M. A. FESLER.

LIQUID FEED SYSTEM.

APPLICATION FILED MAR 8, 1918.

1,308,005.

Patented June 24, 1919.

Fig. 1

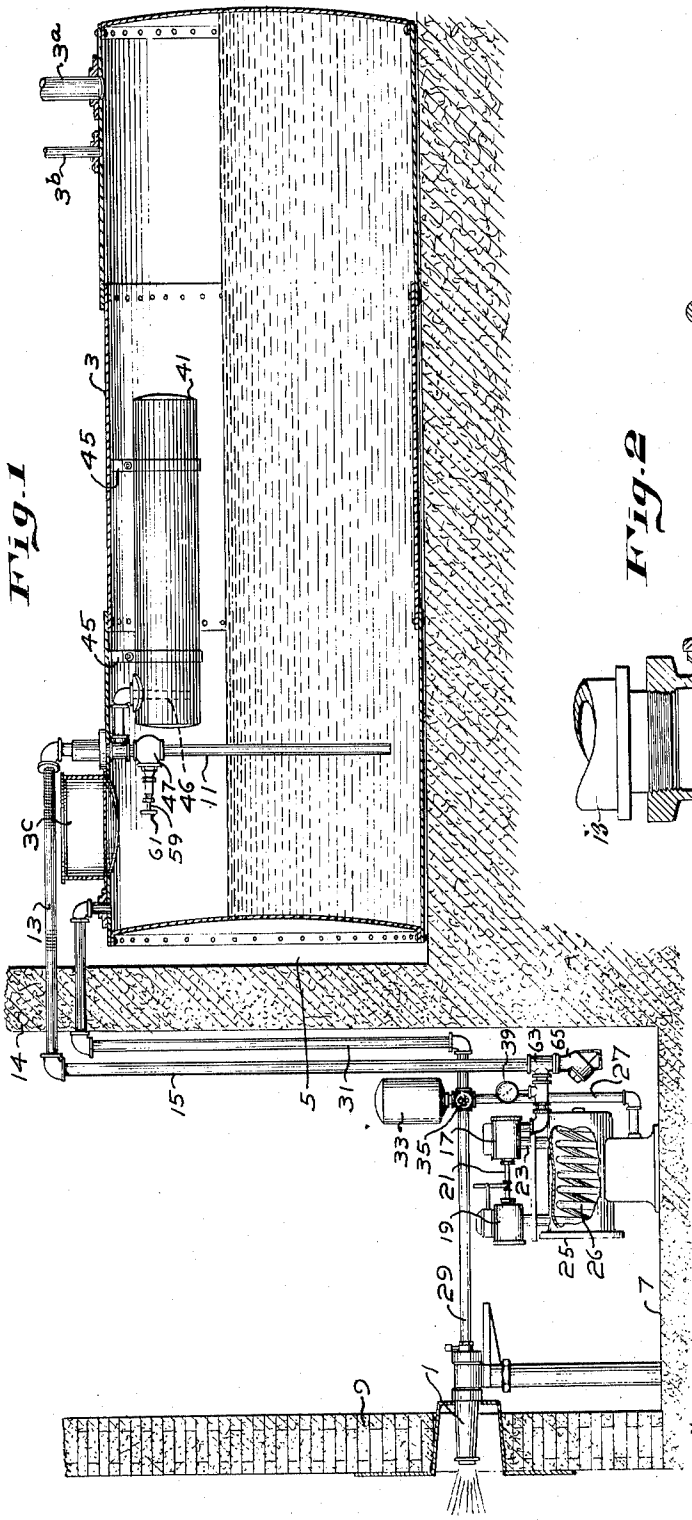


Fig. 2

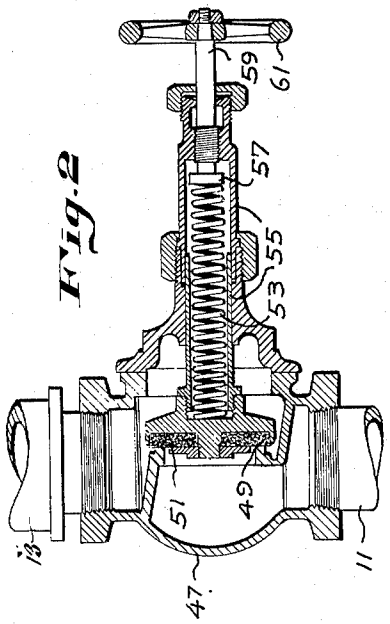
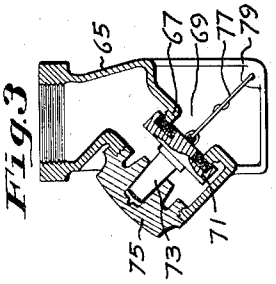


Fig. 3



Inventor
Milton A. Fesler
by Robt. O. Harris
Attorney

UNITED STATES PATENT OFFICE.

MILTON A. FESLER, OF OAKLAND, CALIFORNIA, ASSIGNOR TO FESS ROTARY OIL BURNER INC., OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

LIQUID-FEED SYSTEM.

1,308,005. Specification of Letters Patent. Patented June 24, 1919.

Application filed March 8, 1918. Serial No. 221,113.

To all whom it may concern:

Be it known that I, MILTON A. FESLER, a citizen of the United States, and resident of Oakland, county of Alameda, and State of California, have invented an Improvement in Liquid-Feed Systems, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The invention to be hereinafter described relates to liquid feed systems and more particularly to systems for feeding liquid fuel such as oil to burners.

Heretofore an oil feed system has been used comprising a reservoir for the oil connected by piping with the burner, the oil being drawn through the piping to the burner by a pump which produces a vacuum or pressure reduction in the piping. Also the piping has been arranged to form a siphon adapted to coöperate with the pump to cause the flow of the oil through the system. This has been found to be an efficient system under normal conditions, but if a leak, break or other accident occurs in the system, oil will escape from the piping, and when the siphon is used the oil may continue to flow from the reservoir until exhausted therefrom, with consequent loss of oil and attendant danger and damage to the building in which the system is installed.

The aim and purpose of the present invention is to provide a system whereby liquid may be automatically prevented from flowing from the system in case of accident thereto, or on rise of temperature to a predetermined point.

The character of the invention may be best understood by reference to the following description of one good form thereof shown in the accompanying drawings, wherein:—

Figure 1 is a side elevation of an oil feed system embodying the invention applied to a burner;

Fig. 2 on an enlarged scale is a section through an automatic valve in the system for controlling the discharge of the oil from the reservoir; and

Fig. 3 on an enlarged scale is a sectional view of a temperature responsive device in the system shown in Fig. 1.

Referring to the drawing, the liquid feed system embodying the invention may be applied to various uses, but for purposes of illustration, in the present instance, the system is shown in connection with a crude oil burner 1, which may be of usual construction and hence is unnecessary to show in detail herein. A suitable reservoir may be provided for the liquid or oil, and may conveniently be in the form of a tank 3 mounted in a concrete pocket 5 above the level of the floor 7 on which the burner and the furnace 9 therefor are mounted. At the top of the reservoir is a filling pipe 3^a, a vent pipe 3^b to allow gases to escape from the reservoir, and a manhole 3^c to furnish access to the interior of the reservoir.

To feed the fuel from the reservoir to the burner, a system of piping may be provided, in the present instance, comprising a feed pipe 11 rising from a point near the bottom of the reservoir to the top thereof, where it is connected to a feed pipe 13 extending horizontally away from the reservoir around the manhole 3^c and thence through a fire-proof wall 14 of concrete or other suitable material. The pipe 13 may be connected to a vertical feed pipe 15 which may extend downward to a suitable vacuum pump. In the present instance is shown a steam pump of usual construction, comprising the pump cylinder 17 and the steam cylinder 19 containing pistons connected by the connecting rod 21. A pipe 23 leads from the pump cylinder 17 to a heating chamber 25 containing a pipe coil 26 which receives exhaust steam from the steam cylinder and heats the fuel to render the same in better condition for combustion. A pipe 27 leads from the heating chamber upward to a pair of branch pipes 29 and 31, the pipe 29 leading to the burner and the pipe 31 leading back to the oil supply tank and serving as a return pipe for any excess oil not required by the burner. A dome 33 may be connected to the oil supply pipe 27 conveniently at the juncture of the branch pipes 29 and 31 therewith. The oil is forced by the pump up into this dome, compressing the air confined therein, and thus the dome insures a continuous flow of oil to the burner instead of a pulsating flow such as otherwise would be had by a reciprocating pump. A valve 35 may be provided to control the return or by-passing of

oil to the reservoir. A gage 39 may be provided for the pipe 15 to indicate the vacuum or pressure reduction therein.

The system of piping leading from the reservoir to the burner may be in the form of a siphon, the pipes 11 and 15 constituting the short and long legs of the siphon respectively. The construction is such that when the pump draws the air from said pipes, a siphon effect is produced which assists in the delivery of the fuel from the reservoir to the burner.

In the event of an accident to the system, such, for example, as a break or leak therein, gravity will cause the fuel remaining in the pipes 13 and 15 to flow therefrom with consequent loss of fuel and liability of ignition or other damage to the building in which the system is installed; and where the piping is in the form of a siphon, the oil may continue to flow from the system until the supply in the reservoir is exhausted. An important feature of the invention, therefore, consists in the provision of means for automatically preventing loss of fuel in such a contingency.

In the present instance of the invention, this means comprises a vacuum tank 41 which may be supported in the reservoir by brackets 45 secured to the upper side thereof.

Since the vacuum tank is mounted in the oil reservoir and the latter is located in a concrete pocket separated by a fire-proof wall from the room containing the burner, danger of ignition of the oil from accidental causes is eliminated.

The vacuum tank may be provided with a pipe 46 projecting from a point adjacent the bottom of the tank up through the top of the tank and thence horizontally to the pipe 11 for delivering oil from the reservoir.

Suitable means may be provided for controlling the discharge of oil through the piping to the vacuum pump. In the present instance, for this purpose a feed control valve 47 is provided connected to the pipe 11 at a point conveniently accessible from the manhole 3ᶜ at the top of the reservoir. This valve comprises a seat 49 (Fig. 2) and a disk 51 urged toward said seat by a coil spring 53 mounted in telescoping tubes 55 and confined between said disk and a plunger 57 having a stem 59 threaded to the upper end of one of the tubes 55 and adapted to be adjusted by a handle 61 to vary the tension of said spring as required.

In operation, the pump will produce a vacuum or pressure reduction in the piping and the vacuum tank, thereby lifting the valve disk 51 from its seat 49 against the resistance of the spring 53 and causing the oil to flow from the reservoir, through the piping to the pump. It is then forced to the heating chamber, where it is rendered lighter and in better condition for burning, and thence to the burner.

If a leak or other accident occurs in the system, such as to allow escape of oil therefrom, air will be admitted to the pipes 11, 13 and 15, thereby causing a rise of pressure therein and allowing the spring 53 to automatically close the valve disk 51 to its seat. This will prevent further flow of oil from the reservoir. At the same time the vacuum or partial vacuum in the vacuum tank will automatically draw oil up out of the pipes 13 and 15 into the tank and prevent loss of the oil in said pipes and prevent siphoning of the oil from the reservoir. After the system has been repaired and the pump started again, the oil will be first drawn from the vacuum tank, thereby producing the vacuum therein, and then the oil will be drawn from the reservoir as before.

It may be desirable to automatically draw the oil or liquid from the piping in case fire or other cause raises the temperature of the room in which the piping is located to a predetermined point. To accomplish this, in the present instance, the union 63 in the oil feed pipe 15 may have a fitting 65 (Figs. 1 and 3) attached thereto formed to present a seat 67 surrounding a port 69 opening into the room. Coöperating with said seat is a valve 71 having a stem 73 fitting loosely in a guide bore in a plug 75 threaded to said fitting. A link 77 of suitable fusible composition has one end connected to said valve and its opposite end connected to an eye in an elbow 79 projecting from the body of the fitting.

The construction is such that the valve is normally held on its seat by the fusible link, but if the temperature of the room rises to a predetermined point, such, for example as 140 degrees F., the link will fuse and allow the suction in the piping to move the valve from its seat, thereby admitting air through the port into the fitting, causing the pressure to rise in the piping and permitting the vacuum tank to draw the oil from the piping into the tank.

The temperature responsive device may be located sufficiently near to the furnace so that in the event of a flare back from the furnace, the fusible link will be melted and the oil will be automatically drawn from the piping as described.

While the invention has been described more particularly with reference to the feed of oil to burners, it will be obvious that it is adapted for other uses as desired.

It will be understood that the invention is not limited to the specific embodiment shown, but that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What is claimed is:—

1. The combination with a reservoir for

liquid, of a system to conduct liquid from said reservoir, a valve in said system, and means automatically to close said valve and withdraw from the system liquid therein beyond said valve in the event of a leak in the system.

2. The combination with a reservoir for liquid, of a system to conduct liquid from said reservoir, a valve in said system, and means including a vacuum tank automatically to close said valve and withdraw from the system liquid remaining in the system beyond said valve in the event of a leak in the system.

3. The combination with a reservoir for liquid, of a system to conduct liquid from said reservoir, a valve in said system, spring means tending to close said valve, means automatically to open said valve against the resistance of said spring means to feed liquid from said reservoir, and a vacuum tank for automatically drawing into the tank liquid standing in the system on closure of said valve.

4. The combination with a reservoir for liquid, of a system to conduct liquid from said reservoir, a valve in said system, a pump for normally producing a suction effect in the system to open said valve and draw liquid therethrough, and a vacuum tank communicating with the system for automatically drawing liquid from the system in the event of loss of suction effect in the system.

5. The combination with a reservoir for liquid, of a vacuum tank, piping for conducting liquid from the reservoir and communicating with said tank, a valve in the piping, means normally to produce a suction effect in said piping and tank to automatically open said valve and cause flow of liquid from the reservoir, and means automatically to close said valve to interrupt flow of liquid from the reservoir on loss of the suction effect in the piping.

6. In a liquid feed system, the combination of a reservoir for liquid, piping to conduct liquid from said reservoir, a pump to produce suction effect in said piping to draw liquid from the reservoir through said piping, a valve in said piping opened by suction effect produced by said pump and automatically closed on loss of said suction effect, and a vacuum tank communicating with said piping at a point between said pump and valve and operating automatically to draw liquid from the piping into said tank on loss of said suction effect.

7. The combination with a reservoir for fluid fuel, of a burner, piping to conduct fuel from said reservoir to said burner, a pump normally to produce suction effect in said piping to feed fuel from the reservoir, through the piping to the burner, and means including a vacuum tank for automatically withdrawing fuel from the piping on loss of the suction effect therein.

8. The combination with a reservoir for fluid fuel, of a burner, piping to conduct fuel from said reservoir to said burner, a valve in said piping, a pump to produce suction effect in said piping to feed fuel from the reservoir through the piping to the burner, means to heat the fuel to render the same in better condition for combustion, and means automatically to withdraw the fuel from the system on loss of said suction effect.

9. The combination with a reservoir for liquid, a siphon system for conducting liquid from the reservoir, means to produce a suction effect in the system to cause the feed of liquid from the reservoir through the system, and means automatically to withdraw the liquid from the system in the event of a leak therein.

10. The combination with a reservoir for liquid, of a system to conduct liquid from said reservoir, a normally closed valve in said system, temperature responsive means to allow opening of said valve, and means automatically to withdraw liquid from the system on opening of said valve.

11. In a liquid feed system, the combination with a reservoir for liquid, of a vacuum tank, piping connected with said reservoir and tank for conducting liquid from said reservoir, means to reduce the pressure in said piping and tank to draw liquid from said reservoir through said piping, and temperature responsive means to automatically admit air to said piping and render said tank effective to draw liquid from said piping.

12. In a liquid feed system, the combination with a reservoir for liquid, of a vacuum tank, piping connected with said reservoir and tank for conducting liquid from said reservoir, means to reduce the pressure in said piping and tank to draw liquid from said reservoir through said piping, a valve normally preventing entrance of outside air into said piping and temperature responsive means for allowing said valve to open automatically on rise of temperature thereat to a predetermined point to admit air to said piping and drive the liquid from said piping into said tank.

13. In a liquid feed system, the combination with a reservoir for liquid, of a vacuum tank, piping connected with said reservoir and tank for conducting liquid from said reservoir, means to reduce pressure in said piping and tank to draw liquid from said reservoir, a valve for said piping normally closed to prevent entrance of outside air into said piping, and means including a fusible member for allowing said valve to open on rise of the temperature thereat to a predetermined point, to admit outside air into the piping and drive the liquid into said tank.

14. In a liquid fuel feed system, the combination with a reservoir for the fuel, of a burner, a feed pipe for conducting fuel from said reservoir to said burner, pump means connected into said pipe between said reservoir and burner, a return pipe connected to said feed pipe between said pump and burner and leading back to said reservoir, a vacuum tank connected to said feed pipe, and a spring-pressed valve connected to said feed pipe.

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

MILTON A. FESLER.