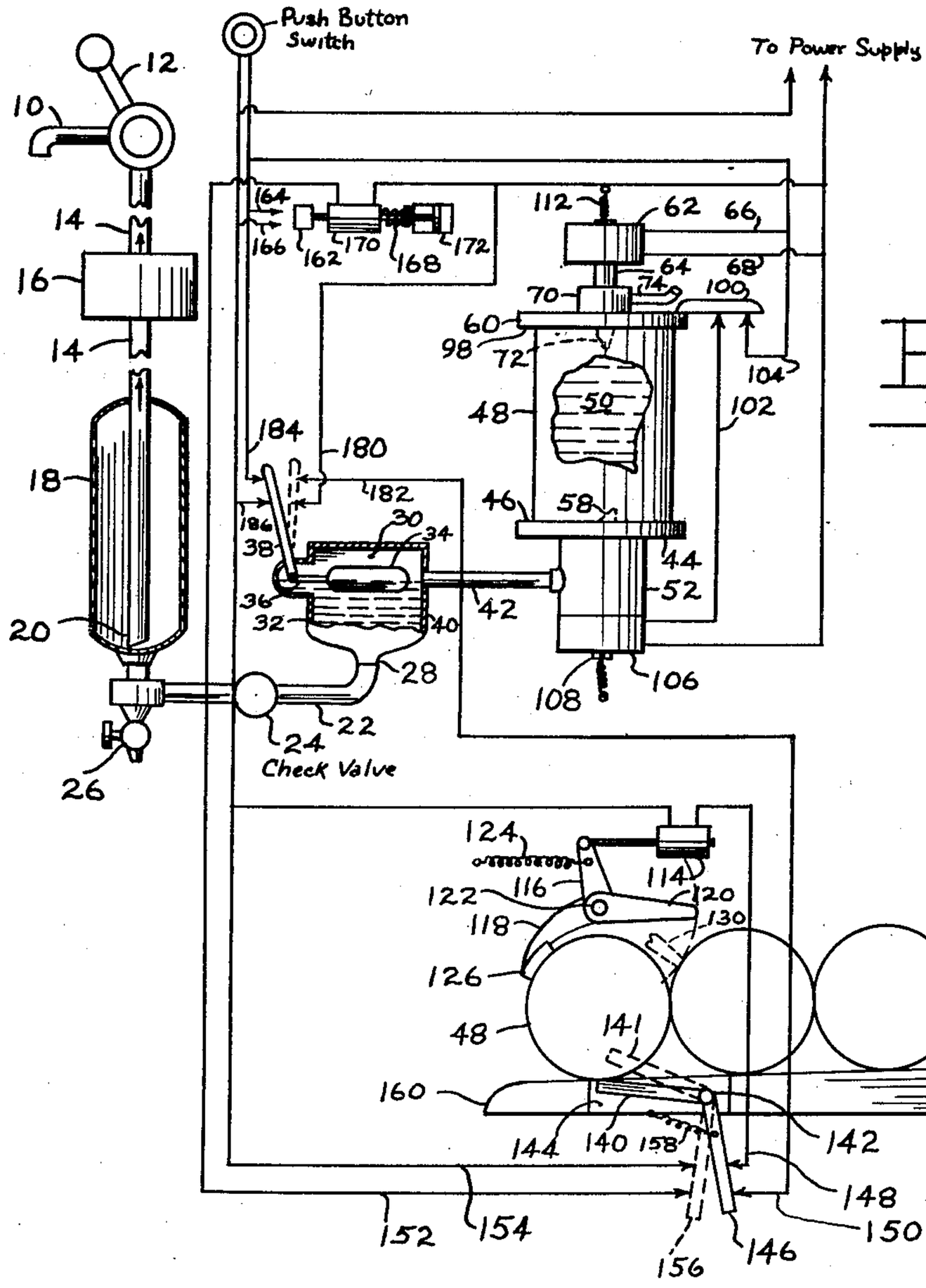

Fig. 1

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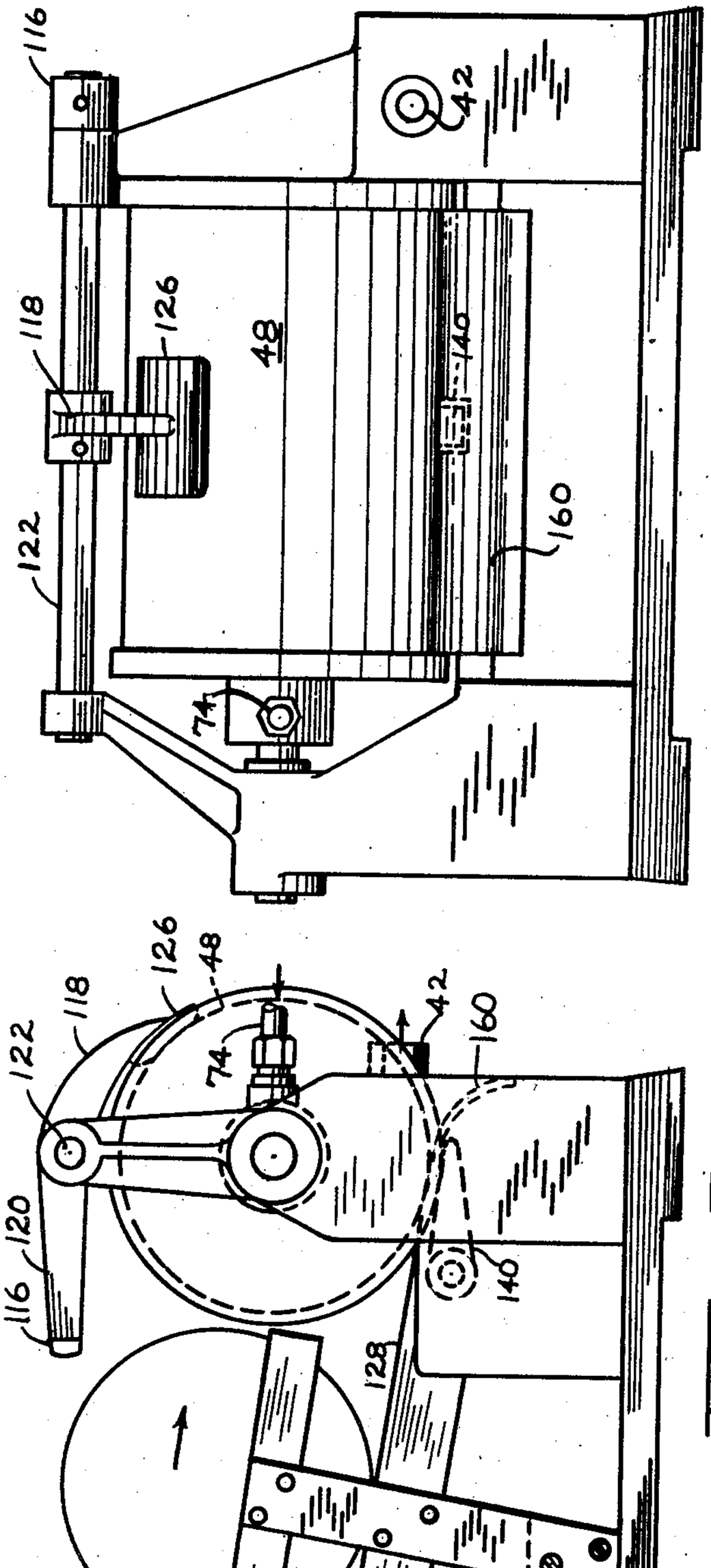

FIG. 2

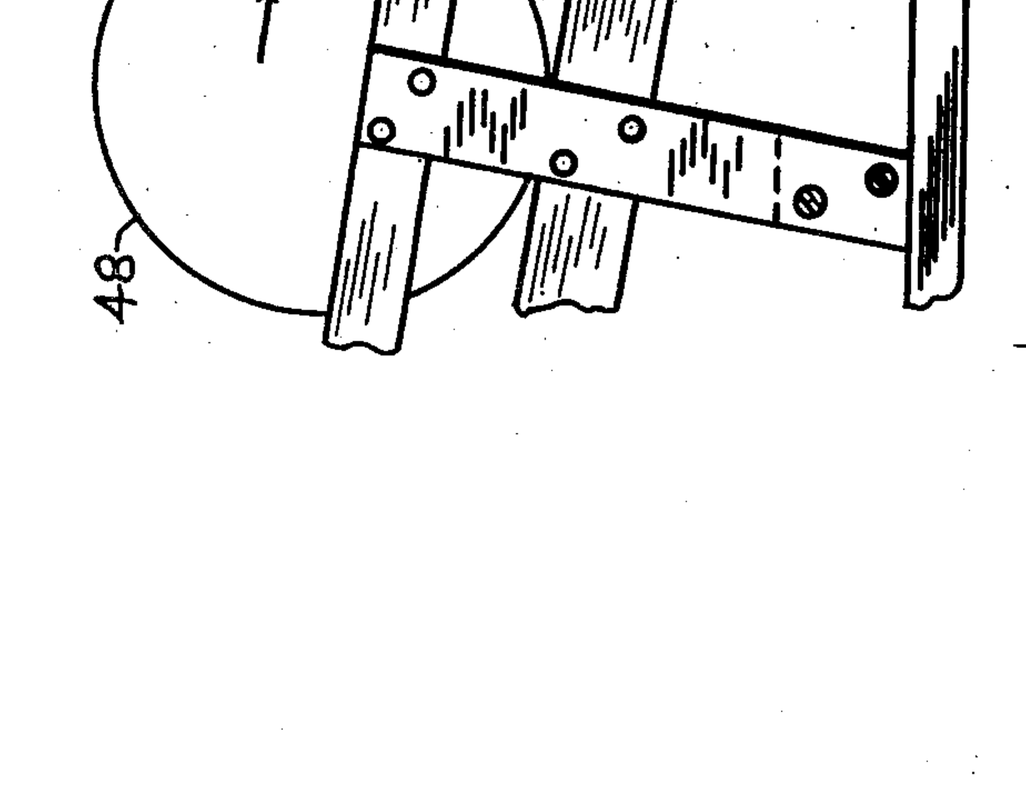

FIG. 3

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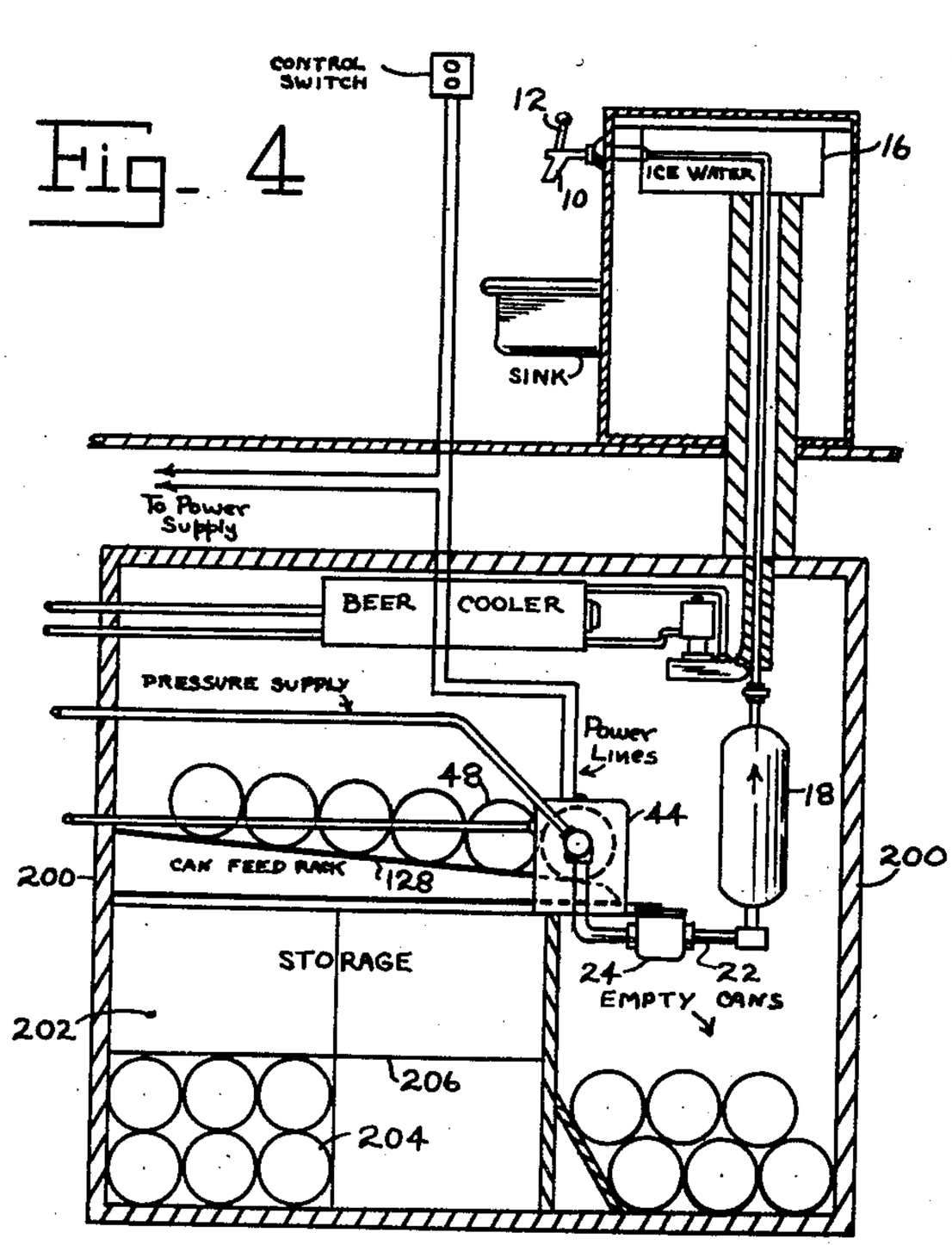
Fig. 4



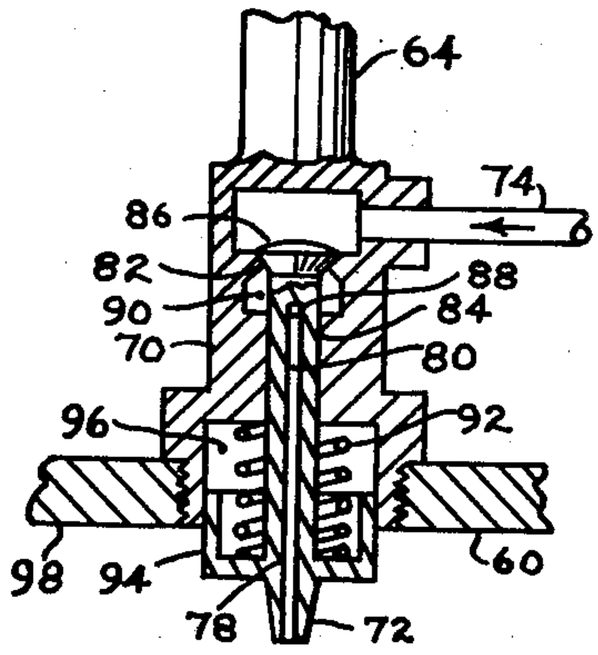


Fig. 5

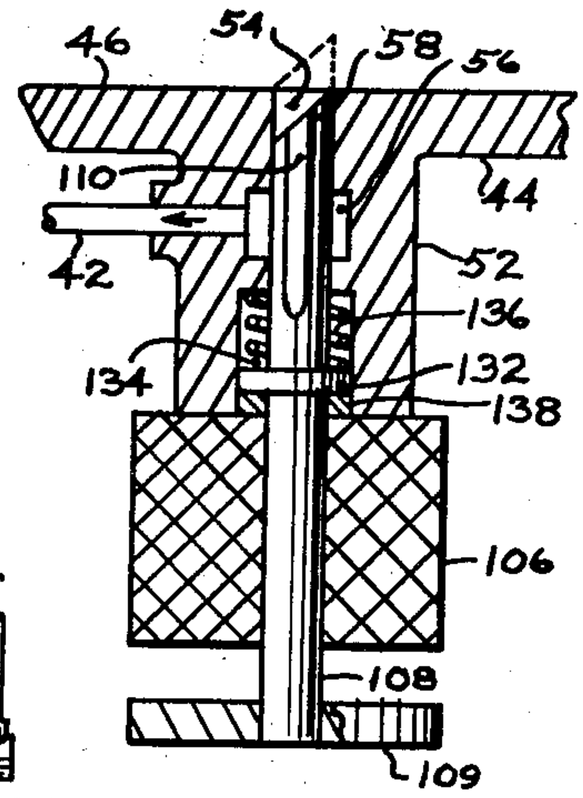


Fig. 6

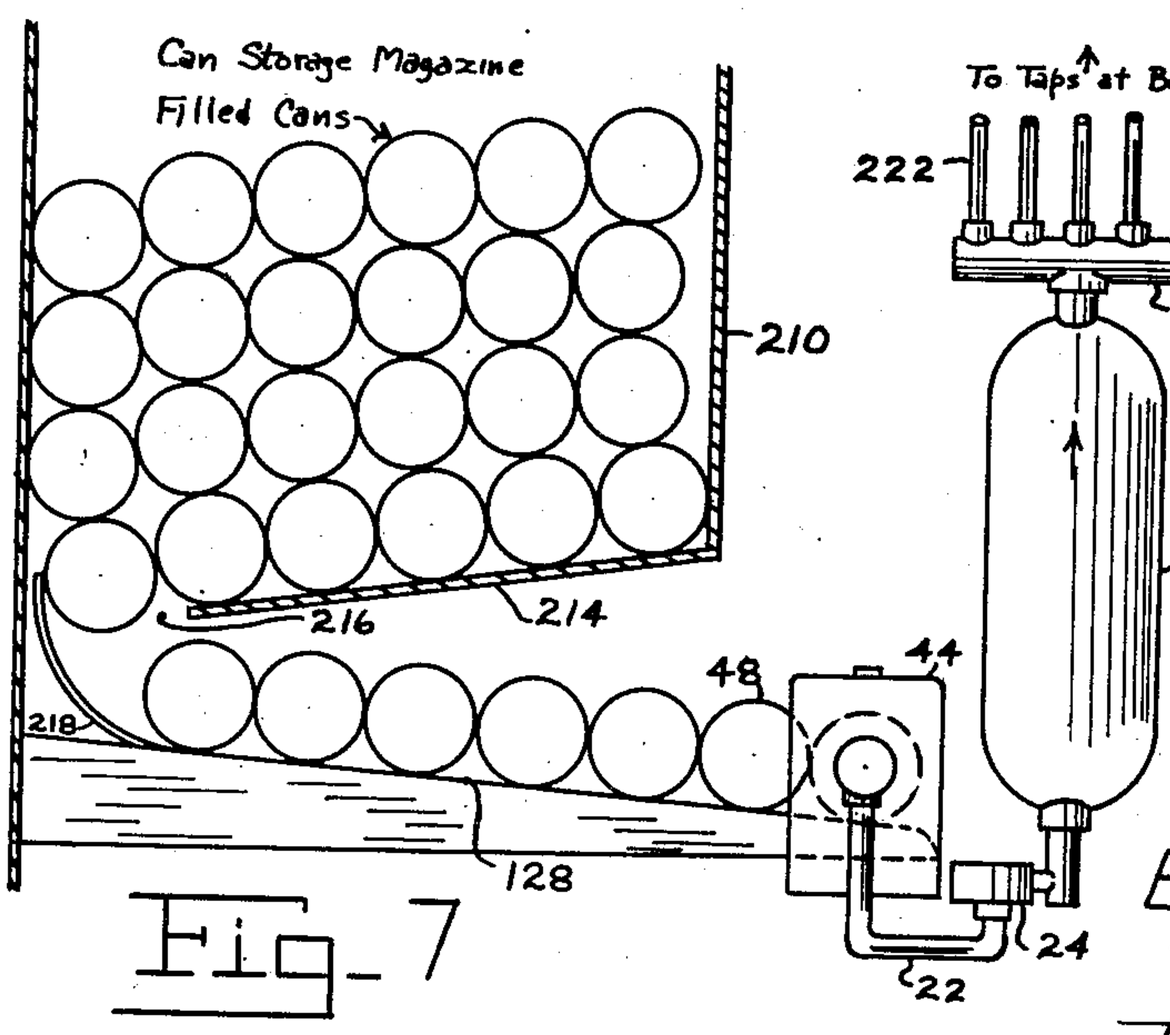


Fig. 7

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2,710,115

AUTOMATIC CAN HANDLING AND LIQUID DISPENSING MACHINE

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Application July 13, 1949, Serial No. 104,552

6 Claims. (Cl. 222—61)

This invention relates to devices for automatically handling canned liquid products including beer, ale, soft drinks, syrups, juices, and the like, and for dispensing the contents of cans containing such liquids.

An object of the invention is to provide an improved machine adapted to receive in a magazine a quantity of cans of liquid products, with means for automatically dispensing the contents of the cans from one or more cans at a time, for use as required.

Another object of the invention is to provide an improved canned liquid handling and dispensing machine which is adapted to handle both cans containing pressurized liquids, and cans containing non-pressurized liquids, with like efficiency.

A further object of the invention is to provide an improved canned liquid handling and dispensing machine of the type described, in which a plurality of cans of liquid are stored in a hopper or magazine, and fed, one by one, or in any desired plurality, into operative position, whereupon conduit means is connected with the interior of such cans for drawing off the contents into dispensing means, which may be a faucet, beer tap, or other convenient outlet depending upon the nature of the liquid being dispensed, and in which suitable cooling and pressurizing means may be interposed to facilitate the dispensing and consumption of the liquid product.

Still another object of the invention is to provide an improved machine of the type described, in which, once the hopper or magazine is filled with cans of liquid, the feeding of such cans to the operative position, drawing off of their liquid contents, and ejection of empty cans, is accomplished wholly automatically, and without the need for use of any manual intervention by an operator.

Another object of the invention is to provide an improved canned liquid handling and dispensing machine which is simple in design, inexpensive to manufacture, effective for the purpose intended, and highly sanitary in use.

Other objects and advantages of the invention will become apparent from the following description of a preferred embodiment of the invention as illustrated in the accompanying drawings, and in which,

Figure 1 is a partly schematic and partly diagrammatic illustration of the parts of my improved canned liquid handling and dispensing machine, showing the circuit diagram of the interconnection of its parts, and illustrating in the lower portion in elevation means for automatically feeding the cans into operative position.

Figure 2 is an elevational detail view of a form of can feed track assembly and can positioning means for emptying the can of liquid, with one can in operative position,

Figure 3 is a left side elevational view of the device shown in Figure 2,

Figure 4 is a sectional elevational view showing a complete beer dispensing installation according to the invention,

Figure 5 is an enlarged sectional plan view of a portion of the device, showing in fragment one face of the can positioning device with means for pressurizing the can,

Figure 6 is an enlarged sectional plan view of another portion of the device, adapted to coact with that of Figure 5 with the can therebetween, and showing in fragment the other face of the can positioning device with means for puncturing and drawing liquid from the can,

Figure 7 is a fragmentary elevational view of a portion of the system according to the invention, showing automatic gravity feed of cans from a storage magazine, and also arrangement for feeding a plurality of beer taps or other liquid using means.

The present invention deals with the problems in automatically handling canned, liquid food products such as beer, ale, carbonated soft drinks, fruit syrups, juices, and other well known foods in liquid form. Such foods are placed on the market in closed metal containers, tightly sealed at all seams, and generally known as cans, and it is necessary for means to be provided to draw off the contents of the cans quickly, conveniently and easily, with a minimum of manual labor. Some of these canned products may be pressurized when canned, as for example, beer or ale, and carbonated soft drinks or pasteurized food products.

Broadly, the invention provides a machine which embraces means for holding a plurality of cans of a given size and automatically feeding them, one at a time, or in some predetermined grouping, to one or more operative devices which puncture or open the can so that its contents may be drawn off or otherwise dispensed. When the can is empty, it is automatically ejected from the machine and another can takes its place, the operation being such that the replacement of an empty can by a full can does not interrupt the availability of the supply of liquid at the dispensing point.

For the purpose of this disclosure, that is, for simplicity of illustration only, the machine is shown and described as handling one can at a time, but it should be understood that, if desired, and without departing from the spirit of the invention, two or more cans may be simultaneously handled in substantially the same manner as one can. It is possible, when handling pressurized canned liquid products, to utilize the pressure thus afforded for supplying the liquid under pressure to the dispensing means. However, it is also understood that means are also provided whereby fluid pressure, from an outside source, may be applied to the system for the same purpose.

Usually the machine would be connected with a suitable dispensing means such as a tap or cock whereby the liquid may be drawn from a can as and when wanted, and in desired or measured quantities. Such an arrangement is illustrated in Figures 1 and 4. Between the tap and the machine, the liquid in its passage, may be cooled, heated or otherwise treated, depending upon the nature of the product being handled.

Liquid food products have been mentioned, but it should be understood that liquid products, other than foods, that are adapted to be canned, may be handled, where it is desired to draw off the liquid in various quantities, from time to time or continuously, as the case may be, and where it may be desired or required that a relatively large quantity of a liquid be available on draft continuously and without interruption of flow of liquid irrespective of the possible, relatively limited liquid content of the can unit being employed. Where pressurization from an external source, that is, external to the can, is employed, such may be for either augmenting that of the pressurized product in the can, or for di-

rectly pressurizing the system to insure the delivery from the canned product supply, of the total contents of the same.

In order to understand clearly the nature of the invention, and the best means for carrying it out, reference may now be had to the drawings, in which like numerals denote similar parts throughout the several views.

As seen best in Figure 1, there is a suitable tap or faucet **10** with an actuating handle **12**, which may be used to control the flow of liquid from the system. Liquid is led to the tap **10** through a supply pipe **14**, in which may be situated means **16**, which may be a cooling means or means for otherwise conditioning the liquid on its way to the tap **10**. The lower end of the pipe **14** extends inside the accumulator tank **18** with its inlet end **20** near the bottom of the tank.

Liquid is supplied to the lower part of the tank through pipe **22**, and, being supplied under pressure, the liquid will rise in the tank against pressure accumulating above it in the upper part of the tank. A check valve **24**, in pipe **22**, prevents back-flow of the liquid product, retaining the same, under pressure in the tank.

Up to this point, it will be seen that if the tap **10** is opened, the pressure accumulated in the tank **18** will force the liquid through pipe **14** and out of the tap. A clean-out drain cock **26** in pipe **22**, permits flushing out the system. The inlet end **28** of the pipe **22** communicates with the interior well chamber **30** of the closed well housing **32**. In the chamber **30** is a suitable float **34** pivoted at **36** in the housing wall, and carrying a contact arm **38** which is thus movable pivotally with the float, which is supported upon the liquid **40** entering the float chamber from pipe **42**.

A can supporting plate **44**, seen in sectional detail in Figure 6, and preferably stationary, is disposed as shown in Figure 1, and may have a resilient sheet facing on its surface **46** adapted to form a liquid-tight seal for a can end of a can **48** having liquid contents **50** which are to be emptied therefrom, when the can is pressed tightly thereagainst. The plate **44** may have a boss **52** in which is formed a liquid channel **54** communicating with the pipe **42**, the duct **54** being enlarged at **56** to form an annular groove adjacent and opening upon the inlet of pipe **42**.

Associated therewith is a suitable can-end perforator **58**. A can **48** is shown in operable position in the machine, in Figure 1. It is held tightly in place between the plate **44**, and the movable member **60**, which, as is also shown in Figure 5, may be moved into can holding position by any suitable means, such as by the solenoid **62**, the plunger **64** of which carries the plate **60**, and which is actuated by current through leads **66** and **68**. Member **60** may be provided with a boss **70** or hub, having a channel therethrough which terminates in a pointed can perforator **72**, which is forced through the can head and by means of which fluid pressure from pipe **74**, may be supplied to the interior of the can **48**, to force the liquid out of the same through pipe **42**.

Preferably, fluid pressure carried by pipe **74** is restrained from flowing until can **48** is securely clamped between the members **44** and **60**. This may be accomplished, as shown best in Figure 5, in sectional detail. There, the perforator **72** is mounted on a valve plunger **78** having an axial bore **80** closed at its upper end which forms a valve seated at **82** in the upper end of the duct bore **84**, the valve head being shown at **86**. The bore **80** communicates at its upper end through a radial bore **88**, with the annularly enlarged portion **90** of the hub bore **84**. The valve **86** is biased into seating position, blocking flow of pressurizing fluid, by valve spring **92** which bears against the inner floor surface of the guide cup **94**, movable in the enlarged circular recess **96**.

From Figure 5, it is seen clearly that the valve **86** is normally closed, blocking flow of pressurizing fluid out of the perforating tip **72** of the device. However, when

a can is placed against the surface **98** of the member **60**, the perforator **72** is pressed upwardly as seen in Figure 5, as it perforates the can, simultaneously unseating the valve **86** and allowing pressurizing fluid to enter the can from pipe **74**, so that flow from pipe **74** does not commence until completion of the can clamping action described. Carried by the movable member **60** is suitable contact blade means **100**, whereby, when in the position shown a circuit is closed through wires **102** and **104**, thus energizing the solenoid **106**, as seen in Figures 1 and 6, moving the solenoid plunger **108** carrying the perforator **58**, driving the perforator **58** through the can head, opening the supply of liquid from the can **48** to the duct **42** through the slot **110** of the perforator.

When solenoid **62** is de-energized, member **60** is retracted by suitable spring means **112**, so as to leave clear space for entrance of a new filled can **48** into operative position. The solenoid **114** controls member **116** which with its arms **118** and **120** is pivoted at **122**, and is biased in the solid line position of Figure 1 by spring **124**. The foot **126** of the lever thus is in the path of a can **48** when the solenoid is de-energized, retaining the can in operative position on the inclined plane **128**. When the solenoid is de-energized, the arm **120** is upraised, but, when the solenoid **114** is energized, then the arm **120** is lowered into position **130**, dotted in Figure 1, to block movement of the next can into operative position, while its foot **126** is upraised to allow the emptied can **48** to roll off the guide chute **128**. Thus, when the foot **126** is in lowered, can blocking position, it allows the clamping members **44** and **60** to clamp the can therebetween and hold it until emptied.

As seen in Figure 6, the solenoid plunger **58** carries a collar **132** movable therewith in the enlarged bore portion **134**, being biased downwardly as seen in the view by the encircling spring **136** against the stop member **138** mounted in the hub **52**. In this position, the inclined cutting edge of the plunger **58** is wholly inside the opening **54**. Upon actuation of the solenoid **106**, it is clear that the plunger **58** moves upwards as seen in the view, that is to say, in a horizontal direction as seen in Figure 1, to its extended dotted line position shown in Figure 6, so as to perforate the can **48**, allowing its contents to enter the pipe **42**. The stop collar **109**, carried on the lower end of the plunger **108** for movement therewith, serves to limit the upward motion of the perforating plunger.

Referring to Figure 1, it is seen that there is a can retaining lever **140** pivoted at **142** in a slot **144** in the inclined plane member **128**, and carrying a switch blade or switch actuating member **146** adapted to travel between its dotted and full line positions to either close the circuit between leads **148** and **150**, or between leads **152** and **154**. While a can **48** is in operative position, that is, between the clamping members **44** and **60**, the can holds down the arm **140**, so as to close the circuit between leads **148** and **150**. When the empty can moves out of the operative position, member **146** is moved to position **156**, closing the circuit between leads **152** and **154**, under the influence of the tension spring **158**, and the arm **140** moves to position **141**, in the path of the next can, which is ready to roll down the inclined runway **128**.

It will be understood that, should it be preferred to set the cans on end, and feed them in that manner, instead of permitting them to roll into place, mechanical feeding means for the cans would be required, and this manner of feeding may be adopted if desired, without departing from the spirit of the inventive idea. In the mechanism as shown, the empty can is permitted, when released, to roll off the sloping ramp **160**, by gravity.

When the new can comes into place against the stop foot **126**, as seen in Figure 1, the circuit at **156** is opened since the can causes the lever to move to solid line position, and switch blade **162**, which was in process of closing, moves into closed position, closing the circuit be-

tween leads **164** and **166**, its blade being carried by solenoid plunger **168** and movable upon actuation of solenoid **170**. The motion of the blade is regulated by the dash pot **172**.

At this point, the solenoids **62** and **106** are again energized, thus putting the new can on stream, and as the liquid begins to flow from the can into the well **30**, the float **34** is raised, breaking the circuit between leads **180** and **182**, preparatory to returning the switch blade **38** to its full line position for closing the circuit between leads **184** and **186**. The solenoid switch coil **170** is thereby de-energized to gradually open the circuit between contacts **164** and **166** at or about the time the circuit is closed at contacts **184** and **186** by the float switch associated with the well **30** which is becoming filled with the liquid **40** from the can.

The status of the machine now, upon the closing of the circuit between contacts **184** and **186**, and the opening of the circuit between contacts **164** and **166**, is shown again in Figure 1. The cycle is ready to be repeated automatically until all of the liquid has been dispensed from the last can in the magazine.

By preferably providing for the storage of a supply of pressurized liquid in tank **18**, there is no interruption of liquid supply at the tap **10** while an empty can is being replaced by a filled can. Also, by means of the two-way, delay action or timing switch **162**, time is afforded for completing the action of ejecting the emptied can and replacing it by a full can in readiness to go on stream before a substantial quantity of liquid has been drawn from the accumulator tank **18**. A float controlled switch at 38 is shown as the means for starting the re-cycling of the system when the can has been emptied. Any other suitable means may be employed that will function to accomplish the desired end as described.

The absence of liquid at a point between the can at operative position and the dispensing means **10** might, for example, actuate a phototube wherein the presence or absence of the liquid modifies the effect of a beam of light, whereby the desired setting of the switch or the energization of suitable circuits is accomplished. With some liquids, a current may be passed therethrough between two electrodes, the absence of the liquid opening the circuit as and for the purpose set forth. Or, the difference in weight between the full and empty can may be employed as another means whereby the desired result may be obtained. Accordingly, it should be understood that the successful design and operation of the apparatus is not limited to the specific means shown. Although solenoid means have been illustrated for accomplishing certain functions, it is understood that other mechanical means and motor actuated mechanism may also be likewise employed.

This invention eliminates the use of the large, heavy, expensive barrels, containers, and the like, and makes for reduced cost of labor in handling and transportation of the containers. It makes possible the use of relatively small, light weight cans that are easily and conveniently handled at the dispensing point. It also eliminates the waste of liquid products that obtains where they are shipped in large containers, barrels and the like, and is especially suitable for such products as ale and beer. Further it affords close control of the product at the dispensing point and does away with heavy trucking of kegs and barrels, their expensive upkeep, high inventory costs, labor and the like.

Means may also be employed to signal at the tap, when the last can has been reached, or the last ten cans, for example, so that the supply of cans in the magazine may be replenished. This may be a simple switch, held open by the last can, or any desired can, and then released to close a signal circuit, ringing a bell or lighting a lamp, indicating, when such can reaches the ramp, that a new supply of cans is needed.

Where liquid products are placed in cans, they may be treated where necessary, for avoiding deterioration while in the can. For some products no such treatment may be necessary, for they may not be subject to any substantial deterioration. However, food and beverages may require such treatment, and the nature thereof will be such as is well known in the canning art. Canned beverages such as beer for example, are of such nature that they may not be readily pasteurized, to avoid building up of excessive pressure in the can, and when beer is canned, as is well known in the art, a chemical known as "Inhibitor" may be employed for preservation purposes.

Figure 4 shows a sectional view of a complete installation according to the invention, for serving one or more beer taps **10** at the bar. In the basement, indicated by the sectioned walls **200**, there is a storage compartment **202** for placing a supply of filled cans **204**, which may be stacked easily with the aid of bin walls **206**. A supply of cans is placed upon the feed runway **128** as illustrated, from which they run by gravity into operative position between the can clamping members, one by one, to have their contents drawn off as the taps are turned on at the bar. When the can is empty, the can clamping members release it, and it rolls off the runway and drops into the bin at the lower right of the view, marked "empty cans," from which they may be removed at intervals. A convenient control switch is shown at the bar in the upper part of the view, where it can be actuated by the bartender as needed, to initiate the cycle already described as in Figure 1.

Figure 7 illustrates an improved form of device whereby a can storage magazine **210** is disposed above the runway **128** and has walls as illustrated to contain a quantity of filled cans to be fed to the runway as needed. The floor **214** of the can storage magazine is inclined from the horizontal, and has an opening as at **216**, through which the cans drop one by one out of the can storage magazine and onto the runway **128**, being guided by the curved guide wall **218**. From there they are emptied one by one as they come between the can gripping clamps at **44**, and the liquid is drawn off through pipe **22**, and through check valve **24**, into the tank **18**, already explained in Figure 1, from which the liquid enters the header **220** and flows through one or more pipes **222** which correspond to pipe **14** of Figure 1 and lead to one or more taps at the bar. Thus Figure 7 also shows how a number of beer taps at the bar may be served from one beer can emptying machine, through a number of feed pipes **222**, each leading to one of the beer taps, and fed by the common accumulator tank **18**.

I claim:

1. A device comprising can gripping means, means for conducting cans of liquid to said can gripping means, automatic means for actuating said can gripping means to grip said cans upon arriving thereat, liquid dispensing means, liquid conduit means connected at one end with said liquid dispensing means, can puncturing means near said can gripping means and constructed and arranged, upon actuation of said can gripping means for puncturing the said cans of liquid, said liquid conduit means communicating with said can puncturing means for conducting liquid therefrom to said liquid dispensing means.

2. A device comprising can storage means for receiving a plurality of liquid filled cans, inclined runway means adapted to receive said cans from said can storage means and to conduct them to an operative position, can gripping means at said operative position and adapted to grip said cans upon arriving at said operative position, can puncturing means cooperating with said can gripping means and brought into action upon actuation of said can gripping means to puncture said cans at said operative position to afford access to the liquid therewithin, liquid dispensing means, liquid conduit means connected between said liquid dispensing means and said can puncturing means and adapted to conduct said liquid to said liquid

dispensing means, and means for regulating the flow of liquid to said liquid dispensing means.

3. A device comprising a frame, a first can gripping clamp member at an operative position, a second can gripping clamp member spaced from said first can gripping clamp member and adapted for clamping motion toward the same, means for storing a quantity of liquid filled cans, means for conducting said cans from said storing means to said operative position between said can gripping clamp members, automatic means brought into action upon arrival of a can at said operative position for actuating said clamp members to grip said can therebetween, can puncturing means carried by at least one of said can gripping clamp members, means for actuating said can puncturing means to afford access to the liquid in said can, liquid dispensing means, and fluid conduit means connected between said can puncturing means and said liquid dispensing means for conducting said liquid thereto, whereby, upon actuating said liquid dispensing means, fluid from said can may be dispensed therefrom.

4. A device according to claim 3, characterized further in that said can puncturing means comprises a plunger, can cutting means carried by said plunger and adapted for movement between extended and retracted positions into and out of said can wall respectively, with a passageway communicating between that portion of said can cutting means adapted for entry into said can and between said liquid conduit means, whereby, upon entry of said can cutting means into said can, the liquid therein is free to flow into said liquid conduit means.

5. A device comprising a frame, a first can gripping clamp member at an operative position, a second can gripping clamp member spaced from said first can gripping clamp member and adapted for clamping motion toward the same, means for storing a quantity of liquid filled cans, means for conducting said cans from said storing means to said operative position between said can gripping clamp members, automatic means brought into action upon arrival of a can at said operative position for actuating said clamp members to grip said can therebetween, can puncturing means carried by at least one of said can gripping clamp members, means for actuating said can puncturing means to afford access to the liquid in said can, liquid dispensing means, fluid conduit means connected between said can puncturing means and said liquid dispensing means for conducting said liquid thereto, whereby, upon actuating said liquid dispensing means, fluid from said can may be dispensed therefrom, second can puncturing means carried by at least one of said can gripping clamp members and having a pressurizing duct extending therethrough, a portion of said pressurizing duct being connectable to a source of fluid under pressure, whereby the fluid in said can may be pressurized to enhance the exit flow thereof through said liquid conduit means.

6. A device comprising a frame, a first can gripping clamp member at an operative position, a second can gripping clamp member spaced from said first can gripping clamp member and adapted for clamping motion toward the same, means for storing a quantity of liquid filled cans, means for conducting said cans from said storing means to said operative position between said can gripping clamp members, automatic means brought into action upon arrival of a can at said operative position for actuating said clamp members to grip said can therebetween, can puncturing means carried by at least one of said can gripping clamp members, means for actuating said can puncturing means to afford access to the liquid in said can, liquid dispensing means, fluid conduit means connected between said can puncturing means and said liquid dispensing means for conducting said liquid thereto, whereby, upon actuating said liquid dispensing means, fluid from said can may be dispensed therefrom, said can puncturing means comprising a plunger, can cutting means carried by said plunger and adapted for movement between extended and retracted positions into and out of said can wall respectively, with a passageway communicating between that portion of said can cutting means adapted for entry into said can and between said liquid conduit means, whereby, upon entry of said can cutting means into said can, the liquid therein is free to flow into said liquid conduit means; and wherein the other of said can gripping clamp members is arranged to move toward said first can gripping clamp member, second can puncturing means carried by said other can gripping clamp member last mentioned and having a pressurizing duct extending therethrough, a portion of said pressurizing duct being connectable to a source of fluid under pressure, whereby the fluid in the can may be pressurized to enhance exit flow thereof.

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