Dec. 3, 1935. J. J. HARMAN 2,023,073

WATER FEEDER

Filed Oct. 12, 1931

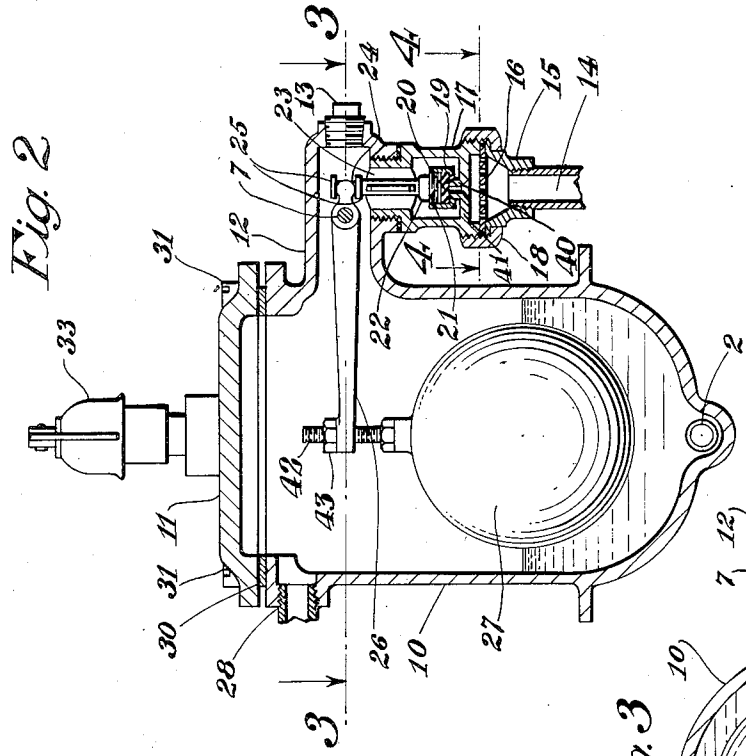


Fig. 2

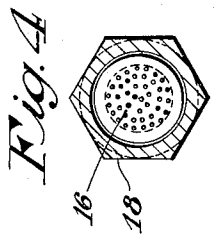


Fig. 4

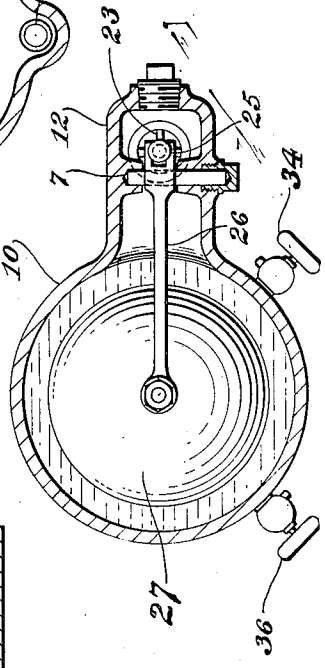


Fig. 3

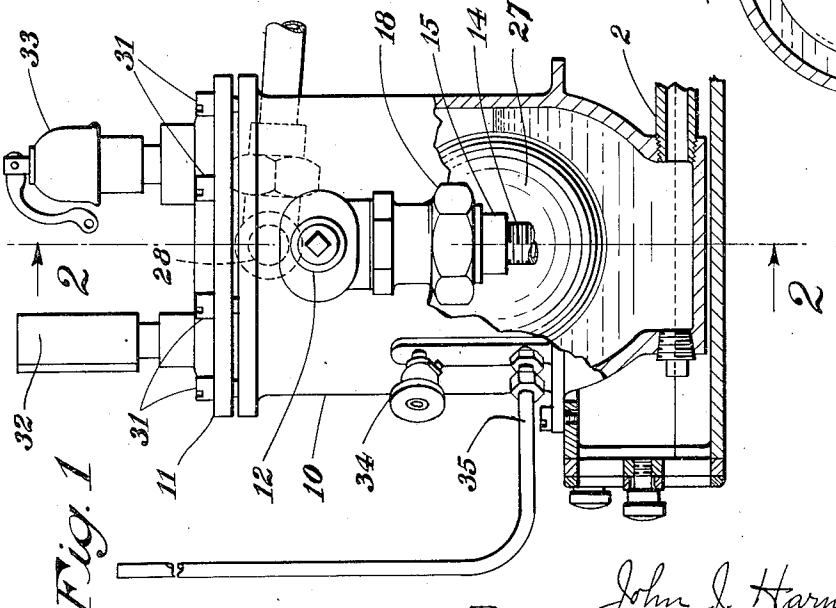


Fig. 1

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Patented Dec. 3, 1935

2,023,073

UNITED STATES PATENT OFFICE

2,023,073

WATER FEEDER

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Application October 12, 1931, Serial No. 568,286

4 Claims. (Cl. 137—101)

This invention relates to fluid feeding devices, and particularly to water feeders, of the float controlled type.

An object of the invention is to provide a simple, practical and efficient means for automatically controlling the supply of fluid, such as water, delivered to any fluid consuming device, such as water to the steam generator of a steam atomized oil burner or to a steam heater, where it is necessary or desirable that the supply of the fluid be accurately controlled. A further object of the invention is to provide a fluid feeding device suitable for regulating the supply of fluids delivered at relatively high temperatures, or which is used in connection with high temperatures such as steam, and in which the control means would not be subject to constant deterioration with subsequent loss of efficiency due to the action of such high temperatures—which is a serious defect in the ordinary feeder operating in conjunction with high temperatures.

A device constituting my invention comprises a fluid reservoir and float, and a valve operated by such float mounted on the fluid supply line exteriorly of the fluid tank or reservoir and connected therewith at a point above the level of the fluid in the tank.

Other objects, novel advantages, and features, of my invention appear in the following specification and accompanying drawing wherein,

Fig. 1 is a side elevation of my fluid feeding device, with parts broken away to show the inner arrangement.

Fig. 2 is a cross sectional view on the lines 2—2 of Fig. 1.

Fig. 3 is a sectional plan view on the lines 3—3 of Fig. 2.

Fig. 4 is a sectional view on the lines 4—4 of Fig. 2.

In the drawing, the fluid feeding device shown is a water feeder as used in connection with an oil burner operating on the steam atomizing principle and which is the subject matter of a separate application, but it is to be understood that this construction is used merely for purposes of illustration, and that the invention is not limited to this specific embodiment for it is obvious that various modifications may be made in this structure to meet the requirements of this or any other type of installation with which the fluid feeder may be used, without in any way departing from the spirit of the invention as defined in the claims. For the sake of simplicity and to avoid needless repetition "water" will be used throughout in describing the fluid used in the feeding device constituting my invention, but it is to be understood that any other fluid may be substituted in place of water, where the same problem exists of automatically and accurately controlling the supply of such fluid.

Referring more particularly to the drawing the water feeder comprises a cup-shaped casing 10 forming a main fluid reservoir and having its upper open end closed by a detachable cover 11. Extending laterally from one side of casing 10 at its upper end is an integral hollow projection 12 the outer end of which may be closed as by a pipe plug 13. The underside of the projection 12 is provided with a tapped aperture in which a hollow valve body 17 is threadedly secured and thus positioned substantially parallel with the main fluid reservoir and exterior of the casing 10.

The lower end of the body 10 may be rounded as shown and provided with an outlet 2 for connection to a steam generator or other device to which water from the main reservoir is to be fed. The inlet for water to the feeder is by way of a pipe 14 which is connected, as will presently be described, to the valve body 17 so that water first passes through the valve body and reaches the main reservoir by way of the hollow projection 12.

As shown in detail in Fig. 2, a union bottom 15 carrying the filter plate 16 attaches to the valve body 17 by means of the threaded collar 18. Within the valve body 17 is mounted for vertical movement the disk holder 19 carrying the rubber disk 20 (which can be made of any other suitable substance) which together constitute a valve operating in conjunction with an apertured projection forming a valve seat 40 on a web 41 which extends transversely of the valve body 17. A spacer 21 fits into the disk holder above the disk 20, and the vertical spindle 22 is threaded into the top of the disk holder 19, the spindle 22 having four vertical side webs 23 forming ports through which the water may pass, and at its top carries the rod 24 having lower and upper shoulders 25 protruding and extending up into the valve seat casting 12. The projection 12 constitutes an inlet for the water into the main reservoir or body 10 and from the valve body 17 is positioned near the top of body 10 and above the water level of body 10, so that none of the heated water in the main reservoir can flow back into the projection 12 and thence into the valve body 17, or come in contact with the incoming water to transfer heat to it by conduction. The valve body 17, in effect constitutes an auxiliary reservoir for the main reservoir 10. The projection 12 which extends outwardly from the side of the

body 10 constitutes a housing for the horizontal lever 26 pivoted laterally on the pin 7. The short end of the lever 26 is bifurcated vertically for engaging the rod 24 of the spindle 22 between its shoulders 25, and the long end of which lever 26 extends into the body of the feeder device. The long end of the lever 26 supports the downwardly depending copper float 27 positioned centrally in such feeder on a horizontal plane and which is adjustably secured to the lever 26 by a threaded member 42 and locked in position by a locknut 43.

On the opposite side of the body 10 from the projection 12 is a tap 28 from which a pipe may connect to the steam chamber of a steam generator (not shown), when the water feeder is used in conjunction with a steam generator, which pipe carries steam into the water feeder for equalizing the pressure between the feeder and the steam generator, or between the feeder and any other fluid consuming device in which it is desirable that the water levels be maintained at approximately the same height and under the same pressures. Similarly, an air hole may be placed in said body 10 to provide ordinary atmospheric pressure in feeder. The lead gasket 30 may be placed between the cover 11 and body 10, and the cover 11 may be attached to the body 10 by means of screws 31, while on the top of the cover 11 may be mounted a suitable steam pressure gauge 32 and pop safety valve 33 where such additional devices are desirable. Tri-cocks 34 and 36 may be mounted on the front side of the body 10 at different levels for trying the levels in the water feeder.

When the water feeder shown herein is used in conjunction with a steam atomizing oil burner, in which steam developed in the steam generator is carried to the steam atomizing nozzle it is desirable to have means provided in the water feeder to break the vacuum forming in the feeder by condensation of steam when the burner interrupts, and thereby prevent oil being drawn back into the feeder through the steam nozzle. This is done by connecting a pipe 35 to the body 10 of the water feeder below the water level therein, which pipe is carried upwardly several feet outside the feeder, and is left open at its upper end. The pipe thus carries a column of water and when steam condenses, forming a vacuum in the feeder, water and air will be drawn into the feeder through pipe 35 before the suction is felt in the steam nozzle, thus breaking the vacuum in the feeder and preventing oil from being drawn into the feeder through the steam nozzle.

The flow of water into the feeder is regulated by means of the float 27 when the water level has reached a predetermined height, which operates through lever 26 to close the valve in the water line by pressing down upon spindle 22 and rubber disk 20 which engages the valve seat 40 and shuts off the flow of water from the water pipe 14.

One feature of the water feeder constituting my invention is that the valve means is mounted outside of the body 10, and the valve seat in effect constitutes an auxiliary reservoir, the result of which is that the soft rubber disk 20 is exposed only to the normally cool water entering the feeder, and is not exposed to the action of the steam and hot water within the feeder. Another feature is that the projection 12 leading to the auxiliary reservoir is positioned near the top of the main reservoir or body 10 and above the water level therein, so that none of the heated water in the main reservoir can flow back into the projection 12 and thence into valve body 17. Thus, by this arrangement, only the steam can contact with the incoming water in body 17, and as the transfer of heat from hot water to cold water is five times that of the transfer from steam to cold water, it is an important advantage that the inlet from the auxiliary reservoir be above the water level of the main reservoir, when the normal flow of water through the valve is interrupted, that heat can be transferred only from the steam in the main reservoir, rather than from the hot water therein. As a consequence, the rubber disk is not subject to deterioration and so is able to control the water supply efficiently at all times. This water and fluid feeder then is of great utility in all cases in which the accurate regulation and control of the water supply to the water consuming device is necessary or desirable, and particularly in those situations in which the water is supplied at a normal temperature and becomes heated within the feeder body, with resultant deterioration to the valve means in the usual form of device wherein the valve means is mounted in the interior of the body of the feeder, or can come in contact with the heated water therein.

I claim:

1. A fluid feeding device, comprising in combination, a cup-shaped casing forming a main fluid reservoir and having an outlet, a projection having a passageway for fluid therein extending laterally from the casing adjacent its upper end, a valve body having one end secured to the lateral projection and lying substantially parallel with the main fluid reservoir, the opposite end of said valve body being connected to a source of fluid supply, said valve body constituting an auxiliary reservoir lying above the fluid level in the main reservoir and connected to the main reservoir by said lateral passageway, a float in the main reservoir positioned below said passageway and adjustable for maintaining a predetermined fluid level therein below said fluid passageway, and a valve in the auxiliary reservoir fastened to and thereby positively actuated by said float to control the fluid supply to said auxiliary and main reservoirs, said valve in its closed position being surrounded by fluid isolated from that in the main reservoir by the passageway.

2. A fluid feeding device, comprising in combination, a cup-shaped casing forming a main fluid reservoir and having an outlet, a projection having a passageway for fluid therein extending laterally from the casing adjacent its upper end, a valve body having one end secured to the lateral projection and lying substantially parallel with the main fluid reservoir, the opposite end of said valve body being connected to a source of fluid supply, said valve body constituting an auxiliary reservoir lying above the fluid level in the main reservoir and connected to the main reservoir by said lateral passageway, an apertured valve seat in said body at one end of said auxiliary reservoir, a float in the main reservoir positioned below said passageway, a lever arm carrying said float extending through said passageway and pivotally connected to said projection, said float being adjustable in the arm for maintaining a predetermined fluid level in the main reservoir below said fluid passageway, a valve member for closing the aperture in said valve seat, and means fastening said valve member to the lever arm whereby said valve member will be positively actuated by said float to con-

trol the fluid supply to said auxiliary and main reservoirs, said valve in its closed position being surrounded by fluid isolated from that in the main reservoir by the passageway.

3. A fluid feeding device, comprising in combination, a casing forming a main fluid reservoir and having an outlet, an integral projection having a passageway for fluid therein extending laterally from the casing, said projection having a threaded opening in its underside adjacent its upper end, a valve body having one end secured in said opening and lying substantially parallel with the main fluid reservoir, the opposite end of said valve body being connected to a source of fluid supply, said valve body constituting an auxiliary reservoir lying above and exterior of the fluid level in the main reservoir and connected to the main reservoir by said lateral passageway, an apertured valve seat in said body at one end of said auxiliary reservoir, a float in the main reservoir, a lever arm pivotally connected to said projection and having one end extending through said passageway into the main reservoir and overlying said float, means for connecting said end of the lever arm to the float for adjusting the latter transversely thereof in the reservoir to maintain a predetermined fluid level therein below said fluid passageway, a valve member for closing the aperture in the valve seat, a stem extending from the valve member into said passageway, means on the other end of said lever arm fastened to said stem for positively actuating said valve member in response to movements of said float to control the fluid supply to said auxiliary and main reservoirs, said valve in its closed position being surrounded by fluid isolated from that in the main reservoir by the passageway, and guide means on the stem engaging said body for positioning the valve member on its seat.

4. A water feeding device, comprising in combination, a cup-shaped casing forming a main water reservoir and having a bottom outlet for said water and an inlet above the water level for steam, a cover secured to the open end of the cup-shaped casing for closing it against leakage, an integral projection having a passageway for water therein extending laterally from the casing at its upper end, said passageway communicating at one end with the main reservoir and being closed at the opposite end, said projection having a threaded aperture in its underside opening into the passageway, a hollow valve body having one end threadedly secured in the aperture and positioned substantially parallel with the main reservoir, means secured to the opposite end of said valve body for connection with a source of water supply, said valve body constituting an auxiliary reservoir lying above and exterior of the water level in the main reservoir and connected therewith by said lateral passageway, an apertured valve seat at the end of said valve body adjacent the water supply connection and surmounted by the auxiliary reservoir, a float in the main reservoir, a lever arm pivotally connected to said projection and having one end extending through said passageway into the main reservoir and overlying said float, means for connecting said end of the lever arm to the float for adjusting the latter transversely thereof in the reservoir to maintain a predetermined water level therein below said passageway, a valve member for closing the aperture in the valve seat, a stem extending from the valve member into said passageway, means on the other end of said lever arm fastened to said stem for positively actuating said valve member in response to movements of said float to control the fluid supply to said auxiliary and main reservoirs, said valve in its closed position being surrounded by water isolated from that in the main reservoir by the passageway and main reservoirs, and guide means on the stem engaging said body for positioning the valve member on its seat.

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