

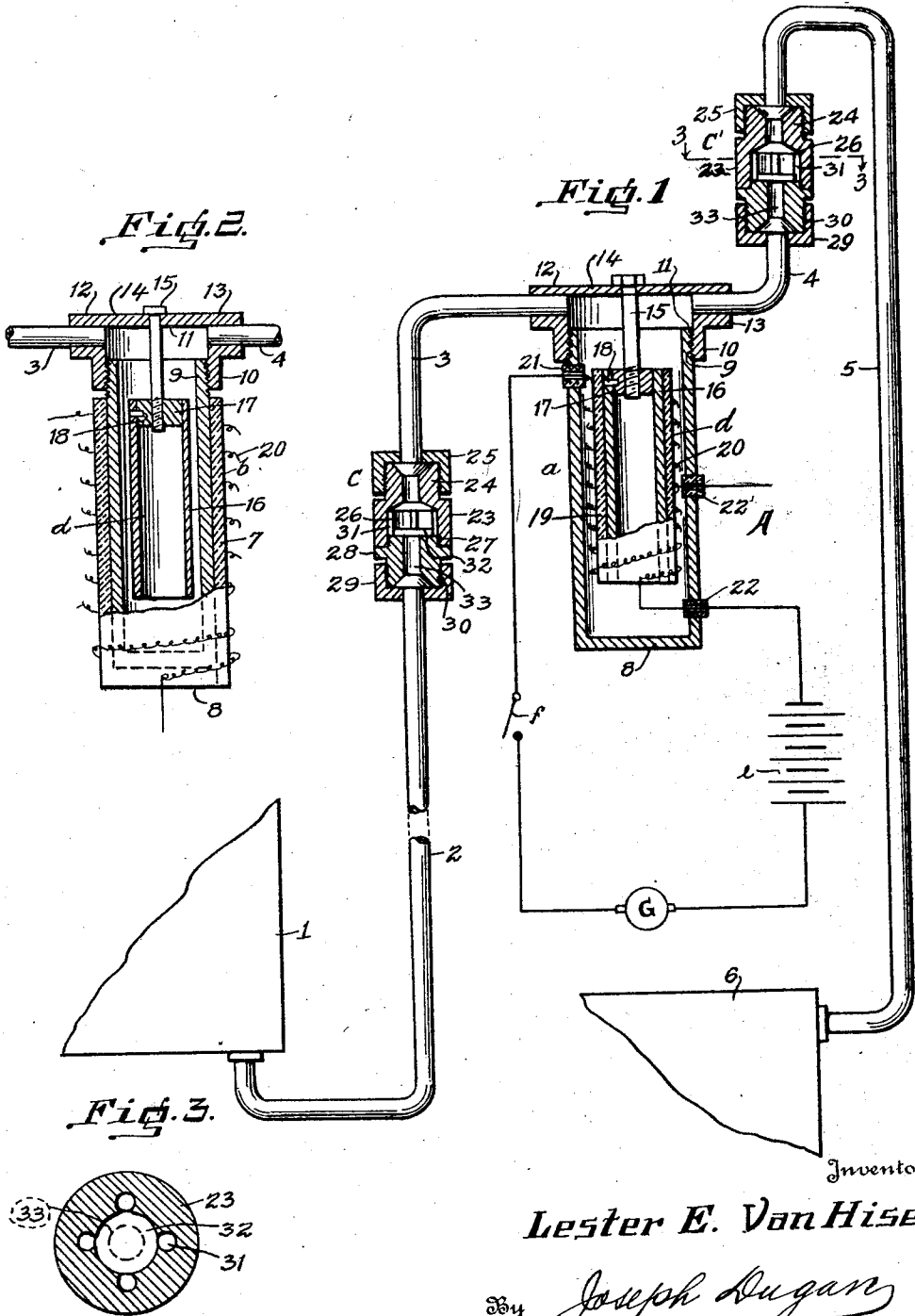
Oct. 9, 1928.

1,686,887

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FLUID ELEVATING AND FEEDING MEANS

Original Filed May 12, 1925



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FLUID ELEVATING AND FEEDING MEANS.

Original application filed May 12, 1925, Serial No. 29,824. Divided and this application filed July 26,
1928. Serial No. 295,496.

This application is a division of my co-
pending application Serial No. 29,824, filed
May 12, 1925.

This invention relates to fluid elevating
and feeding means, and has for its object the
provision of a device of this character which
is adaptable for pumping from a source of
supply any form of fluid desired. Other ob-
jects of the invention will appear as the de-
scription proceeds.

In the drawing:

Fig. 1 is a fragmentary view, certain parts
being in section, of my improved fluid and
elevating means considered in its entirety,
in combination with a source of liquid sup-
ply and the member to which said fluid is
pumped.

Fig. 2 is a fragmentary view of a modifi-
cation of the pump member; and

Fig. 3 is a cross sectional view of a valve
element used in practicing the invention, the
said view being taken on the line 3—3 of
Fig. 1.

Corresponding parts in all the figures are
designated by the same reference characters.

Referring to the drawing the adaptation
of the means may be applied wherever it is
desired to boost fluid or cause the flow of a
fluid from a given point to a given point and
where it is necessary to use a pumping ele-
ment to cause said flow. In particular the
fluid elevating and feeding means may be
designated as an entirety by A in Figure 1,
and of which *a* is one form of pump used in
said system and *b* a second form of pump
which might be substituted for the pump *a*,
the chief difference between the said pumps
residing in the method of heating the same,
the said pump *a* is of relatively diminutive
character and has the characteristics of a bot-
tle, being open at one end and closed at the
other, and therefore may be conveniently
characterized as a bottle like pump member.
In Fig. 1 the numeral 1 represents a tank
which may contain some liquid such as gaso-
line, and a feeding pipe 2 leads from said
tank to a valve element *c* and from said valve
element through a suitable pipe 3 to the
pump *a*.

Leading from said pump is a pipe 4 which
connects with a second valve element *c'* and
from said valve element through a pipe 5

to a storage tank 6. The pump *a* may include
a casing member 7 closed at one end as 8 and
screw-threaded exteriorly as at 9 adjacent its
open mouth. A member 10 is internally
threaded as at 11 for reception on the thread-
ed part 9 of the casing 7, and said member
10 is provided with two annular members 12
and 13 adapted to receive and confine ends
of the pipes 3 and 4. The top 14 of the mem-
ber 10 is provided with an opening through
which projects a screw 15, and said screw nor-
mally supports an element *d* within the cas-
ing 7. The element *d* may comprise a tubular
member 16 closed at one end by means of a
plug 17, said plug being annular in forma-
tion and screw-threaded on its inner surface
for reception of the screw-threaded portion
of the screw 15. In the showing the plug
17 is retained in the tubular member 16 by a
pin 18 passing through said tubular member
and engaging the plug 17. One end of said
tubular member 16, the lower end, is open.
And insulating casing 19 surrounds the tubu-
lar member 16 and coiled about said insulat-
ing casing is an electrical conductor 20.
Each end of the electrical conductor 20
passes through an insulating bushing 21 and
22 in the casing 7, and the said electrical
conductors connect with a source of electrical
current supply *e*, there being a switch ele-
ment *f* in the electrical circuit. If desired,
some form of rheostat might be provided in
the electrical current so as to regulate the
current flowing within the coil 20 surround-
ing the element *d*, or taps may be taken as
shown at 22' whereby different zones of the
member *d* may be heated.

The valve elements *c* and *c'* are identical
in form, and consequently only one of said
elements will be described. The letters of
reference applying to the one, likewise ap-
ply to the other, and said valve elements *c*
and *c'* include an annular body member 23
having a reduced externally threaded mem-
ber 24 with a cap member 25, carrying an
end of the pipes 5 or 3, screw-threaded upon
the threads of the part 24. The annular por-
tion of the body 23 is enlarged at the part
26 and said part is screw-threaded internal-
ly for a portion as at 27. A flanged nut 28
is received within the body 23 at the screw-
threaded portion 27, and a second cap mem-

ber 29, carrying an end of the pipes 3 and 4, is screw-threaded upon the threads 30 of the nut. The chamber of the body 23 is provided with a series of half bores 31 and
 5 a small disc 32 is normally confined within said chamber for closing at times the annular opening 33 in the nut 28.

The operation of the device is as follows:

Assuming that the tank is filled with some
 10 fluid, such as gasoline, and that the apparatus including the pump *a* is fully primed, the switch *f* may be placed in position so as to close an electrical circuit through the coil 20 from the source of current supply *e*, and the
 15 coil 20 will become heated and in turn communicate its heat to the interior of the casing 7 and likewise heat the tubular element *d*.

When the apparatus is fully primed, the heating of the bottle-like pump element will
 20 rapidly vaporize the fluid therein with the result of vaporizing the same and placing pressure therein which will expel fluid upwardly past the check valve *c'*, and this vaporization and expulsion of liquid will continue until the pressure above the intake
 25 check valve *c* is less than atmospheric pressure above the fluid supply in the tank 1 with which the pipe 2 connects. When such differential pressure occurs, atmospheric
 30 pressure will force a quantity of liquid past the check valve *c* into the outer shell 7 of the pump thereby causing rapid condensation due to the cooling effect of the incoming fluid, thereby intensifying the vacuum.
 35 That condition necessarily provides the force for drawing into the pump chamber a fresh supply of fluid from the intake pipe 2, and that fresh supply of fluid is in turn vaporized and expelled in the manner already described. The operation repeats itself so as
 40 to give a distinct pulsation or pumping action that will pump the fluid in a substantially continuous stream into the container 6 which receives the same.

With reference to the member *d* it is pointed
 45 out that this member is primarily instrumental in effecting the pumping action previously described. That is to say when the device is properly primed with liquid fuel
 50 the lower open end of *d* is submerged in the liquid fuel and the space in the member *d* above the fuel and below the member 17 constitutes a vapor trap in which the vapor collects (upon the application of heat) and
 55 when the vaporization of the gasoline or other volatile liquid has accumulated sufficiently in the member *d* it will expand and push out the fuel between the outer side of the member *d* and the inner side of the casing 7.
 60

The inertia and momentum in the moving column of fluid is sufficient to carry the liquid out to such a point that the pressure in chamber *a* is reduced below atmospheric pressure whereupon gasoline will be forced in

through the pipe 3. The incoming gasoline being cold will condense the vapor within the member *d* whereupon the entire device will be filled with gasoline ready for the next pulsation. It may be pointed out that the
 70 operation of the device involves two cycles, first a discharge cycle and then an intake cycle. When the pump is primed so that liquid fills the so-called casing 7 to the proper point, the liquid fuel will enter the mouth of
 75 the member *d* up to a point where it is held back by the air trapped within the member *d*. When heat is applied to the pump the gasoline or other fuel becomes vaporized and the space above the gasoline which seals the open
 80 end of *d*, accumulates vapor under pressure until the pressure becomes strong enough to "let go" and push the gasoline out between the walls of the member *d* and the casing 7, as previously explained.
 85

When the pressure in the vapor has expended itself and moved its increment of fluid forward, a partial vacuum is formed in the member *d* which tends to pull in fresh fuel through the supply line. Such fuel
 90 being cool intensifies the vacuum as explained, and greatly assists in the pumping action.

The modification of the device *b* shown in Fig. 2 consists in coiling the conductor 20
 95 about the outside of the casing 7 in place of coiling it about the element *d*. The results obtained, however, are the same. By fluting or relieving or half-boring, as it might be termed, portions of the wall surrounding the
 100 annular chamber 26, any fluid flowing through the opening 33 may escape past the disc 32 by raising said disc. As shown by the drawing the disc normally closes the opening 33 and prevents any liquid from
 105 passing back through the member *c* or *c'* into the pipes 4 or 3 respectively.

It is obvious that various changes and modifications may be made in departure from the particular description and showing of the
 110 accompanying drawing in adapting the invention to varying conditions and requirements of use and service, without departing from the true spirit of the invention and scope of the appended claims.
 115

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. A device of the character disclosed, including two concentric tubular members and a wire coil surrounding one of said members
 120 for heating said member upon electrifying the wire coil; the inner tubular member being hermetically closed at one end and the other tubular member being formed with a hermetically closed base portion, said inner tubular
 125 member having its open end directed toward and spaced from the base portion; and valve controlled means connected to the open end of said other member to conduct liquid to and from said members.
 130

2. A fluid pumping apparatus including a bottlelike pump element comprising a casing open at one end and hermetically closed at the other, a second member within said casing for regulating the expansion of liquid therein, a valved feed line connected to and outside of the open end of the pump casing, a valved discharge line also connected to and outside of the open end of the pump casing, and an electrical heating element associated with said pump element. 10

5 In testimony whereof, I have signed my name to this specification.

LESTER E. VAN HISE.