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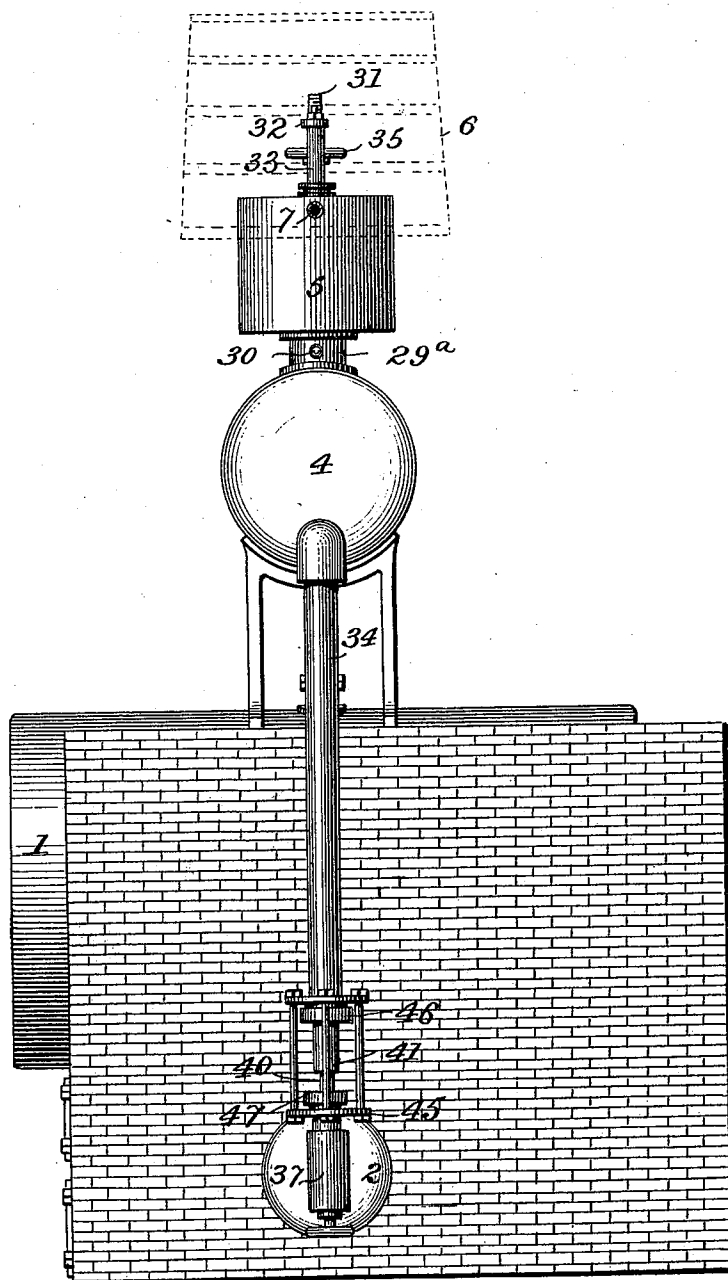
2 Sheets—Sheet 1.

L. A. PARISHER.
AUTOMATIC BOILER FEED.

No. 512,742.

Patented Jan. 16, 1894.

Fig. 1.



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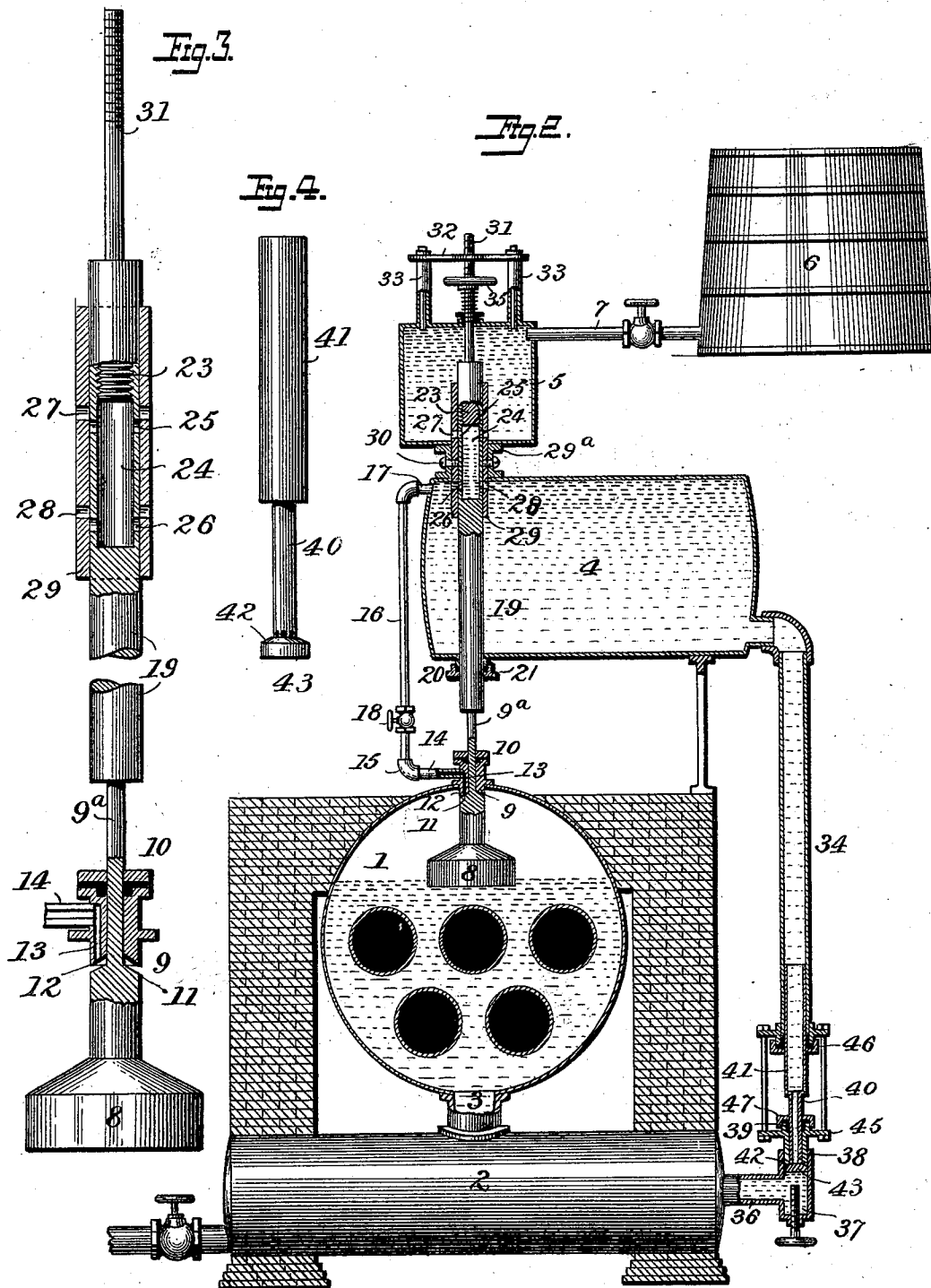
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AUTOMATIC BOILER FEED.

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UNITED STATES PATENT OFFICE.

LEMUEL ALPHUS PARISHER, OF SHREVEPORT, LOUISIANA.

AUTOMATIC BOILER-FEED.

SPECIFICATION forming part of Letters Patent No. 512,742, dated January 16, 1894.

Application filed June 21, 1893. Serial No. 478,376. (No model.)

To all whom it may concern:

Be it known that I, LEMUEL ALPHUS PARISHER, residing in Shreveport, Caddo parish, Louisiana, have invented certain new and useful Improvements in Automatic Boiler-Feeds, of which the following is a specification.

This invention relates to certain new and useful improvements in automatic feeders for steam boilers; and it consists substantially in such features of arrangement, construction, and combinations of parts as will hereinafter be more particularly described. On account of the unreliability of working of some part or other of the feeders for steam boilers as ordinarily constructed, such devices have not heretofore been quite as satisfactory as desired, and it not infrequently happens that in large boiler houses considerable expense is involved by their use as well as the loss of much time and labor in keeping them in perfect working order and repair. With many forms of automatic feeders the defective working or operation of some one part or element is of course likely to destroy the effective working or operation of the whole, and it is particularly desirable that no such defect shall occur and that the action of the devices be always prompt and responsive to the force or medium through which they are actuated.

My invention is designed to remedy many of the defects which have attended the use of boiler feed-devices as constructed heretofore; as well as to provide a boiler feed device which shall be entirely automatic in its character and one in which the several parts shall always be reliable and responsive in their action with little or no liability of getting out of order or of becoming clogged or stopped up.

In the accompanying drawings: Figure 1 represents a side elevation of a steam boiler having my improvements embodied in connection therewith; and Fig. 2 is a transverse sectional view thereof, from which the construction as well as the general operation of the several parts will be clearly understood. Figs. 3 and 4 are sectional views in detail of certain parts.

In carrying my invention into effect, I provide an automatic device or float resting upon the surface of the water in the boiler and which at the ordinary water line or level

serves to close a steam passage leading from the pressure drum to the boiler; and at the same time to open communication between such drum and an intermediate tank receiving its supply from the main water tank. As soon, however as the water in the boiler gets below the proper level, the said device or float descends and automatically opens the steam passage to the boiler and at the same time or simultaneously therewith closes communication between the pressure drum and intermediate tank. The steam rushing into the drum from the boiler exerts its pressure on the water contained in such drum and thereby opens a valve contained in a feed pipe leading from the bottom of the pressure drum to the boiler direct at the bottom thereof, or to the usual mud drum below the boiler. As soon as the water has again reached the proper level the steam passage to the pressure drum will be closed, the communication between the said drum and intermediate tank again established, and the valve in the feed pipe closed, all as before.

While I have herein shown the feed as being made to the boiler direct, it is evident that the water may be first made to pass to a suitable heater and thence to the boiler, but for all the purposes for which my invention is intended the construction and arrangement shown will be amply sufficient.

In the drawings, 1 represents an ordinary steam boiler, and 2 the usual mud drum located beneath the same and having communication therewith through the hollow connection 3. Located above the said boiler in any suitable position relatively thereto is what I term a pressure drum 4, and located above such drum is an intermediate water tank 5 having communication with the main supply tank 6 by means of the connecting pipe 7. It will of course be understood that I do not confine myself to the particular arrangement of the parts referred to, since any relative arrangement thereof may be adopted which will best suit the working or operation of the several parts to be hereinafter referred to.

Located within the boiler is a float 8 which is attached in any suitable manner to the lower end of a valve 9, the short stem 9^a of which works through a gland or stuffing-box 10, fit-

ting into the top of the boiler steam-tight and extending inward a suitable distance, the lower end of such gland being beveled or inclined at 11, so as to form a seat for the correspondingly formed face 12 of said valve. 5 Entering the side of the said gland just outside of the boiler, and communicating with a vertical passage 13 therein, is a short steam pipe 14 connecting by means of the joint 15 10 with a vertical steam pipe 16 leading up to the pressure drum at near the top thereof, where it connects in a similar manner with a similar short pipe 17 entering said drum, as shown. Whenever the valve is closed up tight 15 on its seat against the beveled faces 11 of the gland, it will be apparent that no steam can escape from the boiler to the pipe 16, but that whenever the valve is drawn down from its seat, the passage leading to such pipe from 20 the steam space of the boiler will be open. The said pipe 16 is provided with a suitable valve or cock 18 by which the passage of steam therethrough may be either cut off or regulated, as may be desired. Any suitable steam 25 tight connections may be employed between such pipe and the small or shorter pipes leading into the vertical passage 13 and the pressure drum respectively.

Connected to the upper end of the short 30 stem 9^a in any suitable manner, is an enlarged stem 19 which passes up entirely through the pressure drum 4, and works in a stuffing box 20 secured to the lower or under side of said drum in any suitable manner, but preferably 35 by a packed connection as shown at 21. The said enlarged stem 19 is hollowed out for a suitable distance from its upper end, and a plug 23 fits therein and extends down into the same sufficiently far to form a hollow 40 chamber 24, the height of said chamber being such as that the lower part of the same extends into the pressure drum 4 at the top, while the upper portion thereof extends in a similar manner into the intermediate water 45 tank 5 from the bottom.

In the sides of the chamber 24 at a point thereof within the tank 5, suitable ports 25 are formed, while in the sides thereof of the portion extending within the pressure drum 50 4, similar ports 26 are formed. These ports 25 and 26 register with corresponding ports 27 and 28 which are formed in the sides of a sleeve 29 which extends into the drum 4 and tank 5 in like manner as the hollow chamber 55 24, the said sleeve inclosing the chamber in such manner as to permit movement of the stem 19 so as to carry the ports 25 and 26 into and out of register by the proper operation or working of parts. A flanged support 29^a 60 maintains or holds the tank 5 in its position above the pressure drum 4, and the sleeve 29 is preferably secured in place by pins or screws 30 passing through the sides of said flanged support and entering the sides of the 65 sleeve so as to maintain the latter in its proper position relative to the chamber 24. The sleeve 29 with its ports together with the

chamber 24 and its ports constitute a valve between them, as is obvious.

The plug 23 which closes the upper end of 70 the chamber 24 is formed or provided with a rod or stem 31 which works through the top of the intermediate tank 5 as well as through a stationary cross-head 32 fastened to the top of said tank by means of supports 33. 75

Bearing between the top of tank 5 and a hand-wheel 35 on the stem is a spring 36, the compression of which by the turning of said wheel regulates the action of the valve 9, connected to the lower end of the main stem, 80 and thus may the automatic action or working of the feeding devices be rendered hard or easy, as desired.

Leading from the bottom of the presser drum, preferably at the end thereof opposite 85 to where the steam pipe enters the said drum, is a feed pipe 34, the same being open at its lower end; while leading from the mud drum at the corresponding side thereof is a short tube or pipe 36, having a chamber 37 connected thereto in any suitable manner, the 90 said chamber constituting a valve chamber for the working of a balanced valve 38 (see detail Fig. 4) the stem of which works through a packing or sleeve 39 fitting within said 95 chamber, as shown, and which stem is hollow and contracted for a short distance, as shown at 40, then it enlarges at 41 so as to obtain a greater area of working or pressure surface of the column of water descending down into 100 the same through the feed pipe 34 in which latter the said hollow stem has its working movement vertically. The working faces of the valve and its seat are beveled or inclined as shown at 42 and 43; and to the sides of 105 the said hollow stem, between the lower end of the feed pipe and the upper end of the sleeve or packing 39, are suitable supports 45 which secure the feed pipe in place relative to the valve stem and valve chamber 37. 110

It will be observed that the hollow stem works through suitable packing rings 46 and 47, and that the joints and connections throughout the entire structure are preserved both air and steam tight. 115

Entering the valve chamber 37 from the bottom is an adjustable stem, the adjustment of which will regulate or determine the extent which the valve above it will be permitted to open, and consequently regulate 120 the degree of supply to the boiler to a greater or less extent.

From the foregoing description, it will be seen that as long as the water is maintained at its proper level in the boiler, the valve 9 125 will remain closed, and the ports 25 and 26 in the chamber 24 and sleeve 29 will be in register, or open, so as to allow water from the intermediate tank 5 to flow into the pressure drum 4. As soon however as the water sinks 130 below the water line or level the valve 9, will sink and be drawn from its seat, whereupon steam will escape from the steam space of the boiler into the small passage 13, thence into the

vertical pipe 16 into the pressure drum, above its watersurface, and the pressure thereby exerted will be sufficient to open the valve 38 and permit water to flow into the mud drum and into the boiler from beneath. When the valve 9 is opened, the ports 25 and 26 are carried out of register thus cutting off water to the drum from the tank 5 temporarily. As soon as the water again regains its level the valve 9 is again closed, the ports 25 and 26 made to register again, and the pressure in the drum is relieved; while at the same time the back pressure in the boiler will close the valve 38 upon its seat. It will be understood that the latter valve is a balanced valve and will normally be maintained in its seat against the column of water always contained in the hollow stem and feed pipe by the pressure of the water beneath that is, contained in the chamber 37. When the ports 25 and 26 are again made to register by the action of valve 9 the steam left in the pressure drum will escape into the tank 5 and become condensed serving at the same time to heat the water in said tank.

It will further be seen that by the use of my invention I utilize the steam of the boiler to effect the operation of the feed devices, and that none of such steam goes to waste. Neither are any of the parts liable to get out of order, but they will always be found perfect and reliable.

The operation of simultaneously opening the steam passage from the boiler to the intermediate drum and closing communication between such drum and intermediate tank, is not dependent entirely upon the simple fall or descent of the float by its own weight, but is dependent in a large measure upon the degree to which the spring at the upper end of the valve stem is set, as will be explained. For instance it will be supposed that the float is raised or elevated by the water to close the valve, and that while in this position the said float is submerged, say for about two inches, and that there is a steam pressure of one hundred pounds in the boiler. Due to the shape of the valve, as soon as the same is opened to the slightest degree there will be a pressure of steam exerted downwardly upon the valve and float, thereby carrying the stem down entirely and closing the upper ports. Supposing the surface of the valve upon which the steam is permitted to exert its pressure is five-eighths of an inch, then at one hundred pounds steam pressure we would have five-eighths of one hundred pounds pressure exerted to the float downwardly and this pressure would tend to sink the float still farther, and then as soon as the float is lowered to any extent whatever by decrease of the height of water in the boiler, the pressure will immediately begin to act on the valve in the manner already mentioned. The spring at the top of the valve stem is used to prevent any jar or jerking when the valve is opened, and this spring is so set as to limit the downward

movement of the valve and hold it to the position to which it is brought by the action of the lowering of the water in the boiler.

Without limiting myself to the details of construction and arrangement shown, I claim—

1. In automatic feeders for steam boilers, a pressure drum and a water tank normally in communication with each other, and means for automatically closing such communication on the descent of water in the boiler, in combination with the boiler, the combined float and valve, and the steam passage leading from such valve to the top of the water tank, substantially as described.

2. In automatic feeders for steam boilers, the combination with the boiler, the pressure drum, and water tank, of the intermediate tank, a valve between said drum and intermediate tank, normally maintaining communication between the two, a float in the boiler for operating said valve, an intermediate valve closed by the float, a steam passage leading from such intermediate valve to the pressure drum, and a regulating spring for the intermediate valve, substantially as shown for the purposes set forth.

3. In automatic feeders for steam boilers, a pressure drum and a water tank normally in open communication with each other, and means for automatically closing such communication on descent of the water in the boiler, substantially as described.

4. In automatic feeders for steam boilers, the combination with the boiler, pressure drum, and a supply tank, of the valve 9 having the float and provided with the vertical stem, a chamber moving with said stem and having suitable ports, a stationary case inclosing said movable chamber and having registering ports leading both into the tank and pressure drum a steam passage leading from said valve into the drum, and a valve controlled passage leading from said drum into the water space of the boiler, substantially as described.

5. In automatic feeders for steam boilers, the combination with the boiler, pressure drum, and a tank, of a stationary sleeve connecting said tank and drum and provided with ports leading into each, a float valve in said boiler, the stem of which is provided with a chamber having registering ports, and a steam passage leading from said float valve to the drum, substantially as described.

6. In automatic feeders for steam boilers, the combination with the boiler, pressure drum, and intermediate tank, of the float valve having the end of its stem formed into a chamber having ports and closed by a plug, an adjusting nut and spring on the stem of said plug, a casing surrounding the chamber of the valve stem and provided with registering ports and a steam pipe leading from the valve to the top of the drum, substantially as described.

7. In automatic feeders for steam boilers,

the combination with the boiler, pressure drum, and main tank, of the intermediate tank, a valve between said drum and intermediate tank normally maintaining open communication between the two, and a float in the boiler, for operating the said valve, substantially as described.

8. In automatic feeders for steam boilers, the combination with the feed pipe, and the valve casing supported by a passage leading into the boiler, of the balanced valve provided with a hollow stem contracted for a part of

its length and enlarged toward the top, the said stem working within the feed pipe and having its upper end open, substantially as shown and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEMUEL ALPHUS PARISHER.

Witnesses:

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G. A. TURNER.