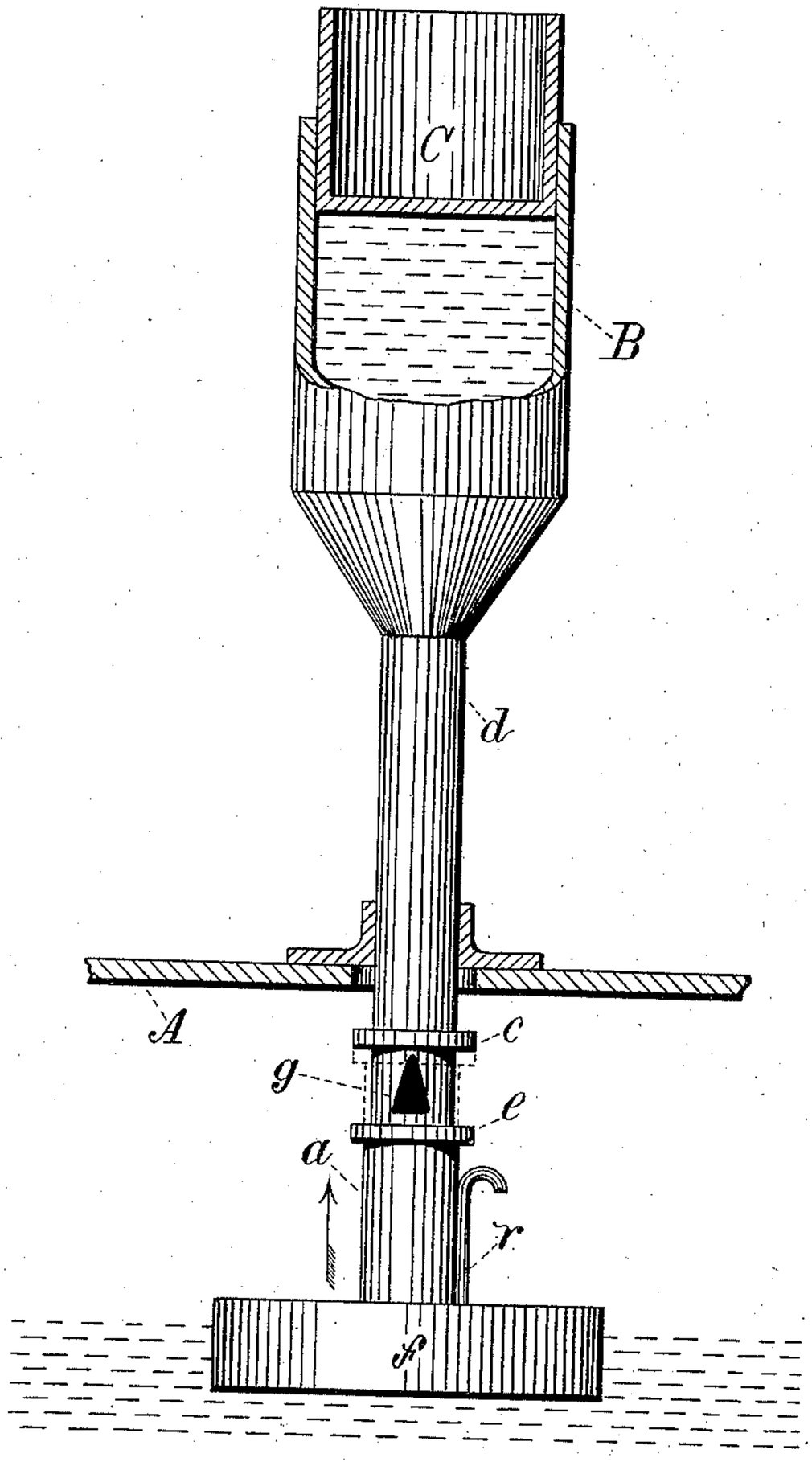
(No Model.)

A. A. SHOBE.

FEED WATER APPARATUS.

No. 335,968. Patented Feb. 9, 1886.



WITNESSES.

R. Newton.

A. H. Newton.

INVENTOR.

Abraham A. Shobe.

By F. S. Davenport, Atty.

UNITED STATES PATENT OFFICE.

ABRAHAM A. SHOBE, OF JERSEYVILLE, ILLINOIS.

FEED-WATER APPARATUS.

SPECIFICATION forming part of Letters Patent No. 335,968, dated February 9, 1886.

Application filed October 31, 1885. Serial No. 181,477. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM A. SHOBE, of Jerseyville, in the county of Jersey and State of Illinois, have invented a new and Improved Feed-Water Apparatus; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an improvement in automatic feed-water apparatus for steam-boilers, chiefly of that class employed for warming purposes, and more particularly for use in street-cars, my object being to provide an automatic feed-water supply and regulator more simple in construction and more reliable in action than those heretofore in use. The means by which I accomplish these ends are explained in the following specification and illustrated in the accompanying drawing, in which the figure shown is an elevational view of my device represented in connection with a portion of the upper part of the shell of a steam-boiler, shown in section, as is also a part of the water-tank and the whole of the piston.

A represents a portion of the top of a steam-boiler, in which is inserted vertically a water-supply pipe, *d*, reaching downward to a suitable distance within the boiler. On the upper end of said pipe, which may be of any required length, is a cylindrical tank, B, provided with a hollow piston or ram, C, adapted to slide freely in the body of the tank, yet fitting the latter with such accuracy as to be perfectly water-tight.

Upon the lower portion of that part of the pipe *d* which is within the boiler slides vertically a sleeve, *a*, to the lower end of which is secured a hollow float, *f*. The upper end of the said sleeve is provided with a collar, *e*, adapted to butt, when the float is sufficiently raised, against a similar collar, *c*, upon the pipe *d*. It will be observed that the interior of the sleeve *a* has no communication with the interior of the float, that the pipe *d* is closed at the lower end, and that to counteract the pressure of the steam upon the outside of the float it is provided with a small pipe, *r*, by which steam is admitted to the interior, the outlet-orifice of said pipe being sufficiently above the water to exclude the latter, thus equalizing the internal and external pressure, and relieving the float of all strain save that which is due to the buoyant power of the water. It will be further noticed that the under side of the collar *c* and the upper side of the collar *e* are made perfectly true, and are ground together so as to be when in contact perfectly water-tight.

Immediately below the collar *c* and in the side of the pipe *d* is an outlet-orifice, *g*, preferably of the form of an elongated triangle, and adapted to be closed and opened by the rise and fall of the sleeve *a*.

All of the above-named details being as described, the operation of my device is as follows: The boiler being filled with water to the proper height—that is, until the float is at such an elevation as to bring the flange or collar *e* into contact with the collar *c*, as shown in broken lines, the purpose of said collars being not only to arrest the upward motion of the float after cutting off the flow of water from the orifice *g*, but also to prevent the escape of a small quantity of water that would find its way out by flowing between the pipe *d* and the sleeve *a*, which is purposely made to fit loosely, in order to prevent the possibility of sticking—the tank B is then nearly filled with water, and the piston C inserted and weighted to such a degree as to produce, by the action of gravitation alone, a pressure upon the water in the tank sufficient to overcome the resistance of the steam in the boiler. It will be noticed that as the water in the boiler sinks by evaporation or other cause the float will withdraw the collar *e* from the collar *c*, and, opening the outlet *g*, admit water from the tank B, which, being provided with the properly-weighted piston, fills the office of a force-pump controlled by the rise and fall of the water in the boiler through the intervention of the parts already explained.

In regard to the peculiar form given to the orifice *g*, my object is to meet the exigency of a rapid fall of water in the boiler, from accident or otherwise, by making the said orifice of such a shape that for equal distances traveled downward by the sleeve *a* more than equal additions will be made to the volume of water admitted to the boiler, and that will pro-

duce a similar effect, but in reverse order, as the water rises.

It is obvious that other forms of outlet might be substituted for the one shown that would accomplish the same purpose and produce the same effect. I therefore do not claim the particular form of outlet-orifice represented in my drawing; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a feed-water apparatus for steam-boilers, the combination, with the feed-pipe having an outlet-orifice in the side and provided with a longitudinally-sliding sleeve actuated by a float, of the collars *c* and *e*, the former secured to the feed-pipe and the latter to the upper end of the sleeve, as and for the purpose set forth.

2. In a feed-water apparatus for steam-boilers, the combination, with the induction-pipe *d*, provided with a collar, *c*, and having an outlet-orifice, *g*, closed and opened by a sleeve, *a*, actuated by a float, of a supply-tank provided with a gravity force-piston, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 18th day of September, 1885.

ABRAHAM A. SHOBE.

Witnesses:

A. W. NEWTON,

EDWARD FLANNIGAIN.