No. 714,148. Patented Nov. 25, 1902.

O. E. & E. E. CLARK.

BOILER FEED REGULATOR.

(Application filed Feb. 25, 1901.)

(No Model.)

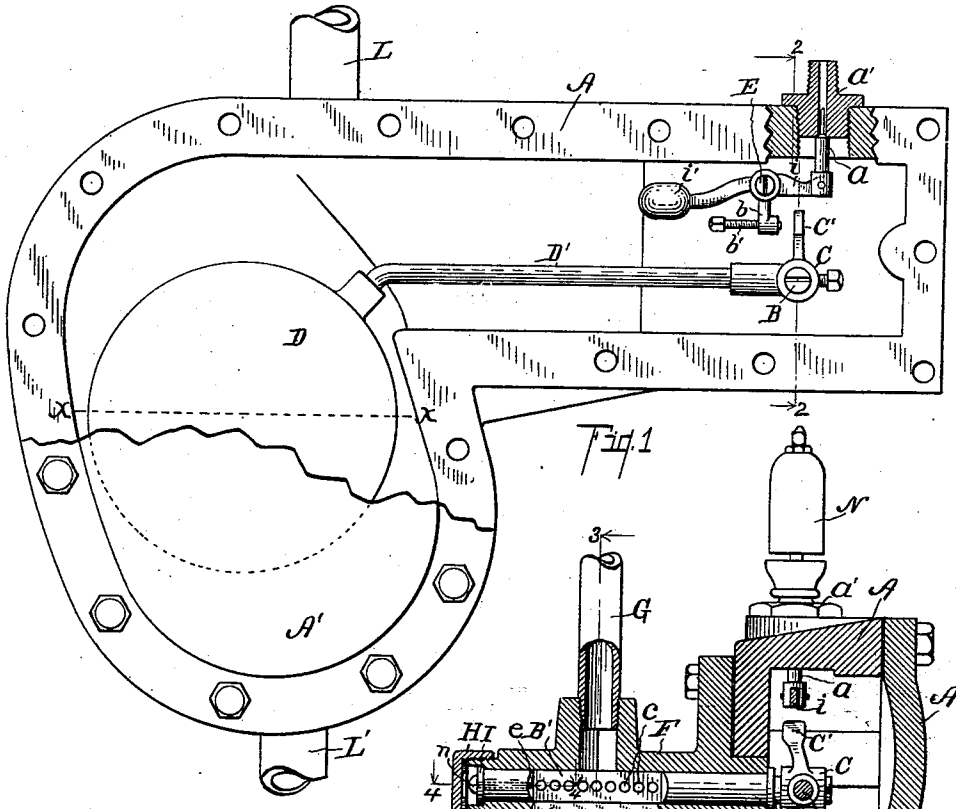

Fig. 1

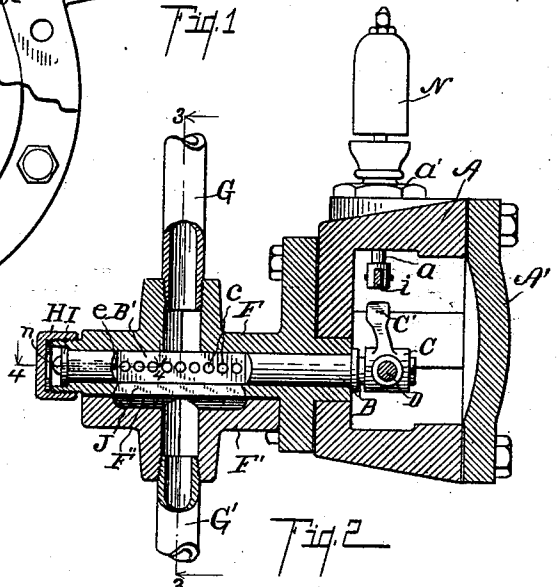

Fig. 2

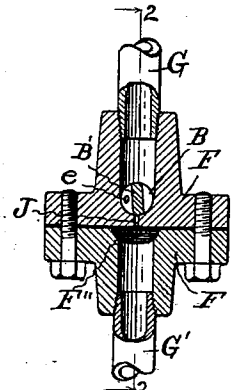

Fig. 3

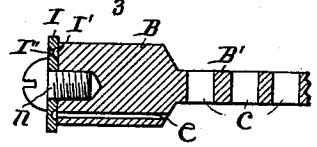

Fig. 4

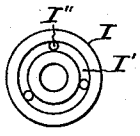

Fig. 5

Witnesses:

A. E. Houghton

Otis A. Earl

Inventors

Omar E. Clark & Ellworth E. Clark

By Fred L. Chappell

Att'y.

UNITED STATES PATENT OFFICE.

OMAR E. CLARK AND ELLSWORTH E. CLARK, OF VICKSBURG, MICHIGAN.

BOILER-FEED REGULATOR.

SPECIFICATION forming part of Letters Patent No. 714,148, dated November 25, 1902.

Application filed February 25, 1901. Serial No. 48,733. (No model.)

To all whom it may concern:

Be it known that we, OMAR E. CLARK and ELLSWORTH E. CLARK, citizens of the United States, residing at the village of Vicksburg, in the county of Kalamazoo and State of Michigan, have invented certain new and useful Improvements in Boiler-Feed Regulators, of which the following is a specification.

This invention relates to improvements in regulators and alarms which are especially adapted and intended for use in connection with steam-boilers and feed-water pumps and devices, although the regulator is adapted for use in connection with any tank and its supply devices, whether that be a pump or pressure from a waste-main or other source.

The objects of the invention are, first, to provide a simple and compact device for the purpose which will occupy the minimum amount of room; second, to provide an improved construction of valve for use in connection with a float for this purpose; third, to provide an improved form and arrangement of float and casing; fourth, to provide an improved construction of alarm and connection for use in a device of this kind.

Further objects will definitely appear in the detailed description to follow.

We accomplish the objects of this invention by the devices and means described in this specification.

The invention is clearly defined, and pointed out in the claims.

The essential parts of our improved regulator and alarm are fully illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a detail view of our improved regulator with a portion of the front casing broken away. Fig. 2 is a transverse detail sectional elevation taken on a line corresponding to line 2 2 of Figs. 1 and 3, the improved valve appearing in full lines. Fig. 3 is a detail sectional elevation transversely through the valve and its casing, taken on a line corresponding to line 3 3 of Fig. 2. Fig. 4 is an enlarged longitudinal section through the outer end of the valve, taken on a line corresponding to line 4 4 of Fig. 2. Fig. 5 is an enlarged detail inside view of the washer I, showing its construction.

In the drawings the sectional views are taken looking in the direction of the little arrows at the ends of the section-lines, and similar letters of reference refer to similar parts throughout the several views.

Referring to the lettered parts of the drawings, A is the main body of a casing, shaped something like a chemist's retort, having a cap A′ over the front of the same, which can be readily removed, when all of the working parts become at once easily accessible.

D is a float, preferably a hollow copper ball, in the large end of the casing and connected by a lever D′ to the valve B, which is adapted to rock in its seat, as will appear clearly in the description to follow. The valve B also serves as a rock-shaft, carrying the upwardly-projecting arms C′, which actuates through stop *b* the lever *i*, which is weighted at *i′* and controls a needle-valve *a*, which controls the passage of steam through a suitable nozzle *a′* to the whistle W. The top of the casing A is connected by a pipe L to the steam-space of the boiler, or in case the device is intended to control the level of water in the tank it is extended above the water-level. The lower portion of the casing is connected by the pipe L′ to a boiler below the water-line or to the tank below the level to which it is to be filled. As the chamber or casing is thus connected the water-line within the same will be at the same level as the water-line of the boiler or tank, which is indicated by the dotted line *x x* in Fig. 1. Thus it will be noted that the rise and fall of water in the casing will act on the float D and serve to control the valve to which the arm D′ may be connected. The valve-casing F is secured to the smaller end of the casing and lies at right angles to the arm D′, to which the float is attached. The valve is provided with a cylindrical bore, and a narrow longitudinal slit J is through the same for the passage of steam or fluid under pressure, which may either control the feed device itself or supply the passage of the liquid intended to be delivered into the tank or boiler. We prefer to use the regulator in connection with the feed-water pump when using it to regulate the water in a boiler.

The valve B is cylindrical, the opposite sides being cut away opposite the slit J. Small perforations *c* extend transversely through the web thus formed and allow the steam or

liquid, whatever it may be, to pass to both sides of the valve and perfectly balance the same. A collar is on the inner end of the valve, and a washer I is on the outer end and is retained in position by a suitable screw, which prevents longitudinal movement of the valve. On the inner face of the washer is an annular groove I′, and one or more perforations I″ lead through the washer at this point. A hole *e* extends longitudinally through the outer end of the valve B, and steam or other liquid is consequently free to escape through the outer end of the valve through the passages thus formed and balance the same. A cap H, provided with a suitable gasket, fits onto the casing F at this point and forms a chamber around the end of the valve, and from this it will be seen that the valve is a balanced valve in all respects, steam being on all sides and at each end of it, and there will consequently be no perceptible friction on account of the steam-pressure, and the valve will thus operate with great ease and freedom, making it possible to utilize a comparatively small float D.

The operation of the structure is quite clear from the description. When the water in the tank or boiler becomes low, the float D descends, following the water-line in the regulator. This of course rocks the valve B, which is opened, and steam passes through the pipe G G′ to the feed-water pump or liquid under pressure is delivered in case the apparatus is made use of to regulate the amount of water in the tank. In the event that the supply of water is out or if for any reason when the valve is opened there is a failure to feed the float will still farther descend, when the finger C′ will operate the lever *i*, blowing the whistle or operating any other desired alarm. We have shown our improved regulator in its most approved form. The casing and float are capable of use in connection with other valves and will of course be effective as a controller without the alarm, though the structure effects the double purpose of regulator and alarm in a very simple and compact device.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a regulator and alarm the combination of the casing A; the valve B; the float D and lever D′ connected to rock said valve and supported thereby; a finger C′ on said valve; a whistle or alarm W; a valve therefor; a weighted lever to hold said valve closed; an arm *b* with set-screw *b′* to be actuated by finger C′, coacting as specified.

2. In a regulator and alarm the combination of the casing A; the valve B; the float D and lever D′ connected to rock said valve and supported thereby; a finger C′ on said valve; a whistle or alarm W; a valve therefor; a weighted lever to hold said valve closed; an arm *b* to be actuated by finger C′, coacting as specified.

3. In a regulator the combination of a suitable casing, a float; a connection from said float to a valve, and the valve consisting of a casing F with a cylindrical seat therethrough and containing a long slit J for a throat or passage; a cylindrical valve B in said seat with its sides flattened to form a web B′ through which are transverse apertures *c*, having a collar at one end and a washer at the opposite end and a cap on the casing, forming a chamber around the outer end of the valve; a passage *e;* openings I′, I″ out at the end of the valve through the washer into the chamber, all coacting substantially as described, for the purpose specified.

4. In a regulator the combination of a suitable casing, a float; a connection from said float to a valve, and the valve consisting of a casing F with a cylindrical seat therethrough and containing a long slit J for a throat or passage; a cylindrical valve B in said seat with its sides flattened to form a web B′ through which are transverse apertures *c*, having a collar at one end and a washer at the opposite end and a cap on the casing, forming a chamber around the outer end of the valve; all coacting substantially as described, for the purpose specified.

In witness whereof we have hereunto set our hands and seals in the presence of two witnesses.

OMAR E. CLARK. [L. S.]
ELLSWORTH E. CLARK. [L. S.]

Witnesses:
HERBERT O. SPADE,
CLARA H. PAGE.