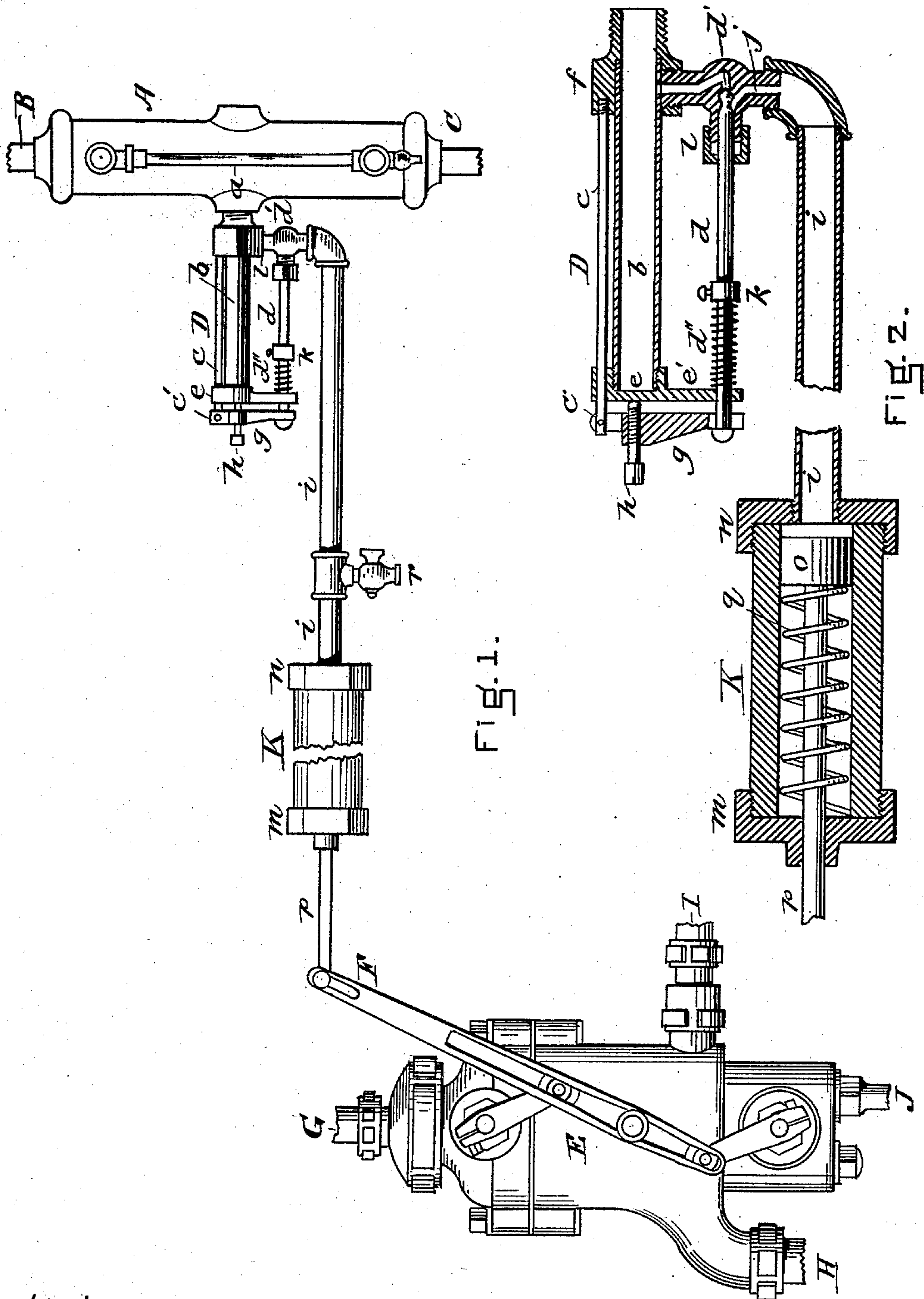


(No Model.)

C. B. BOSWORTH.
BOILER FEEDER.

No. 442,097.

Patented Dec. 9, 1890.



WITNESSES

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BOILER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 442,097, dated December 9, 1890.

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To all whom it may concern:

Be it known that I, CHARLES B. BOSWORTH, a citizen of the United States, residing at Everett, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Devices for Automatically Supplying and Regulating the Feed-Water to Steam-Boilers, of which the following is a specification, reference being had to the accompanying drawings, and to letters marked thereon.

Referring to the drawings, Figure 1 represents in elevation a side view of the entire device, showing its several parts in combination; and Fig. 2 represents in sectional elevation certain of these parts on an enlarged scale.

Of the parts shown in combination, A is a hollow cylinder capped at either end, and having at its upper end a pipe B, connecting it with the steam-space of the boiler, and at its lower end a pipe C, connecting it with the water-space of the boiler. This hollow cylinder has mounted upon it a glass water-gage *a* of the kind usually employed to show the level of the water in a steam-boiler, so that when the top of the water shows up to the middle of the glass it is at the proper working-level both in cylinder A and in the steam-boiler. At this point the thermostat D is inserted in the cylinder A, thus connecting the interior of the expansion-tube *b* of the thermostat with the interior of the cylinder A, and by means of its connecting-pipes B and C with the interior of the steam-boiler.

The thermostat D embraces in its construction the expansion-pipe *b*, which at its inner end is open to the interior of the cylinder A and closed at its outer end by a suitable screw-cap *e*, from which depends a rigid guide *e'* for the outer end of the rod *d*. The rod *c* at its inner end is firmly screwed into the connecting-nut *f* and at its outer end is guided in the metal of the cap *e*. To the outer ends of the rods *c* and *d* are shackled the two ends of the lever *g*, the fulcrum being at *c'* and the operating force at the set-screw *h*. The inner point of rod *d* is formed into a conical valve *d'*, which controls the passage *j*, connecting the expansion-pipe *b* with the steam-pipe *i*. A compressed spiral spring *d''*, mounted on the rod

d and controlled by a collar and set-screw at *k*, keeps the conical valve *d'* to its seat, unless forced therefrom by the expansion of the tube *b*, operating through the lever *g*. Rod *d* is also provided with a packing-box at *l* to prevent leakage. The rod *c* is of iron, the rod *d* of iron or brass, and the expansion-tube *b* is of brass.

E represents an injector or "inspirator" of the character usually employed in feeding water to steam-boilers, and the valves of which are operative by a single lever, as at F. The steam enters the injector or inspirator at pipe G, the water being drawn into the instrument through suction-nozzle H and delivered into the steam-boiler through a pipe connected with the injector at I. An overflow-pipe is connected at J to carry off the waste water.

In the line of connection between the thermostat and the injector is placed a small steam-cylinder K, having a screw-cap at either end *m* and *n* and inclosing a piston *o* and piston-rod *p*, which are pushed forward by steam which enters the cylinder from the pipe *i*, connected with the thermostat. At the opposite end of this small cylinder the piston-rod *p* passes through the cap *m* as a guide, and is extended to make connection with the top of the lever F.

Within the cylinder K is a spiral spring *q*, which bears upon the piston *o* and against the opposite head of the cylinder. This spiral spring returns the piston to its primary position when the pressure upon it is removed. Inserted in the steam-pipe *i* is a drip-cock *r* for draining the pipe, as may be desired. Also by the adjustment of this cock there is made sufficient outlet to permit steam and condensed water to escape, and thus allow the more rapid back-stroke of the piston. Another pet cock may be inserted in the lower side of cylinder K, near to cap *m*, to be used for similar purposes.

The operation of my boiler-feeding device is as follows: When the water in the steam-boiler has fallen to the lowest prescribed limit, as at *a*, steam from the upper part of cylinder A will enter the tube *b* of the thermostat, expanding it by the accession of temperature. The longitudinal expansion of the tube *b*

operates upon the lever *g* through the set-screw *h*, moving the rod *d* outward and opening the conical valve *d'* and passage *j*, permitting steam from the cylinder A to flow
5 into the pipe *i* and press forward the piston of the cylinder K, the piston-rod of which is directly connected to the head of the controlling-lever F of the injector, so that the said lever is thrown over to its opposite extreme
10 of movement by a single stroke of the piston, and the feeding begins. Now, when by the operation of the injector the water has risen in the cylinder A to a point slightly above the expansion-tube *b* of the thermostat, the water
15 therein is cooled by radiation and the tube contracts, permitting the spiral spring *d''*, which presses on the collar *k*, to close the valve *d'* and shut off the pressure from the pipe *i* and cylinder K, in which case the piston *o* and piston-rod *p* of the cylinder K, and
20 the controlling-lever F, connected therewith, will return to the primary position shown in the drawings under the resilient action of the

spring *q*, to be ready for the next operation.

Having thus fully described my invention, 25 what I claim, and desire to secure by Letters Patent, is—

1. The combination of the injector and its operative piston, a thermostatic instrument communicating with the piston, and a drip- 30 cock located in the pipe between the piston and thermostatic instrument, as set forth.

2. The combination, with a steam-injector and its operative piston, of a thermostatic instrument consisting of a tubular stem adapted 35 to be connected with the boiler and communicating with the piston, such instrument being provided with a valve where it communicates with the piston, a spring for actuating such valve, and a lever bearing against such 40 spring and secured to the stem, as set forth.

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Witnesses:

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