July 11, 1933. R. J. GALLAGHER 1,917,364

CONTROL DEVICE FOR LIQUID DISPENSING APPARATUS

Filed Jan. 20, 1932 2 Sheets-Sheet 1

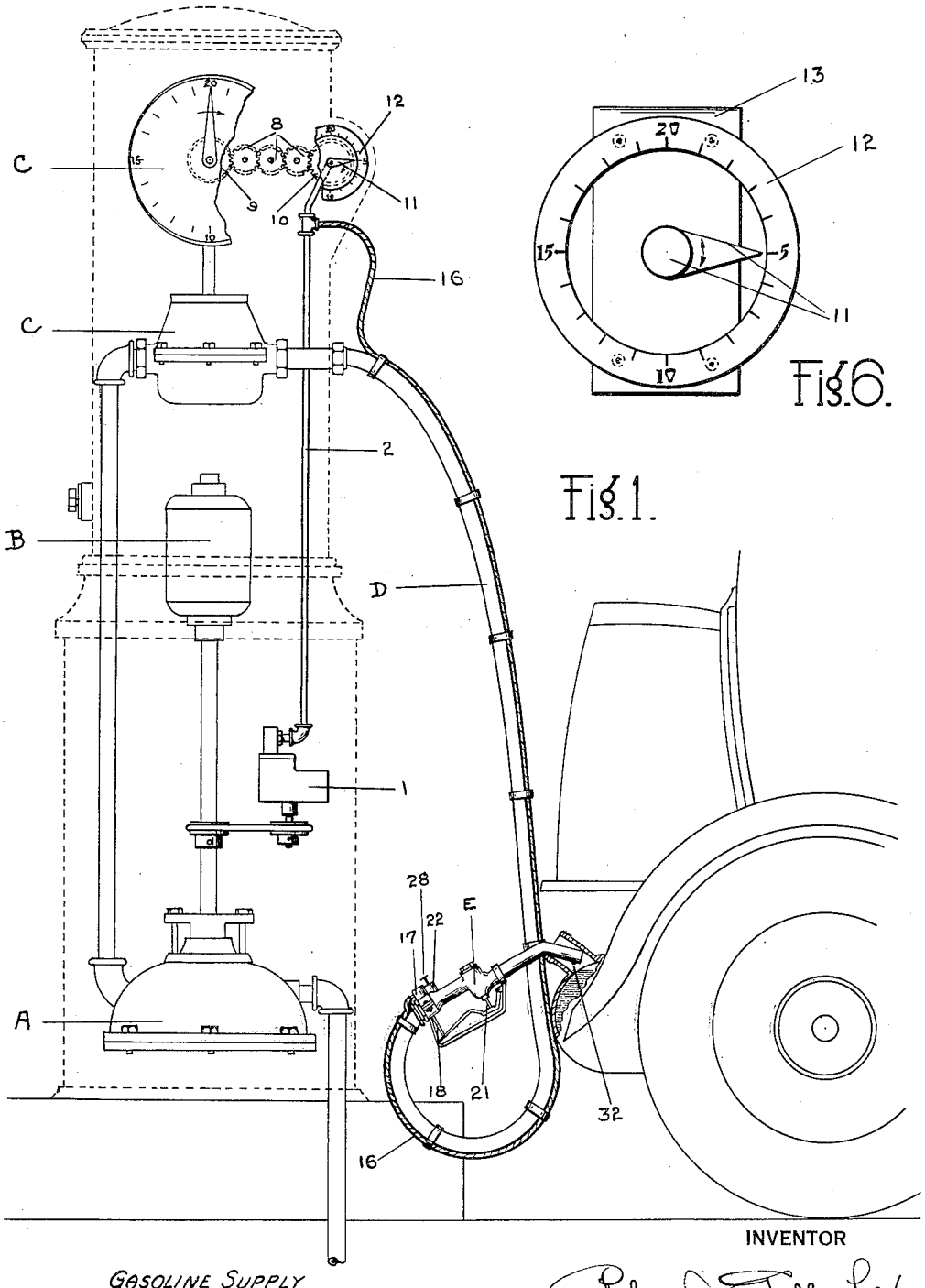


Fig. 1.

Fig. 6.

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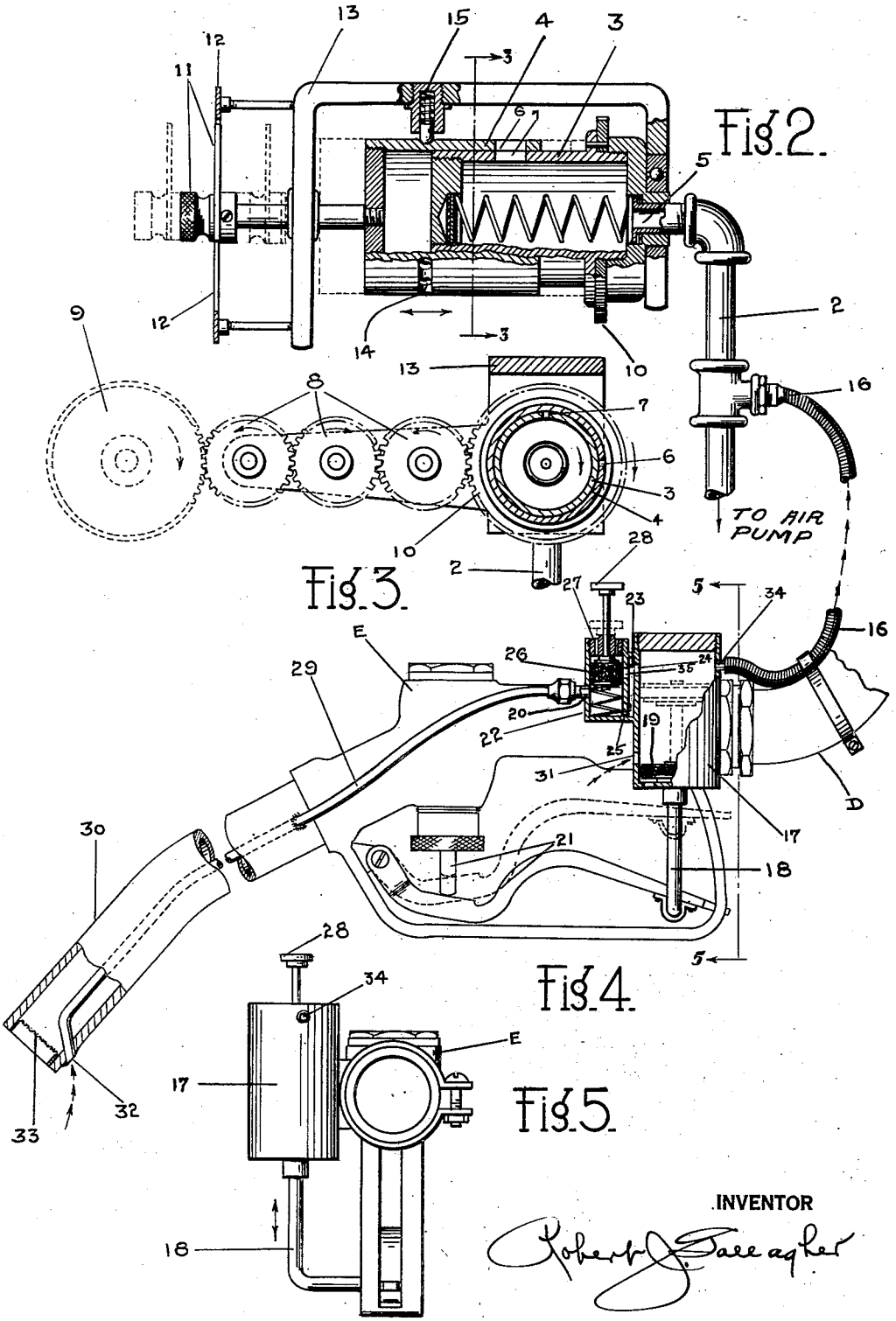


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE

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CONTROL DEVICE FOR LIQUID DISPENSING APPARATUS

Application filed January 20, 1932. Serial No. 587,661.

This invention has to do with liquid dispensing apparatus generally, but in its preferred embodiment it is an attachment for gasoline dispensing apparatus, comprising a valve, a predetermining device working in conjunction with, and dependent for its advantages on said valve, and means for applying reduced air pressure to cause the two named instrumentalities to function.

I wish it to be understood that while I consider the aforesaid combination novel, I consider the reduced air pressure controlling means, independent of the predetermining device to be new and capable of individual use.

The primary object of my invention lies in the provision of a fluid dispensing nozzle provided with a valve for controlling fluid flow therethrough and also provided with suction controlled means for automatically actuating said valve under certain conditions of use of said nozzle.

Another and important object lies in the provision of a predetermining device operated by fluid flow remote from said nozzle, which automatically actuates said suction controlled means on the nozzle, to operate said valve.

To explain fully the advantages of my invention I shall refer briefly to the operation of well known meter-type gasoline dispensing apparatus. As an example, to fill an order for 15 gallons, the meter pointer is turned to zero position, the nozzle valve manually held open and the liquid allowed to flow through the meter, hose and nozzle into the receptacle. Meanwhile the operator must watch both the pointer on the meter and the receptacle to avoid overrunning either, and, when the proper amount has been dispensed, release the spring-closing nozzle valve thereby stopping the flow.

To fill an order for a "full receptacle", the operator must watch the liquid rise in the receptacle, which frequently the size and type of fill opening does not permit, often resulting in overflowing the tank.

With the foregoing in view, my invention provides a means for holding open the nozzle valve, a means for automatically closing said valve when a predetermined amount has been dispensed and also independent means for closing said valve automatically when a predetermined height has been reached by the liquid in the receptacle, or by eruption of the liquid in the receptacle due to pocketed air.

The terminal or nozzle valve may be used conventionally if desired by means of a manual release incorporated with the automatic control mechanism of said valve or by setting the predetermining device to nullify the automatic features.

The object of my invention is to gain automatic control safely of the terminal valve of a liquid dispensing apparatus, and at the same time permit the use of flexible hose for conveying liquid to remote receptacles. Consequent advantages of the device are: reduction of fire hazard and waste due to spillage, reduction of loss due to inadvertent over-dispensing, and increased sales and good will due to the customer's assurance of receiving a maximum capacity filling without spillage.

Referring now to the drawings forming a part of this application and wherein like reference numerals indicate like parts:

Figure 1 is a general view in front elevation of an ordinary meter-type, electric driven gasoline dispensing apparatus with my invention applied thereto.

Figure 2 is a partly cross-sectional detail side view of a predetermining rotary and sliding valve forming part of my invention.

Figure 3 is a detail sectional front view taken on line 3—3 of Figure 2.

Figure 4 is a combined fragmentary and partly sectional side view of my automatic control device applied to the terminal or nozzle valve.

Figure 5 is a rear view taken on line 5—5 of Figure 4.

Figure 6 is a front view of a manually operated meter knob and pointer for predetermined settings of the valve control means.

The meter-type electric-driven gasoline dispensing apparatus as shown in light line in Figure 1 is used for convenience of illustration, but the invention is not limited to this type as the invention can be applied to other types such as gravity, hydraulic or air-pressure systems of dispensing.

The electric-driven apparatus above mentioned can briefly be described as comprising a liquid pump (A), a motor (B) for driving the same, a meter (C) for measuring and registering the amount of fluid flow, a flexible hose (D) for conveying liquid to the receptacle and a spring-closing nozzle valve (E) to control the flow.

In addition, I provide an air pump 1 of any requisite capacity, designed to create a suction or partial vacuum in pipe 2 connecting said pump and the inner barrel 3 of the predetermining air-valve, shown in Figure 2, by a swivel connection 5.

This predetermining air valve is a combined rotary and sliding valve mechanism comprised preferably of an inner barrel 3 and outer cylinder 4 nicely fitted, and carried in bearings in vertical members of bracket or box 13. Said cylinder and barrel are provided with uniform slots or openings 6 and 7 respectively through their side walls. Inner barrel 3 is adapted for rotation by suitable gearing 8, 10 actuated by a gear 9 on the pointer spindle of meter C.

Outer cylinder 4 is adapted for manual rotary adjustment by means of knob-and-pointer set 11 and is slidable longitudinally by the same means. Indentations 14 are provided in an annular groove around said cylinder 4 in any suitable number, preferably corresponding in number to graduations on marker 12, Figure 6. A spring-pressed detent 15, mounted in the horizontal member of bracket 13 engages said indentations 14 when said outer cylinder 4 is in the predetermining position, which is the position shown in Figure 2.

A preferably flexible hollow tube 16 is connected in any suitable manner to and communicates with the pipe 2, and extends to and communicates through the opening 34 with the cylinder 17 on the nozzle N near the top of said cylinder. The rod 18 of piston 19, movable in the cylinder 17, is attached in any suitable manner to the manual valve opening means 21 for the spring-closing nozzle valve E.

A valve release control cylinder 22 may be placed in any suitable position, as adjacent to holding cylinder 17 and communicates with said cylinder 17 by means of openings 24 and 35 in said cylinders communicating with a spacing chamber 23 between said cylinders. It will be clear, of course, that other means of communication between such cylinders may be employed, depending on the spacing of such cylinders apart. Holding-cylinder 17 has one opening 24 above the limit of its piston travel, into said chamber 23, and release control cylinder 22 has two openings into said chamber 23, one opening 35, normally covered by piston 26 reciprocable in cylinder 22, and one opening 25 below the limit of travel of piston 26 and constantly open.

The piston 26 is nicely fitted into the cylinder 22 and is held in normal position covering opening 35 by means of an expansion spring as shown. Attached to said piston 26, and extending through vented cylinder head 27, is a rod, on the end of which is placed a button 28 for manual depression of said piston.

Communicating with an opening 20 in the release control cylinder 22, and immediately below the normal upper position of piston 26, is one end of a tube 29, which tube extends along or within the nozzle N and spout 30, terminating at some desired point on the outer side of said spout, preferably adjacent its delivery end.

A flow diffusing screen 33 may be placed near the outlet opening of said spout 30.

It will be understood that if my invention is applied to dispensing apparatus which may be already equipped with an air pump or which has a suction line available, the pipe 2 can be tapped into said pump or line at any convenient point, eliminating the necessity for installing the pump 1.

The operation of the invention can be described by citing an example of filling an order for 15 gallons of gasoline and calling the units of measure graduated on meter (C) and marker 12, gallons: The knob-and-pointer set 11 is manually rotated to indicate fifteen on marker 12 thereby placing opening 6 in cylinder 4 in position three quarters of the distance around one complete clockwise rotation of said cylinder. Spring-pressed detent 15 fixes accurate location and maintains said location by engaging the indentation provided therefor. The motor (B) is started and liquid pump (A) pumps liquid around through its conventional by-pass (not shown) as the terminal valve E is as yet closed. The air pump 1 draws air through opening 31 in holding-cylinder 17 via tube 16 and pipe 2, said opening allowing free inlet for air while piston 19 is in down or closed position and below said opening 31. The nozzle valve opening arm 21 is now manually raised, starting the flow of fluid through the nozzle into the receptacle or tank F and piston 19 is also simultaneously raised to the position in cylinder as shown by dotted lines in Figure 4, and held in this position by suction from the tube 16 and by atmospheric pressure on the bottom of said piston, which pressure gains entrance through the opening 31. Meanwhile a small volume of air is being drawn through the tube 29, by way of under piston 26, through opening 25, through chamber 23, through opening 24, through opening 34, through tube 16 and pipe 2 to pump 1. Said volume of air, however, is not sufficient to offset the capacity of pump 1 and thereby equalize pres-

sure on top of piston 19 owing to the restricted passage of opening 25. The object of this leak will be referred to and explained later. As the meter pointer-spindle and attached gear 9 rotate by reason of flow, inner barrel 3 rotates by reason of gearing 8 and 10. As opening 7 arrives at the same relative position as the pre-set opening 6, a sufficiently large air inlet is thereby made which overcomes the function of the air pump 1 as regards the suction through tube 16. The air pressure thereby being equalized on top and bottom of piston 19, in cylinder 17, the spring-closing nozzle valve (E) closes, shutting off the flow at the predetermined fifteen gallons, the same being posted on meter.

To fill an order for a full receptacle, for example, knob-and-pointer set 11 would be pushed in longitudinally, in which case opening 6 would be out of the rotation path of opening 7 thereby voiding the predetermining feature for the time but keeping the pipe 2 air-tight. The pumps are started, the nozzle spout 30 and accompanying gauging-tube 29 are inserted into the receptacle so that gauging-tube terminus 32 is at the approximate height of desired maximum filling. As the liquid rises, or erupts, in the receptacle it submerges the gauging-tube terminus 32, through which, as previously explained, a draft of air has been passing constantly since the start of the operation. As the said draft of air is cut off by the rise or eruption of the liquid in the receptacle, release control cylinder 22 is immediately partly evacuated by air pump 1, by the route previously detailed, and atmospheric pressure is gained through the vented cylinder head 27, forcing piston 26 downward, thereby covering opening 20, uncovering opening 35 and providing a sufficiently large air inlet through vented cylinder head 27, opening 35, chamber 23 and opening 24 to offset the air pump means 1. The air pressure thus being equalized on the top and bottom of holding-piston 19, the spring-closing nozzle valve (E) closes, stopping the flow, and the meter posting the amount dispensed.

It will be clear from the foregoing also that the terminal or nozzle valve E while being held open by suction during operation of the device, can be instantly released at any time by manually depressing piston 26 by means of the conveniently located button 28 attached thereto.

If for any reason, dispensing is wished to be done conventionally, knob-and-pointer set 11 is pulled out longitudinally to the left to the limit of its travel in Figure 2 which leaves opening 7 uncovered, thereby overcoming the function of the air pump 1 and voiding the suction operation at the nozzle valve.

Of course, my invention is of wide application and is not limited to the particular details herein described and shown. I do not limit myself, therefore, to the exact form of construction and arrangement of parts shown, other than by the appended claims.

Having thus described my invention, what I claim is:

1. In combination, a liquid-meter, means to force and convey liquid to said meter, means to convey liquid from said meter, an air and meter controlled flow-control-valve connected with last mentioned means and air-pumping and air-pipe means for applying air suction to said valve controlling means.

2. In combination, a liquid-meter, means to force and convey liquid to said meter, flexible pipe means to convey liquid from said meter, an air-controlled portable liquid-control-valve at terminal of last mentioned means, controlling means therefor, air-pumping and air-pipe means for applying reduced air pressure to said controlling means and an air-valve connected with said air-pipe means and actuated by said meter for controlling said valve controlling means.

3. In combination, a liquid-meter, means to force and convey liquid to said meter, flexible hose means to convey liquid from said meter, air-controlled portable liquid-control-valve at terminal of last mentioned means, controlling means therefor, air-pumping and air-pipe means for applying reduced air pressure to said controlling means, and a meter-actuated rotary air-valve manually adjustable both predeterminably and non-functionally connected with said air-pipe means for controlling said valve controlling means.

4. An attachment for liquid dispensing apparatus, consisting of a spring-closing-liquid valve provided with an air device for actuating and selectively controlling said spring closing means, and combined air-pumping and air-tubing means for applying reduced air pressure to said air device.

5. An attachment for liquid dispensing apparatus, consisting of a spring-closing liquid-valve provided with a spout and flow-diffusing screen in said spout, an air operated mechanism for actuating said liquid-valve and incorporated therewith, an air operated releasing mechanism for automatically controlling said actuating mechanism, and combined air-pumping and air-pipe means for applying reduced air pressure to said actuating and releasing mechanisms.

6. An attachment for liquid dispensing apparatus, consisting of a spring-closing liquid-valve, a combined manually and air-actuated opening mechanism for said liquid-valve incorporated therewith, an air operated releasing-mechanism for automatically controlling said opening mechanism, an air operated gauging tube for automatically controlling said releasing mechanism, and combined air-pumping and air-pipe means for applying reduced air pressure to said air actuated and air operated mechanisms.

7. A fluid dispensing apparatus comprising a nozzle for hose connection with a fluid supply, a valve for controlling the flow of fluid through said nozzle, said valve being normally urged to closed position, means for manually opening said valve, means for holding said valve open, and means adjacent the discharge end of said nozzle for releasing said holding means and permitting said valve to close independently of said opening means, said releasing means including an air inlet in communication with a source of reduced air pressure independent of the fluid flow through said nozzle.

8. A fluid dispensing apparatus comprising a fluid pump, a measuring device actuated by the fluid flow from said pump, a discharge control valve, means for opening said valve, air actuated means for causing said valve to close, an air suction line operatively connected with said last named means, means driven by said measuring device and connected with said air line for actuating said valve closing means, and means for adjusting said driven means whereby the closing of said valve is selectively predetermined.

9. A fluid dispensing apparatus comprising a fluid pump, a measuring device actuated by the fluid flow from said pump, a discharge control valve, means for opening said valve, air actuated means for causing said valve to close, an air suction line operatively connected with said last named means, means driven by said measuring device and connected with said air line for actuating said valve closing means, means for adjusting said driven means whereby the closing of said valve is selectively predetermined, and separate means associated with said air line and valve closing means for closing said valve independently of said adjustable means.

In testimony whereof, I affix my signature.

ROBERT J. GALLAGHER.