

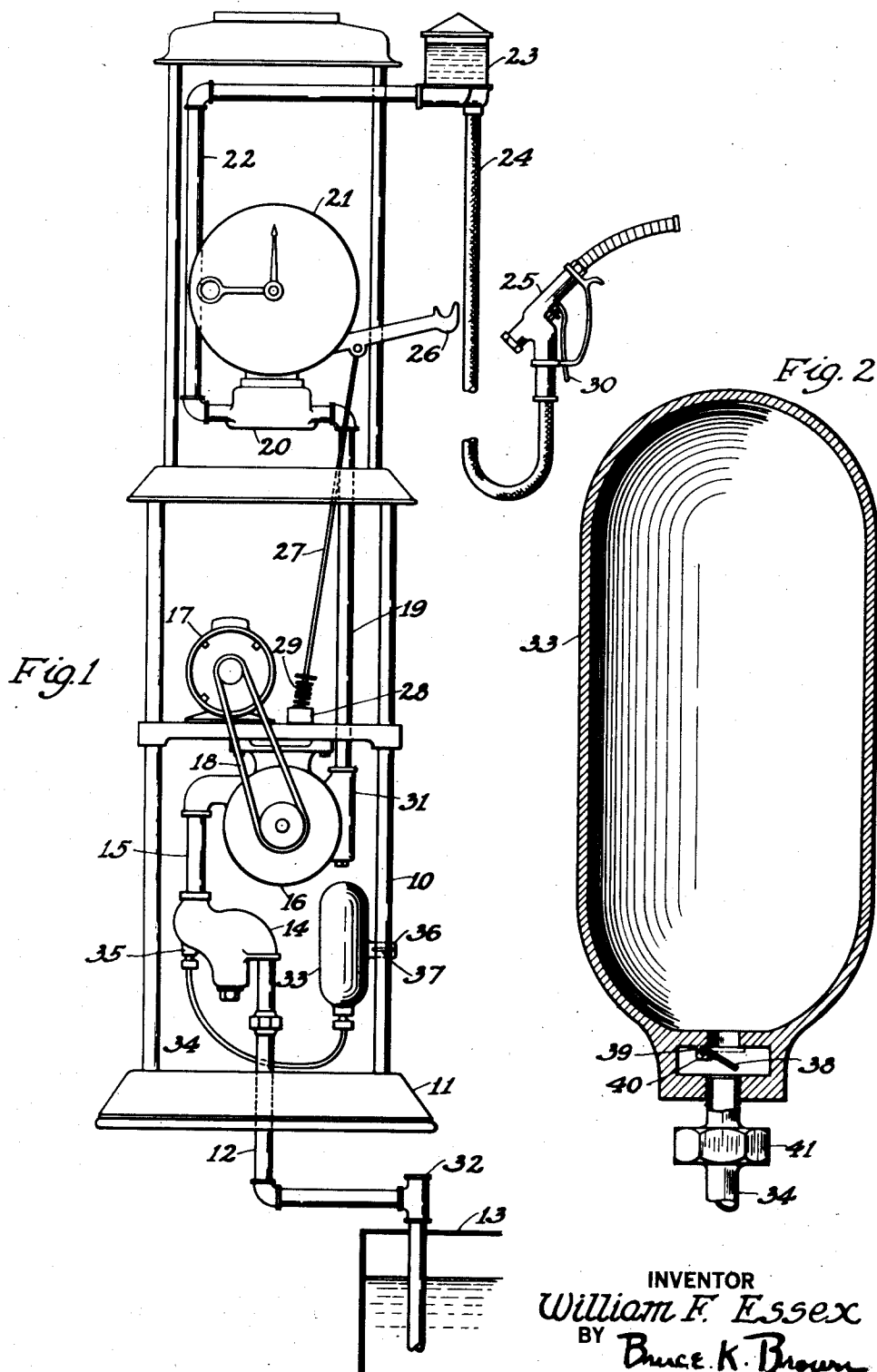
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DISPENSING PUMP

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DISPENSING PUMP

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This invention relates to improvements for dispensing pumps and particularly to improve-
ments for dispensing pumps adapted to handle
gasoline and similar volatile liquids.

5 In the process of dispensing gasoline and similar volatile liquids with the conventional type of dispensing pump, for example, the type of dispensing pump which comprises a pump and dispensing conduit, considerable trouble results from
10 the thermal expansion of the volatile fuel within the closed system.

The object of my invention is to provide a compression chamber that will compensate for the thermal expansion of the gasoline or similar
15 volatile fluids within the dispensing pump.

My invention will be more fully understood from the following description when read in connection with the following drawing, in which:

20 Figure 1 represents an elevational view of the dispensing pump.

Figure 2 represents a vertical cross section of the expansion chamber.

The operating mechanism of the dispensing pump is mounted upon a suitable frame work
25 10, which is supported by the base plate 11. A conduit 12, which leads to the underground tank 13, passes up through the base plate to the strainer 14 where any foreign material is removed from the gasoline. A conduit 15 connects the exit of the strainer 14 with a suitable propelling means such as a rotor pump 16, which
30 is driven by the motor 17 through the belt or chain 18. A conduit 19 connects the outlet of said pump to a metering device 20. A recording device 21 is actuated by said meter and the amount of gasoline that flows through the meter is recorded on said device. A conduit 22 connects the exit of said meter with a visible flow
35 gage 23, and a flexible hose 24 connects the visible flow gage with a nozzle check valve 25.

A hook 26 is provided at a convenient place on the pump for holding the nozzle check valve 25 when said nozzle check valve is not being used. The hook 26 is adapted to move downwardly
45 when the nozzle 25 is hung thereon. The downward movement of the hook causes the rod 27 to move downwardly and open the electrical switch 28, thereby breaking the electrical circuit leading to the motor 17. When the nozzle check valve is removed from the hook 26, the spring 29 forces the rod 27 and hook 26 upwardly and thereby
50 closes the electrical circuit leading to the motor and starts the rotor pump. It is clear that the motor continues to run as long as the nozzle check valve is off the hook 26.

When the dispensing pump is used, the nozzle 25 is removed from the hook 26, which in turn starts the motor 17 and pump 16. The nozzle check valve 25 is then opened by pressing the handle 30, and gasoline is then pumped from the storage tank 13 through the strainer 14, pump 16, meter 20, visible flow gage 23, and through the conduit 24 to the nozzle check valve 25. After the desired amount of gasoline has registered on the recording device 21, the nozzle check valve 25 is quickly closed by releasing the handle 30. After the nozzle check valve 25 has been quickly closed, the motor 17 and pump 16 continue to run until the nozzle is hung on the hook 26. A pump by-pass 31 is provided on the pump 16 to prevent an excess pressure from building up in the lines leading from the pump to the nozzle check valve when said nozzle is closed and off the hook 26.

During the hot seasons the gasoline that is trapped between the check valve 32 on the underground tank 13 and the nozzle check valve 25, expands and creates considerable pressure thruout the closed pipe system of the pump if a means is not provided to compensate for the same. When the dispensing pump is idle for a relatively short period of time, the thermal expansion of the gasoline creates pressures as high as 75 to 300 pounds per square inch within the dispensing pump, and as a result, leaks form throughout the closed pipe system and sometimes the flexible hose 24 bursts. Heretofore the prior art has sought to compensate for the thermal expansion of gasoline by placing a compression chamber filled with air on the exit side of the pump 16, but such chambers have proven to be inoperative. When the compression chamber is placed on the exit side of the pump, it fills up with gasoline and ceases to function as a means to compensate for the thermal expansion. The explanation of the inoperativeness of the chamber is believed to be as follows: Gasoline is forced into the chamber under pressure because it is on the pressure side of the pump, and after a short period of time the air contained within the chamber is dissolved in the gasoline and the liquid gasoline takes the place of the dissolved air. At all times the gasoline in the compression chamber is under pressure and it is never withdrawn. Even when the nozzle check valve 25 is opened, the pressure in the line leading from the pump to the nozzle is not sufficiently reduced to withdraw the gasoline from the compression chamber when said compression
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chamber is connected to the outlet side of the pump.

According to this invention, I have found that a compression chamber 33 connected on the inlet or suction side of the pump will compensate for the thermal expansion of the gasoline trapped between the check valve 32 and nozzle check valve 25. The expansion chamber 33 is connected by the conduit 34 to the drain outlet 35 of the filter 14. It should be understood that the compression chamber may be connected at any point between the check valve 32, which is located on the underground tank, and the intake of the rotor pump 16, but preferably it should be connected near the inlet side of the pump 16. The compression chamber may be attached to the top part of the filter 14, so that the air which rises to the top of the filter can pass into the compression chamber. The expansion chamber 33 should be constructed to withstand considerable pressure and the chamber may be made of any design and should be of at least one liter capacity, although compression chambers of one-half liter capacity have been successfully used. A lug 36, or any other suitable means, is fastened to the chamber and is provided with holes to receive a U-shaped clamp 37, which detachably secures the chamber to the frame member 10. The compression chamber may be positioned at any point along the frame member 10, for example, it may be placed above the elevation of the motor 17. The conduit 34 which connects the chamber to the inlet side of the pump may be of any size, but preferably from $\frac{1}{4}$ " to $\frac{1}{2}$ " in diameter. Instead of having the compression chamber made separate from the other mechanisms of the pump, the chamber may be integral with the filter or pump, but in either case the compression chamber must be on the inlet side of the pump.

By the use of the compression chamber on the inlet, or suction side of the pump, the thermal expansion of the gasoline or volatile materials in the closed pipe system of the dispensing pump is compensated for to such an extent that it is almost impossible to detect the slightest increase in pressure during the hot seasons. When the compression chamber 33 is installed, the chamber may be completely or partially filled with air. When the rotor pump 16 is started, a suction is created in all pipe lines on the inlet side of the pump, and most of the gasoline in chamber 33 is withdrawn from said chamber. When the nozzle 25 is closed or the pump 16 is stopped, a small quantity of gasoline is forced back into the compression chamber 33. Each time the pump is operated, the major part of the gasoline in the compression chamber is withdrawn, and when the pump is stopped a new supply of gasoline is introduced into the compression chamber. The gasoline in the pipe lines leading to the intake side of the pump is under reduced pressure and consequently the air which is dissolved in the gasoline is released from solution and forms a froth of bubbles. Therefore, the fresh portion of gasoline that passes into the compression chamber 33 each time the pump is used, contains sufficient entrained air and commingled gasoline vapors to maintain a cushion within the compression chamber.

The above theory of operation of chamber 33, when placed on the inlet side of pump 16, is thought to explain why an air cushion is always maintained in the compression chamber. It

should be understood that I do not intend to be limited to the above theory of operation.

Figure 2 shows a vertical cross section of the compression chamber. The lower portion of the compression chamber is provided with a perforated check valve 38 which is pivotally attached at 39. A stop 40 is provided to restrict the downward movement of the check valve. The purpose of the perforated check valve is to retard the rush of gasoline into the compression chamber each time the nozzle check valve 25 is closed but the egress of the gasoline from the compression chamber is not retarded. I have found that each time the nozzle check valve 25 is closed, the fresh supply of gasoline pushed back into the compression chamber would fill about one-half of the chamber when the perforated check valve is not used. Consequently, only the remaining one-half of the chamber could be used to compensate for thermal expansion. By using the perforated check valve 38 the fresh supply of gasoline pushed back into the chamber each time the nozzle check valve was closed would fill about one-fourth to one-third of the compression chamber, thereby leaving a greater space to compensate for thermal expansion. It should be understood that the compression chamber may be used without the perforated check valve, but the use of this valve prevents large quantities of gasoline from being pushed back into the chamber each time the nozzle check valve 25 is closed.

The perforated check valve may be substituted by any type of valve that dampens the flow of gasoline into the chamber, but does not interfere with the egress of the gasoline from said chamber. The compression chamber 33 may be connected to the conduit 34 by any suitable means such as by the union 41.

I have described my invention with reference to a wet hose type of pump, that is, the type of pump where the flow of liquid is controlled by a nozzle check valve on the end of the dispensing conduit, but it should be understood that I may use the compression chamber on the inlet side of any type of pump.

While my invention has been described with reference to a gasoline dispensing pump, it should be understood that other similar liquids may be dispensed from the pump. The scope of my invention is to be determined by the following claims and not by the specific disclosure as hereinabove set forth.

I claim:

1. A gasoline dispensing pump, comprising, in combination, a pump, a means for driving said pump, a storage supply tank, a conduit communicating with said supply tank and the inlet of said pump, a compression chamber communicating with the conduit on the inlet side of said pump, a means in the lower part of the compression chamber for retarding the flow of gasoline into the compression chamber and permitting a substantially normal flow of gasoline from the compression chamber, and a discharge conduit for conveying the gasoline from the discharge of said pump.

2. A gasoline dispensing pump, comprising, in combination, a pump, a means for driving said pump, a storage supply tank, a conduit communicating with said supply tank and the inlet of said pump, a compression chamber communicating with the conduit on the inlet side of said pump, a check valve for retarding the flow of gasoline into said compression chamber and permitting a

normal flow of gasoline from the compression chamber, and a discharge conduit for conveying the gasoline from the discharge of said pump.

3. A gasoline dispensing pump, comprising, in
5 combination, a pump, a means for driving said pump, a storage supply tank, a suction conduit communicating with said supply tank and the inlet of said pump, a check valve in said suction
10 conduit which prevents the return flow of gasoline to the storage supply tank, a discharge conduit for conveying the gasoline from the discharge of said pump, a normally closed nozzle

check valve on the end of said discharge conduit, a compression chamber communicating with the suction conduit on the inlet side of said pump, and a valve for retarding the flow of gasoline into the compression chamber during the thermal
80 expansion of the gasoline between said check valve and said nozzle check valve and at the same time permitting an unrestricted flow of gasoline from the compression chamber during the operation of said pump.

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