

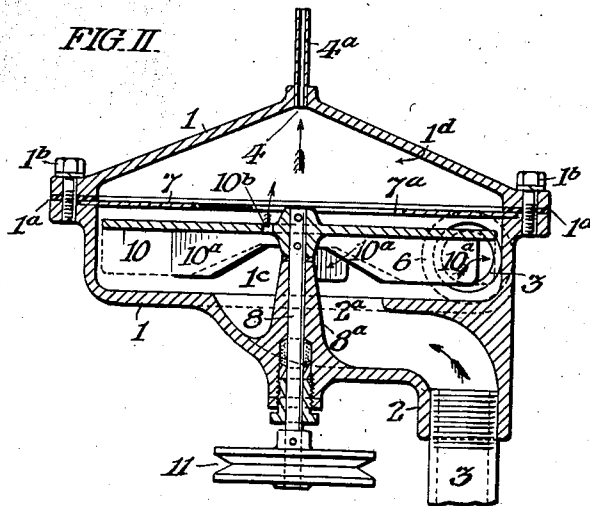
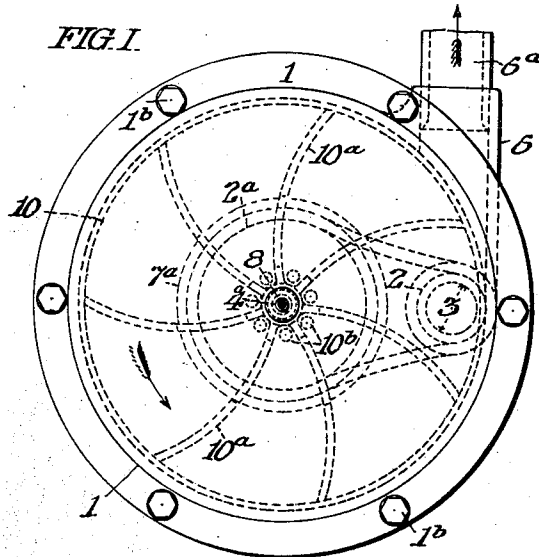
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A. E. PAIGE

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METHOD AND APPARATUS FOR DISPENSING VOLATILE LIQUID

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INVENTOR:
Arthur E. Paige

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METHOD AND APPARATUS FOR DISPENSING
VOLATILE LIQUID

Arthur E. Paige, Philadelphia, Pa.

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4 Claims. (Cl. 103—113)

My invention may be advantageously employed in dispensing hydrocarbons, for instance motor gasoline. It is ordinary practice to dispense such gasoline from a subjacent tank through apparatus including a pump, an electric motor operatively connected with said pump, a flow meter, having volume indicating means operated by the passage of liquid through said meter, and a flexible dispensing hose connected with the outlet from said meter and provided with a manually operative valve at its free end. Such hydrocarbon is not only volatile, but contains more or less atmospheric air occluded therein; so that unless means are provided to eliminate air and gaseous vapors from such liquid before it is passed through the meter, the indicating means does not correctly show the volume of liquid actually dispensed through the hose, but a greater volume including entrained air and gaseous fluid, and, consequently, the customer is cheated.

Therefore, the prior art is replete with various devices including complicated valve means intended as so-called "air eliminators" for gasoline dispensing apparatus.

It is the object and effect of my invention to simplify and consequently lessen the cost of gasoline dispensing apparatus by providing a pump capable of simultaneously elevating the gasoline from the supply tank to the dispensing hose and separating from the liquid, before delivery thereof through the meter, the lighter fluids for which the customer should not be charged. As hereinafter described, an essential element of my invention is a wheel having a circular series of blades, rotatable upon a vertical axis, with centrifugal impelling and separating effect upon the liquid and the gaseous fluids primarily occluded therein.

In said drawing; Fig. I is a plan view of apparatus conveniently embodying my invention. Fig. II is a vertical sectional view of said apparatus taken on the line II, II in Fig. I.

In said figures; the casing 1 has at the lower portion thereof a liquid conduit connection 2, leading to the axial inlet opening 2^a in said casing. The conduit 3 extends from said connection 2 to a subjacent tank or other source of supply of the volatile liquid. Said casing is conveniently formed of two parts, of cast metal, with the gasket 1^a between them and rigidly connected by tap bolts 1^b. The upper part of said casing has at the top thereof the outlet vent 4, for lighter fluid. Intermediate of said liquid inlet 2 and vent 4 said casing is provided

with the tangential outlet 6 for the liquid to be dispensed, which is discharged therethrough into the conduit 6^a which may have a flexible dispensing hose connected with its distal end and provided with a nozzle containing a valve which is normally spring pressed to close it, but may be manually opened, in accordance with the present practice in gasoline dispensing apparatus.

The partition 7 separates said casing 1 into two compartments, one above the other. The lower compartment 1^c has said liquid inlet 2 and liquid outlet 6. The upper compartment 1^d is in communication with the lower compartment 1^c through the opening 7^a in said partition 7, preferably in coaxial relation with said outlet 4.

The rotary shaft 8 extends vertically in said casing 1, in coaxial relation therewith; being conveniently journaled in the bearing 8^a in the bottom wall of said casing. The centrifugal impeller wheel 10 is rigidly connected with said shaft 8, in said lower chamber 1^c adjoining said partition 7 and has a circular series of blades 10^a extending outwardly with respect to said shaft 8.

Said shaft 8 is provided with means exterior to said casing 1 for rotating said shaft and impeller wheel; conveniently the belt pulley 11 which is rigidly connected with said shaft, and may be turned by a belt connection with an electric motor. However, an electric motor may be directly connected with said shaft 8. Said shaft 8 is upheld, conveniently by the wheel 10 fixed thereon, to present said impeller wheel 10 in position to discharge liquid through said tangential outlet 6.

Between said conduit connection 2 of the casing 1 and the subjacent tank or other reservoir for the liquid to be dispensed, said liquid inlet conduit 3 is preferably provided with a check valve which opens freely toward said casing when said impeller wheel is rotated during a dispensing operation; but closes when the rotation of said wheel 10 is stopped by the operator at the conclusion of a dispensing operation. Of course, it is necessary to "prime" such dispensing apparatus to enable it to elevate the liquid from the subjacent reservoir. That is to say, the conduit 3 and the liquid passageways leading therefrom to the tangential outlet 6 and the conduit 6^a are primarily filled with liquid to enable the impeller 10 to elevate the liquid in the subjacent tank past said check valve, and, thereafter, said impeller remains submerged in the liquid to be dispensed.

If it is desired to permit continued rotation of said impeller wheel 10 when the manually controlled valve at the end of the dispensing conduit is closed; I find it convenient to provide
 5 a by-pass from said conduit 6^a to said conduit 3 with a check valve which is normally closed by a spring, but is automatically opened by the pumping action of said wheel 10 to permit by-passage of liquid from the outlet to the inlet side of
 10 said impeller wheel 10 at a predetermined pressure of liquid in said dispensing conduit 6^a less than would be detrimental to the dispensing hose connected therewith.

It is to be noted that the lighter hydrocarbons
 15 used for motor fuel are not only highly volatile, but when subjected to air pressure to provide them as in some types of motor gasoline dispensing apparatus, they absorb a considerable percentage of atmospheric air which remains
 20 occluded and entrained therein until the pressure which induced such absorption is relieved.

The effect of the construction and arrangement above described is that upon rotation of said impeller wheel 10 liquid is drawn into said
 25 casing 1 from the subjacent tank or other reservoir with whatever atmospheric air and liquid vapor may be occluded therein. The rotation of said wheel 10 turbulates such liquid and gaseous mixture in the compartment 1^c and the
 30 centrifugal effect of such rotation drives the liquid portion of the mixture to the perimeter of said chamber 1^c, relieving the fluid pressure at the axis of the rotor 10 and leaving the gaseous fluids free to escape axially upward from
 35 compartment 1^c, through apertures 10^b, in said rotor 10, into the compartment 1^d from which they may be vented to the atmosphere through the outlet 4 and the conduit 4^a which latter may extend to the top of any outer casing in which
 40 the apparatus shown may be inclosed.

However, I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without
 45 departing from the essential features of my invention as defined in the appended claims.

I claim:

1. In apparatus for dispensing volatile liquid; means for simultaneously pumping such liquid
 50 from a subjacent tank to dispense it centrifugally and centripetally eliminating therefrom lighter fluid including volatile portions of said liquid and atmospheric air; including a casing having at the lower portion thereof a liquid
 55 inlet conduit connection, and at the upper portion thereof a gaseous fluid outlet, and intermediate of said inlet and outlet a tangential outlet for said liquid; said gaseous fluid outlet being very small and restricted in comparison
 60 with said liquid outlet; a partition separating said casing in two compartments, one above the other, the lower compartment having said liquid inlet and liquid outlet and the upper compartment having said gaseous fluid outlet; said partition having an opening therethrough for passage of gaseous fluid from said lower compartment to said upper compartment; a rotary shaft
 65 extending vertically in said casing; a centrifugal impeller wheel rigidly connected with said shaft in said lower compartment adjoining said partition, and having a circular series of blades extending outwardly with respect to said shaft;

and means for rotating said shaft and wheel, connected with said shaft exterior to said casing; whereby liquid is drawn into said casing through said liquid inlet and discharged from
 5 said casing through said liquid outlet and lighter fluid simultaneously separated from said liquid, passed into said upper compartment, and vented through said gaseous fluid outlet.

2. In apparatus for dispensing volatile liquid; means for simultaneously pumping such liquid
 10 to dispense it centrifugally and eliminating therefrom lighter fluid; including a casing having at the lower portion thereof a liquid inlet conduit connection, and at the upper portion thereof a gaseous fluid outlet, and intermediate
 15 of said inlet and outlet a tangential outlet for said liquid; said gaseous fluid outlet being very small and restricted in comparison with said liquid outlet; said casing including two compartments, one above the other, the lower compartment having said liquid inlet and liquid outlet and the upper compartment having said gaseous fluid outlet; a passage for gaseous fluid from said lower compartment to said upper compartment; a rotary shaft extending vertically in said
 20 casing; a centrifugal impeller wheel rigidly connected with said shaft in said lower compartment, and having a circular series of blades extending outwardly with respect to said shaft; and means for rotating said shaft and wheel;
 25 whereby liquid is drawn into said casing through said liquid inlet and discharged from said casing through said liquid outlet and lighter fluid simultaneously separated from said liquid, passed into said upper compartment, and vented through said gaseous fluid outlet.

3. In liquid dispensing apparatus; the combination with a container having a liquid supply inlet, a liquid dispensing outlet and an unobstructed outlet vent directly to the atmosphere
 30 for fluid lighter than the liquid to be dispensed; said outlet vent being very small and restricted in comparison with said dispensing outlet; means for simultaneously progressing the liquid from its inlet to its outlet, separating lighter fluid therefrom, and venting the latter from said container, including a single rotor having centrifugal impeller means in said container, and means exterior to said container for revolving
 35 said rotor; wherein the rotor is revolved in a horizontal plane, the progression of the liquid is effected horizontally and the separation of the lighter fluid from the liquid is effected vertically upward and axially with respect to said rotor.

4. In dispensing volatile liquid; the method of separating lighter fluid therefrom by gravity and centrifugal force operating simultaneously; which consists in circularly whirling the fluid mixture in a container, thereby forcibly progressing the liquid tangentially toward a dispensing outlet from said container, and simultaneously progressing the lighter fluid axially toward an unobstructed outlet vent from the container, directly to the atmosphere; said outlet vent being very small and restricted in comparison with said dispensing outlet; wherein the whirling movement of the mixture and progression of the liquid is effected in a horizontal plane, and the separation of the lighter fluid from the liquid is effected vertically.

ARTHUR E. PAIGE.