L. MASCHEK AND C. B. HIGGINS.

VALVE.

APPLICATION FILED OCT. 28, 1918.

1,351,259.

Patented Aug. 31, 1920.

3 SHEETS—SHEET 1.

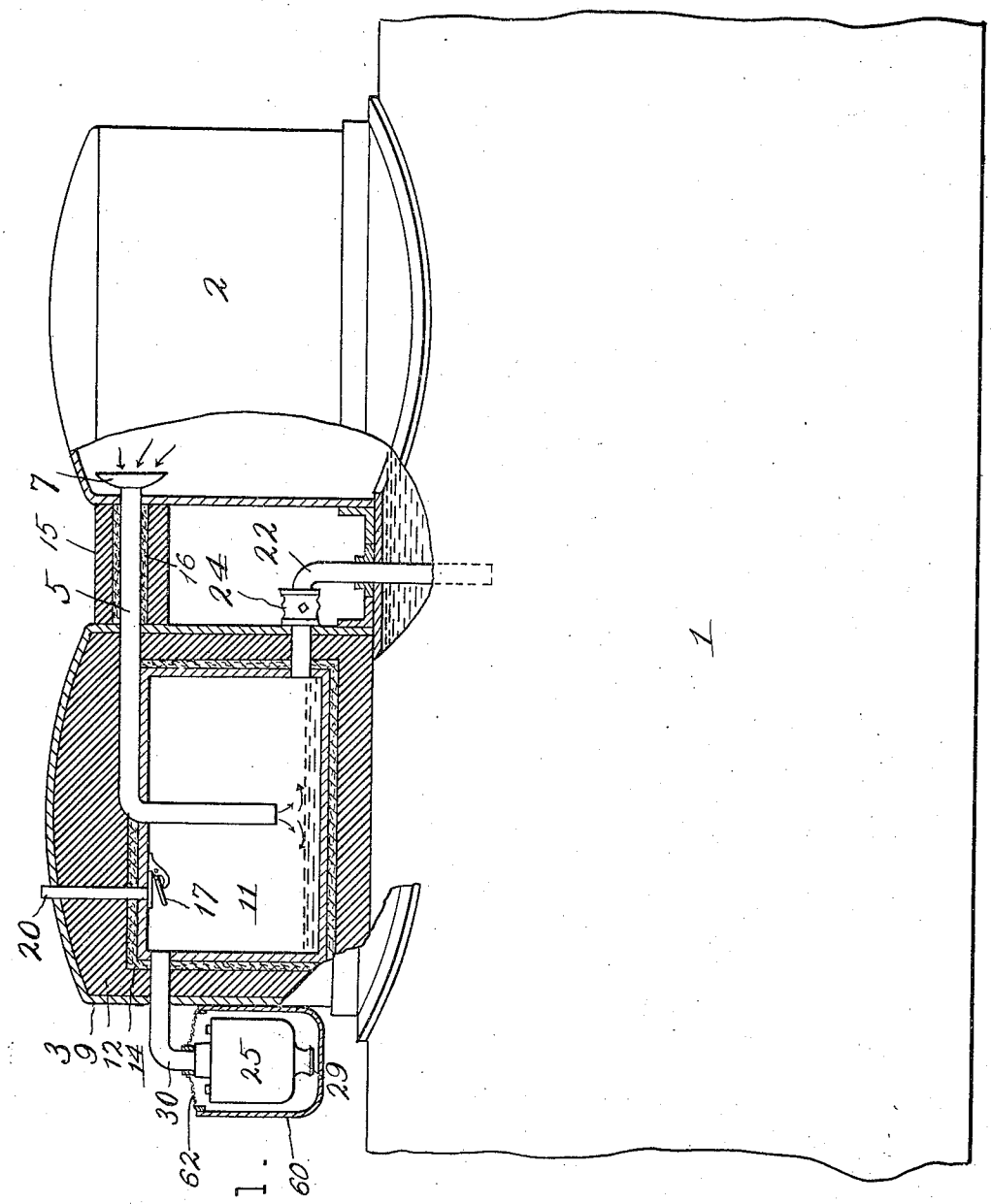


FIG. 1.

WITNESS:

L. J. Fischer

INVENTORS:

Louis Maschek
and Camillus B. Higgins,
BY
F. G. Fischer,
ATTORNEY.

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3 SHEETS—SHEET 2.

FIG. 3.

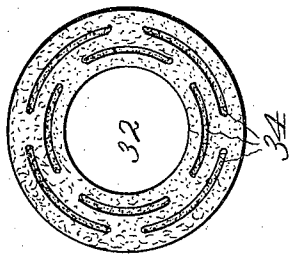


FIG. 4.

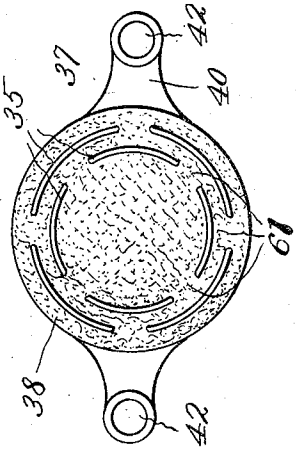
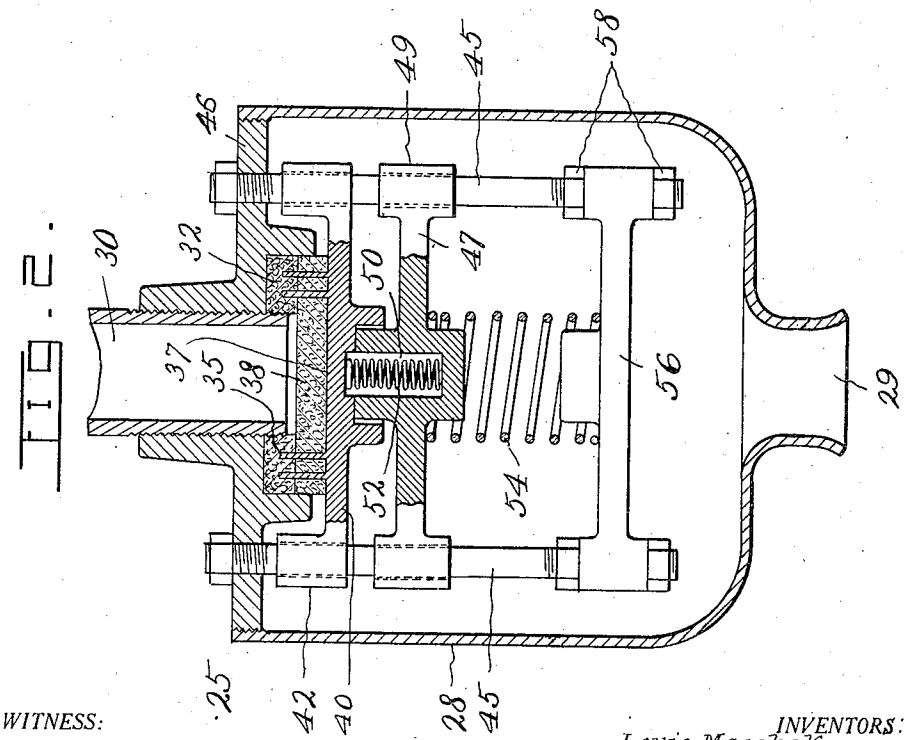


FIG. 2.



WITNESS:

L. J. Fischer

INVENTORS:
Louis Maschek
and Camillus B. Higgins,
BY
F. G. Fischer,
ATTORNEY.

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3 SHEETS—SHEET 3.

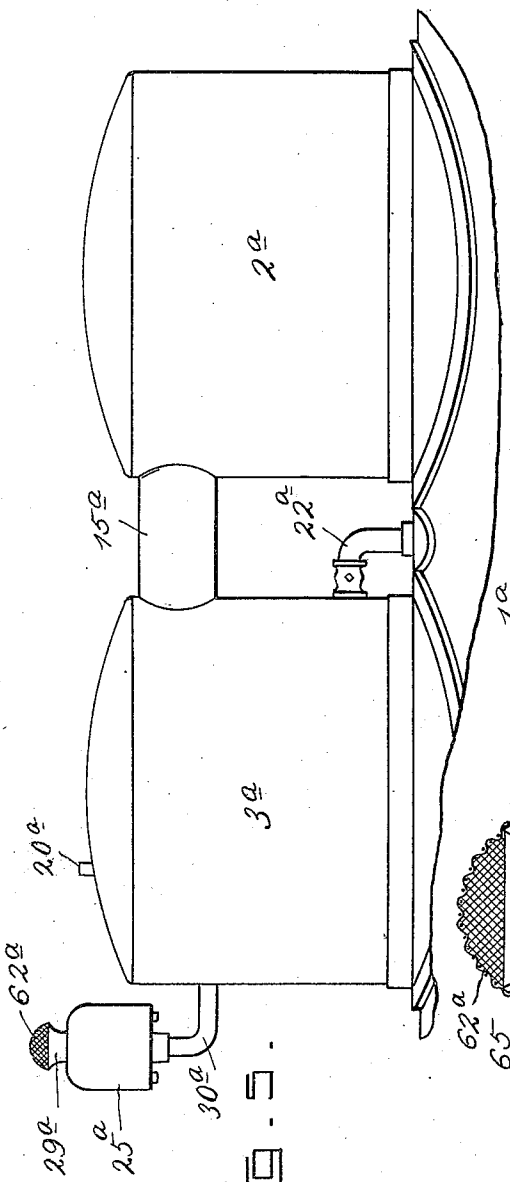


FIG. 5.

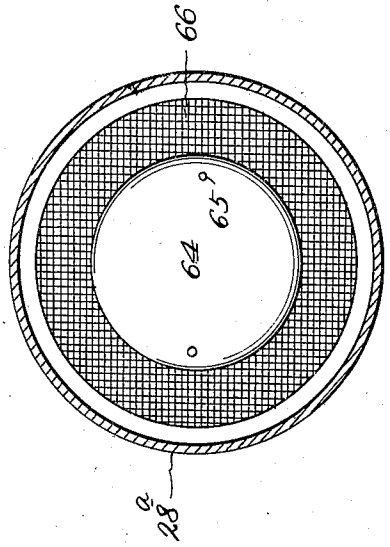


FIG. 7.

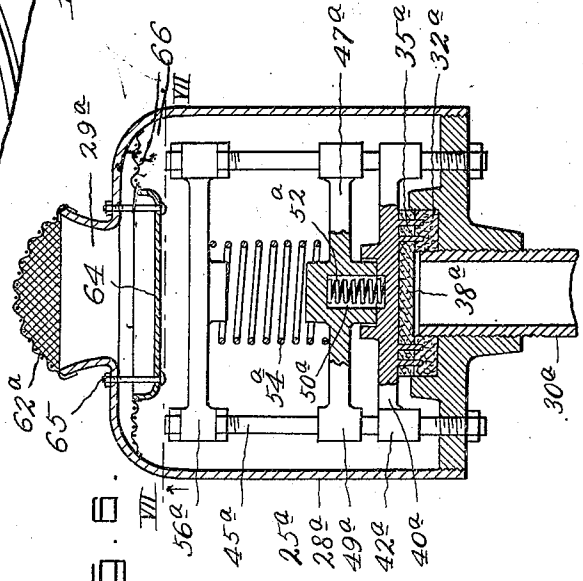


FIG. 6.

WITNESS:

L. J. Fischer

INVENTORS:

Louis Maschek

and Camillus B. Higgins,

BY

F. G. Fischer,

ATTORNEY.

UNITED STATES PATENT OFFICE.

LOUIS MASCHEK AND CAMILLUS B. HIGGINS, OF KANSAS CITY, MISSOURI.

VALVE.

1,351,259. Specification of Letters Patent. Patented Aug. 31, 1920.

Application filed October 28, 1918. Serial No. 260,023.

To all whom it may concern:

Be it known that we, LOUIS MASCHEK and CAMILLUS B. HIGGINS, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Valves, of which the following is a specification.

Our invention relates to improvements in valves and while it may be used to advantage for a variety of purposes, it is more particularly adapted to permit the escape of gas arising from gasolene and other volatile hydrocarbon oils contained in tank cars, storage tanks, etc.

In order that the invention may be fully understood, reference will now be made to the accompanying drawings, in which:

Figure 1 is a broken elevation partly in section of a tank equipped with one form of the device.

Fig. 2 is an enlarged vertical sectional view of the relief valve employed constituting an important feature of the invention.

Fig. 3 is an inverted plan view of the relief valve seat.

Fig. 4 is a plan view of the valve plug.

Fig. 5 is a broken elevation partly in section of a tank equipped with another form of relief valve.

Fig. 6 is a vertical, sectional view of the relief valve disclosed on Fig. 5.

Fig. 7 is an inverted, cross section on line VII—VII of Fig. 6.

Referring now in detail to the various parts, 1 designates a tank for holding gasolene or other volatile oils, said tank being surmounted by a dome 2.

3 designates the condenser for liquefying the gas arising from the oil in the tank 1, a pipe 5 extending from the dome 2 to the interior of the condenser 3 for the purpose of leading the gas from the former to the latter. The inlet end of the pipe 5 has a bell-mouth 7, so that the gas may readily enter said pipe.

The condenser 3 may be made in any suitable form and of any suitable material. In practice, we prefer to employ an outer sheet metal shell 9, an inner sheet metal chamber 11, and insulation of asbestos 12, and felt 14 to fill the space between the chamber 11 and the shell 9. The pipe 5 is also insulated with asbestos 15 and felt 16.

17 designates a self-opening starter-valve having a vent 20 leading from the chamber 11 to the atmosphere.

22 designates a return pipe leading from the lower portion of the chamber 11 to the upper portion of the tank 1 and provided with a check valve 24, adapted to be opened by the liquefied gas when the same has accumulated to a certain depth within said chamber 11.

25 designates the relief-valve whereby a portion of the gas in the chamber 11 may escape on reaching a predetermined pressure. Said relief-valve 25 embodies a casing 28 having an outlet 29, and an inlet pipe 30 leading from the upper portion of the chamber 11. The inlet pipe 30 projects through the top of the casing 28 and is surrounded by a valve seat 32 having segmental grooves 34 in its lower face to receive corresponding segmental projections 35 on the valve plug 37, which is provided at its upper side with a felt or other suitable cushion 38 adapted to bear against the cushion valve seat 32. The valve plug 37 is provided with laterally extending arms 40 having sleeves 42 slidably-mounted on guide rods 45, extending downwardly into the casing 28 from the upper end 46 thereof where said guide rods 45 are fixed.

47 designates a member arranged beneath the valve plug 37 and provided with sleeves 49 slidably-mounted upon the rods 45. The member 47 is provided with a central pocket 50 in which a secondary spring 52 is seated. Said spring 52 is placed in the pocket 50 under compression, so that it will bear against the underside of the valve plug 37 and hold the same in closed position against the valve seat 32.

The member 47 is yieldably-held against the valve plug 37 by a primary coil spring 54, bearing against said member 47 and a yoke 56 adjustably-secured to the lower ends of the guide rods 45 by lock nuts 58.

60 designates a cup-shaped deflector loosely surrounding the valve 25 to deflect the gas discharged therefrom upwardly away from the tank 1. Thus should the tank-car become wrecked and the discharg-

ing gas be ignited, the flame is carried away from the tank 1 and danger of a fire from this cause is averted. The upper, open end of the cup 60 is covered by a wire screen 62, which excludes cinders and other foreign matter.

In practice, the starter-valve 17 is initially in open position to permit a circulation of the gas from the dome 2 to the chamber 11 through the pipe 5. After the gas attains a predetermined pressure within the chamber 11, it closes the starter-valve 17, which cuts off the flow of gas to atmosphere. As only a very light pressure is required to close the valve 17, the waste of gas through the vent 20 is insignificant. After being entrapped in the chamber 11 on the closure of the valve 17, the gas expands within said chamber, the walls of which are protected from the heat of the outer atmosphere by the shell 9 and the insulation 12 and 14. Thus as the gas impinges against the relatively cool walls of the chamber 11, it becomes liquefied and flows to the bottom of said chamber where a small amount is permitted to accumulate before returning to the tank 1 through the pipe 22. This small amount of gasolene covering the bottom of the chamber assists in liquefying the gas as it discharges from the outlet end of the pipe 5.

Should unusual conditions arise, such as a fire adjacent to the tank, and tend to cause the pressure within the chamber 11 to approach the danger point, the gas is permitted to escape through the relief-valve 25, the plug 37 of which is forced from its seat against the action of the spring 54 and allows the gas to escape through the ports 61 between the ends of the segmental projections 35.

Should jarring, such as is caused by the tank-car passing over the ends of two rails, cause the member 47 to move downwardly and compress the primary spring 54, the valve is still held to its seat by expansion of the spring 52 and hence there will be no loss of gas by accidental opening of the relief valve.

In the other form disclosed by Figs. 5 to 7, inclusive, the construction is, substantially the same as above described as indicated by similar reference numerals with exponents, the chief differences being that the relief valve is inverted so that its outlet 29^a is turned upwardly away from the tank 1^a, and thus obviates the necessity of the deflector 60 disclosed on Fig. 1. The outlet 29^a is covered by a screen 62^a to exclude cinders, etc., from the interior of the casing 28^a. Fine dust and other debris passing through the screen 62 is caught in a pan 64 suspended by pins 65 from the upper portion of the casing 28^a. A screen 66 extends from the periphery of the pan 64 to the interior surface of the shell 28^a to intercept any small particles which might pass through the screen 62 and not enter the pan 64.

From the foregoing description, it is apparent that an apparatus well adapted for the purpose intended has been provided and while two forms of the invention have been shown, the right is reserved to make such changes in the construction, arrangement, and proportion of parts as properly fall within the spirit and scope of the claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent, is:

1. A valve consisting of a casing having inlet and outlet ports, a valve plug to close one of said ports, a yieldably supported member to normally hold said valve plug in closed position, and resilient means interposed between said member and the valve plug to hold the latter to its seat in case said member should be jarred away from said valve plug.

2. A valve consisting of a casing having inlet and outlet ports, a valve plug to close one of said ports, a spring pressed member to yieldably hold said valve plug in closed position, and resilient means interposed between said member and the valve plug to hold the latter to its seat in case said member should be jarred away from said valve plug.

3. A valve consisting of a casing having inlet and outlet ports, a valve plug to close one of said ports, a yieldably supported member provided with a pocket and adapted to normally hold said valve plug in closed position, and a spring disposed within the pocket and bearing against the valve plug to hold the latter to its seat in case said member should be jarred away from said valve plug.

4. A valve consisting of a casing having inlet and outlet ports, a valve plug to close one of said ports, sleeves to said valve plug, guides fixed to the valve casing and slidably embraced by said sleeves, and yieldable means to normally hold said valve plug in closed position.

5. A valve consisting of a casing having inlet and outlet ports, a valve plug to close one of said ports, a yieldably supported member to normally hold said valve plug in closed position, sleeves to said member, and guides slidably embraced by said sleeves.

6. A valve consisting of a casing having inlet and outlet ports, a flexible valve seat surrounding one of said ports and provided with grooves, a valve plug yieldably held against said seat, and segmental projections fixed to said valve plug and adapted to enter the grooves in the valve seat.

7. A valve consisting of a casing having inlet and outlet ports, a flexible valve seat

surrounding one of said ports and provided with grooves, a valve plug yieldably held against said seat, segmental projections fixed to said valve plug and adapted to enter the grooves in the valve seat, flexible means fixed to the valve plug and adapted to engage the flexible seat, and a cup-shaped deflector surrounding the valve.

In testimony whereof we affix our signatures, in the presence of two witnesses.

LOUIS MASCHEK.
CAMILLUS B. HIGGINS.

Witnesses:
F. G. FISCHER,
L. J. FISCHER.