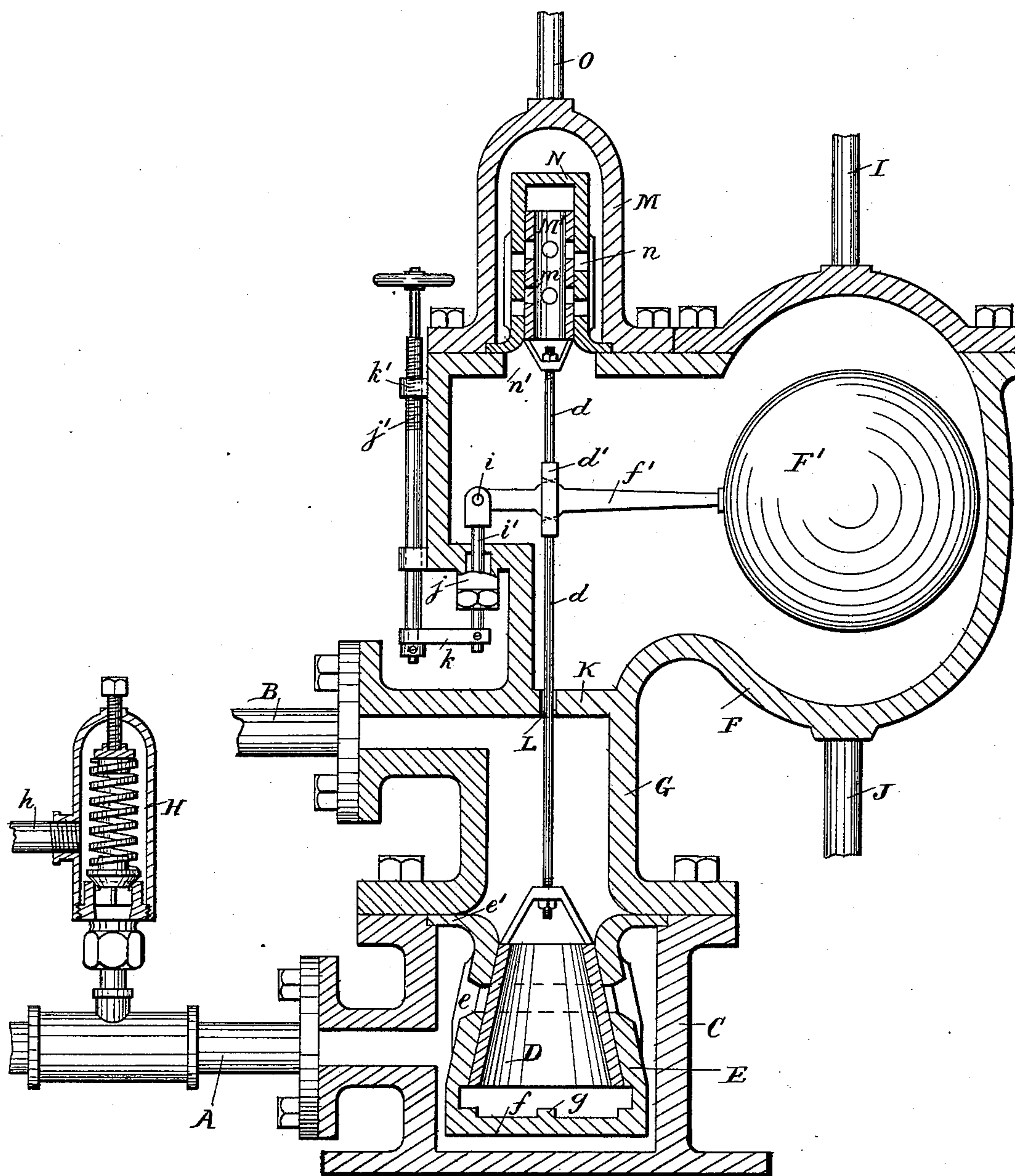


(No Model.)

W. O. GUNCKEL.
BOILER FEED REGULATOR.

No. 404,400.

Patented June 4, 1889.



Witnesses.

W. D. Porter
A. Richmond

Inventor,

W. O. Gunckel.

By his Attorney

Herbert W. Jenner.

UNITED STATES PATENT OFFICE.

WINFIELD O. GUNCKEL, OF TERRE HAUTE, INDIANA.

BOILER FEED-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 404,400, dated June 4, 1889.

Application filed July 26, 1888. Serial No. 281,082. (No model.)

To all whom it may concern:

Be it known that I, WINFIELD O. GUNCKEL, a citizen of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Boiler Feed-Regulators; and I do hereby 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 boiler feed-regulators; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

This invention consists largely of improvements in the regulators for which I have made applications for Letters Patent on March 2, 1888, Serial No. 265,901, and May 4, 1888, Serial No. 272,837.

The drawing shows a vertical section through the feed-regulator.

A is the pipe through which the feed-water is pumped into the regulator, and B is the pipe through which the water passes from the regulator into the boiler.

C is the casing of the feed-regulating valve D, which works within the conical seat E.

F is the casing for the float, and G is a stem which connects the float-casing with the regulating-valve casing. The seat E is provided with annular orifices *e*, so that the valve D is balanced against lateral pressure. The seat E has a flange *e'* at the top, which is secured between the flanges of the casing C and stem G. The valve-seat E is provided with a solid bottom *f*, and *g* are projections for the valve to rest upon, so that the water may pass under it.

The conical valve D is hollow and open-ended. It is preferable to a cylindrical valve, because it is absolutely frictionless in its movements while regulating the amount of water passing through it, and the small amount of downward pressure upon it when closed is only just sufficient to prevent it from sticking.

H is the safety-valve, which is preferably a spring-valve, as shown, and *h* is the overflow-pipe which returns the surplus water to the

supply-tank of the pump. The safety-valve is attached to the inlet-pipe A in the usual manner.

F' is the float, provided with the float-lever *f'*, and *d* is a rod provided with a yoke *d'*, which connects the said float-lever with the conical valve D. The float-lever is pivoted to the pin *i* of the adjustable stem *i'*, which passes through the stuffing-box *j*, and is operated by means of the screwed spindle *j'* and connecting-piece *k*. The connecting-piece is secured to the end of stem *i'*, and has the end of spindle *j'* journaled in it. A screw-threaded boss *k'* is provided on the casing for the said spindle to engage with.

I is the pipe which connects the top of the float-casing with the steam-space of the boiler, and J is a pipe which connects the bottom of the float-casing with the water-space of the boiler. The adjustable fulcrum for the float-lever permits the water-level of the boiler to be varied several inches at pleasure without moving the entire regulator.

K is a partition between the internal space of the float-casing and the water-space above the regulating-valve.

L is a hole for the passage of the stem *d*. The object of thus separating the float-casing water-space from the water-space above the valve is to insure still water for the float to work in, the hole L being too small to allow the disturbance of the water in the space above the valve, due to the action of the pump, to be communicated to the water under the float.

The feed-pump is caused to operate continuously, and when the float rises it decreases the annular passage between the conical valve D and its seat, so that the surplus water is forced through the safety-valve down the overflow-pipe.

M is the steam-supply-valve casing secured to the upper part of the float-casing.

M' is a cylindrical balanced steam-supply valve provided with steam-passages *m*.

N is a cylinder in which the valve M' works, and *n* are annular passages in said cylinder which communicate with the said steam-passages in the valve. The valve M' is connected to the upper end of the stem *d*,

and n' is an opening in the top of the float-casing, which permits the steam to have free access to the interior of the valve.

O is the steam-supply pipe for the pump, which pipe is connected to the casing M. The pump receives all its steam through the float-casing and said pipe O.

When the float rises and a portion of the feed-water is forced through the safety-valve, the valve M' is also moved to partially cut off the supply of steam to the pump. This, of course, makes the pump work slower and saves it from wearing out so quickly.

What I claim is—

1. In a boiler feed-regulator, the combination, with a conical regulating-valve working in a seat provided with orifices for the passage of water, of an outer casing for said valve and its seat, a float operatively connected to said conical valve, a float-casing connected to said valve-casing, inlet and delivery pipes upon opposite sides of the regulating-valve, and a safety-valve secured upon the inlet-pipe, substantially as and for the purpose set forth.

2. In a boiler feed-regulator, the combination, with an open-ended conical regulating-valve, of a valve-seat provided with lateral orifices for the passage of water, and projections on its bottom for the said valve to rest on, of an outer casing for the said valve and its seat, a float operatively connected to said conical valve, a float-casing connected to the said valve-casing, inlet and delivery pipes upon opposite sides of the regulating-valve, and a safety-valve secured upon the inlet-pipe, substantially as and for the purpose set forth.

3. The combination, with the water-regulating valve of a boiler-feeder, of the float provided with a lever and operatively connected to said valve, a fulcrum-stem for the said lever passing through the float-casing, a connecting-piece secured to the end of said stem, and a revoluble screwed spindle engaging with a stationary screw-threaded projection and journaled in the connecting-piece for adjusting the fulcrum of the float, substantially as set forth.

4. In a boiler feed-regulator, the combination, with a water-regulating valve provided with a stem and a float operatively connected to the said stem, of an outer casing for the said valve, water inlet and delivery pipes upon opposite sides of the valve, a casing for the float connected to the steam and water spaces of the boiler, and a partition provided with a hole for the valve-stem and arranged between the water-space under the float and the water-space above the regulating-valve, whereby the float may rest in still water, substantially as set forth.

5. In a boiler feed-regulator, the combination, with a water-regulating valve provided with inlet and outlet pipes, and a safety-valve upon the said inlet-pipe, of a float provided with a pivoted lever and working in a casing above the said water-valve, a balanced steam-supply valve for the pump working in a cylinder on top of the float-casing, both valve and cylinder being provided with orifices for regulating the passage of steam from the float-casing, and a stem connecting the said steam and water valves with the float-lever, substantially as and for the purpose set forth.

6. In a boiler feed-regulator, the combination, with a water-regulating valve provided with inlet and outlet pipes, and a safety-valve on the said inlet-pipe, of a float provided with a pivoted lever, a steam-supply valve for the pump, a stem connecting the said steam and water-valves with the float-lever, and casings inclosing the said water-valve and float and having their internal spaces separated by a partition provided with a small hole for the passage of the valve-stem, whereby the float may work in still water and the steam-valve receive dry steam direct from the upper part of the float-casing, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WINFIELD O. GUNCKEL.

Witnesses:

PHILIP B. O'REILLY,
C. T. NOBLE.