

No. 850,314.

PATENTED APR. 16, 1907.

M. L. PHIPPS.
AUTOMATIC BOILER FEED.
APPLICATION FILED SEPT. 13, 1906.

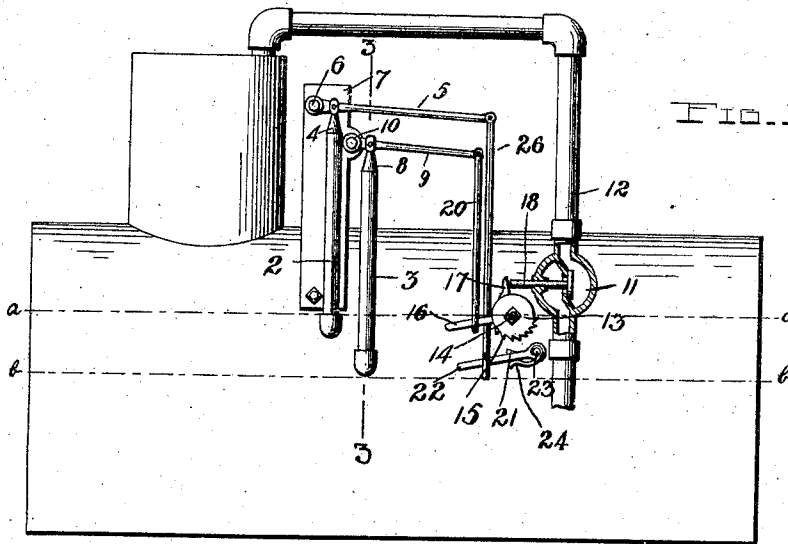


FIG. 1.

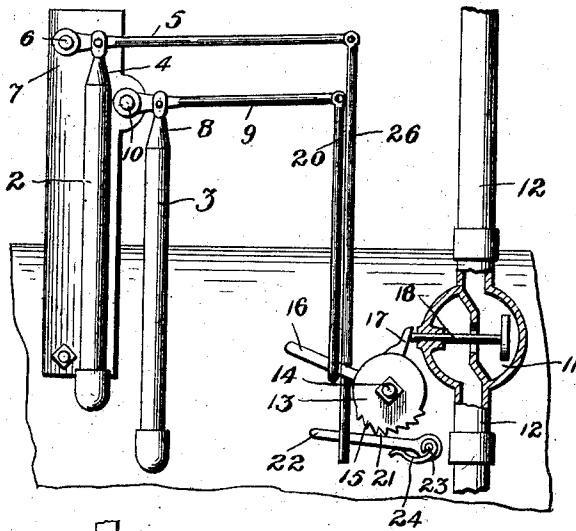


FIG. 2.

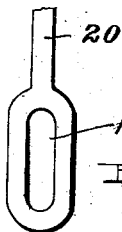


FIG. 4.

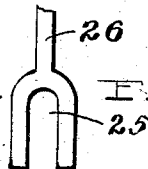


FIG. 5.

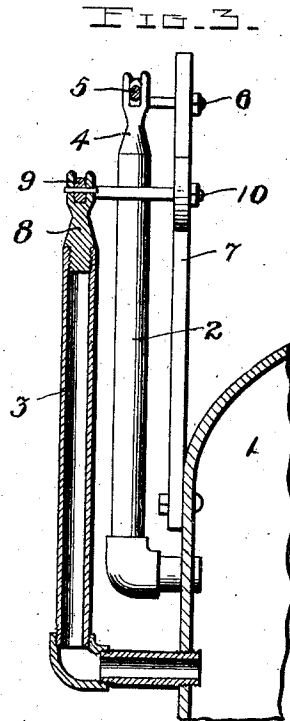


FIG. 3.

Witnesses
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UNITED STATES PATENT OFFICE.

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AUTOMATIC BOILER-FEED.

No. 850,314.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed September 13, 1906. Serial No. 334,491.

To all whom it may concern:

Be it known that I, MOSES LETCHER PHIPPS, a citizen of the United States, residing at Galax, in the county of Grayson and State of Virginia, have invented certain new and useful Improvements in Automatic Boiler-Feeds; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in devices for automatically feeding steam-boilers; and it consists in the novel features of construction, combination, and arrangement of parts hereinafter described and claimed.

The object of the invention is to improve and simplify the construction and operation of devices of this character, and thereby render the same more reliable and efficient.

The above and other objects, which will appear as the nature of the invention is better understood, are accomplished by means of the construction illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a steam-boiler, showing the application of the invention thereto. Fig. 2 is a detail view of the device, showing the position its parts assume when the water in the boiler drops below the low-water mark. Fig. 3 is a detail vertical transverse section taken on the plane indicated by the line 3 3 in Fig. 1, and Figs. 4 and 5 are detail views of the lower ends of two links or rods which actuate the valve-controlling devices.

The steam-boiler 1 may be of any form and construction and its high and low water level are indicated, respectively, by the dotted lines *a a* and *b b* in Fig. 1. Opening into the boiler adjacent to said lines or marks are upwardly-projecting pipes 2 3, which are preferably made of copper, so that they will expand to a considerable degree when the level of the water in the boiler drops below their open lower ends and permits the steam to enter them. The upper end of the pipe 2 is closed by a plug 4, having a bifurcated portion in which is pivoted a lever 5. The latter is pivoted at 6 upon an upright 7, secured upon the boiler adjacent to the pipes 2 3. The upper end of the pipe 3 is similarly closed by a plug 8, which has a lever 9 pivoted in its bifurcated upper end, said lever being

also pivoted upon the upright or support 7, as shown at 10. The pipes 2 3 are adapted to serve as thermostats and to actuate devices which control a valve 11 of any suitable form and construction arranged in a steam-pipe 12, leading from the steam-dome of the boiler to a steam-pump (not shown) which is suitably connected to the boiler 1 to supply the same with water. The devices which operate and control the valve 11 comprise a rotary or oscillatory disk 13, pivoted at 14 upon the side of the boiler and having ratchet-teeth 15 around a portion of its periphery and two radially-projecting arms 16 17. The arm or projection 17 is adapted to engage and actuate the stem 18 of the valve 11, said stem being slidably mounted in the valve-casing and projecting through the same, as clearly shown in the drawings. The arm 16 projects into a loop 19, formed upon the lower end of a rod or link 20, which has its upper end pivoted upon the long arm of the lever 9. Coacting with the ratchet-teeth 15 is a pawl 21, formed upon a lever 22, pivoted at 23 upon the side of the boiler. A spring 24 upon the pivot 23 engages the lever 2 and forces the same upwardly to hold the pawl 21 normally in engagement with the ratchet-teeth to prevent rotation of the disk 13 in one direction. The outer end of the lever 22 is engaged by the forked lower end 25 of a rod or link 26, which latter has its upper end pivoted upon the long arm of the lever 5.

The operation of the invention is as follows: When the water in the boiler drops below the lower open end of the pipe 2, the steam entering the latter will expand the same and elevate the lever 5 and its forked rod 26. This permits the spring 24 to elevate the lever 22 and move the pawl 21 into engagement with the segmental ratchet 16. When the level of the water drops below the lower water-line *b b*, steam will enter the pipe 3, expand the same, and elevate the lever 9 and its rod or link 20. The loop on the lower end of the latter elevates the arm 16 of the disk 13, and hence causes the projection or arm 17 to push the valve-stem 18 inwardly to open the valve 11, as shown in Fig. 2. When the valve is thus open, the steam passes from the boiler to the feed-pump, which supplies the water to the boiler. As the boiler is filled the level of the water

rises above the lower open end of the pipe 3,
 so that the latter cools and contracts, permit-
 ting the lever 9 and its loop-rod 20 to drop.
 This, however, does not actuate the disk 13,
 5 since the latter is held against movement by
 the pawl 21, and hence the valve 11 is re-
 tained in its open position. When the level
 of the water rises above the line *a a*, steam is
 cut off from the pipe 2, so that the latter con-
 10 tracts and lowers its rod 5 and lever 26. As
 the forked end of the rod 26 is lowered the
 rod 5 is also lowered, thereby disengaging
 the pawl 21 from the ratchet or segment 15.
 When the latter is thus disengaged, it will re-
 15 turn to its normal position, (shown in Fig. 1,)

and the valve 11 will close and cut off the
 supply of steam to the feed-pump, and hence
 stop the feeding of water to the boiler. From
 the foregoing it will be observed that this de-
 20 vice is entirely automatic in its operation.

Various changes in the form, proportion,
 and the minor details of construction may be
 resorted to without departing from the prin-
 ciple or sacrificing any of the advantages of
 25 the invention as defined by the appended
 claims.

Having thus described my invention, what
 I claim as new, and desire to secure by Let-
 ters Patent, is—

3- 1. The combination of a steam-boiler and
 means for controlling the feed of water there-
 to, of thermostatic bodies in communication
 with the boiler adjacent to its high and low
 water marks, a device actuated by one of
 35 said thermostatic bodies for operating said
 water-feeding means to supply water to the
 boiler, means for holding said device in its
 operative position, and means actuated by
 40 the other of said thermostatic bodies for ac-
 tuating said holding means to release said
 device.

2. The combination of a steam-boiler and
 means for controlling the feed of water there-
 to, of thermostatic bodies in communication
 45 with the boiler adjacent to its high and low
 water marks, an oscillatory element for actu-
 ating said water-feeding means, operating
 means between said element and one of said
 thermostatic bodies, means for holding said
 50 element in its operative position, and operat-
 ing connections between said holding means
 and the other of said thermostatic bodies for
 releasing said element.

3. The combination of a steam-boiler and
 means for controlling the feed of water there- 55
 to, of thermostatic bodies in communication
 with the boiler adjacent to its high and low
 water marks, an oscillatory element for actu-
 ating said water-feeding means, said element
 having a segmental ratchet portion and a pro- 60
 jecting arm, a lever actuated by one of said
 thermostatic bodies, a rod connected to said
 lever and having a loop to receive said arm,
 a spring-actuated lever having a pawl to co-
 65 act with the said segmental ratchet, a lever
 actuated by the other of said thermostatic
 bodies, and a rod connected to the last-men-
 tioned lever and having a forked portion to
 engage said pawl-carrying lever.

4. The combination with a steam-boiler, a 70
 steam-pipe leading therefrom to a feed-
 water pump, and a valve in said steam-pipe,
 of thermostatic tubes in communication with
 said boiler adjacent to its high and low
 water marks, an oscillatory element for 75
 opening said valve actuated by one of said
 thermostatic tubes, means for holding said
 element against movement to retain the
 valve in its open position, and means actu-
 80 ated by the other of said thermostatic tubes
 for releasing said holding means.

5. The combination with a steam-boiler, a
 steam-pipe leading therefrom to a feed-
 water pump, and a valve in said steam-pipe,
 of thermostatic tubes in communication 85
 with said boiler adjacent to its high and low
 water marks, an oscillatory, valve-actuating
 element having a projecting arm and ratchet-
 teeth, a lever actuated by one of said ther-
 mostatic tubes, a rod connected to said lever 90
 and having a loop to receive said arm, a
 spring-actuated lever having a pawl to en-
 gage the ratchet-teeth on said element, a
 lever actuated by the other of said thermo-
 static tubes; and a rod connected to said 95
 lever and having a forked portion to engage
 said pawl-carrying lever, substantially as de-
 scribed.

In testimony whereof I have hereunto set
 my hand in presence of two subscribing wit- 100
 nesses.

MOSES LETCHER PHIPPS.

Witnesses:

J. P. Cox,

W. E. BEAMER.