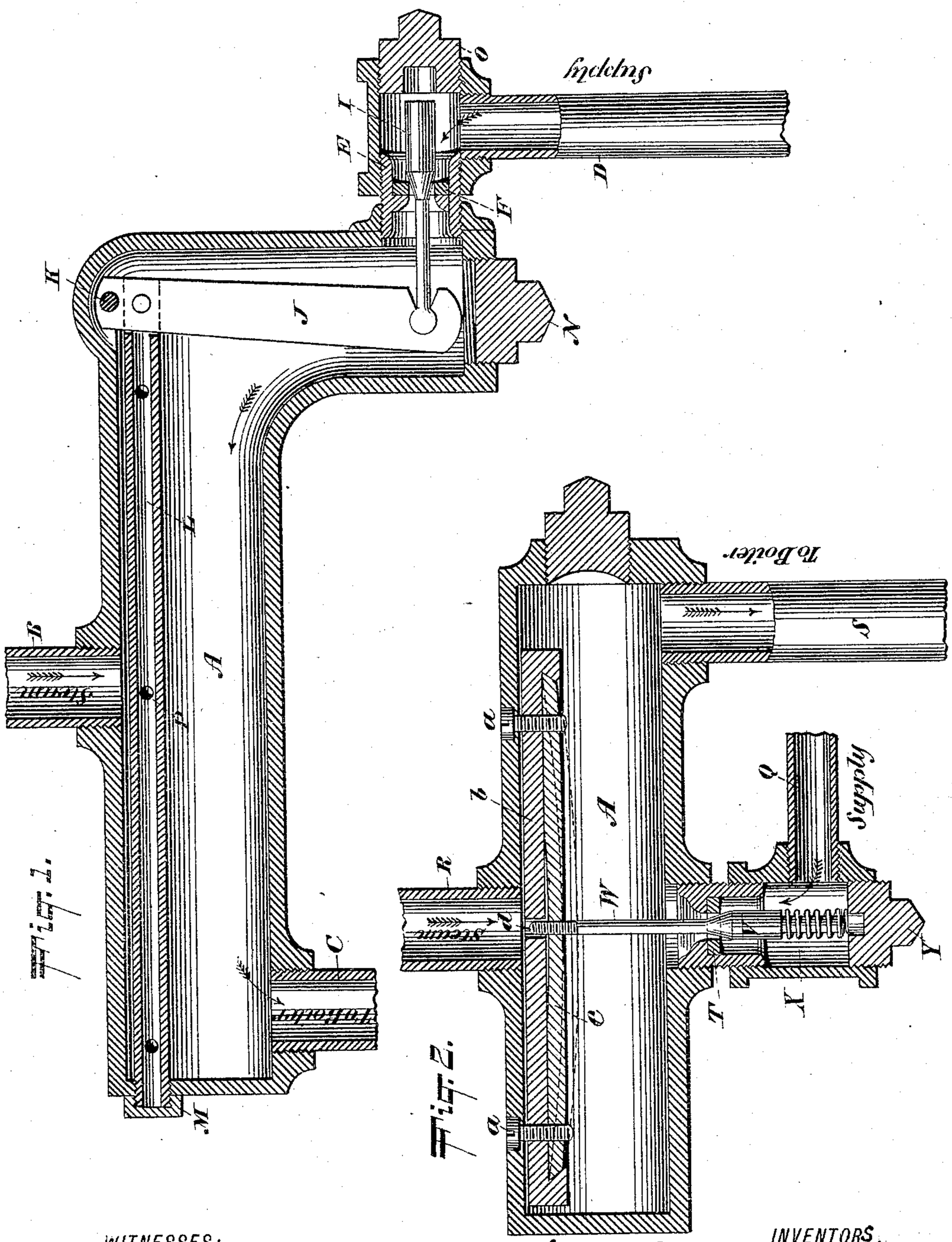
(No Model.)

J. E. MARCY & H. A. JONES.

BOILER FEEDER.

No. 433,576. Patented Aug. 5, 1890.



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BOILER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 433,576, dated August 5, 1890.

Application filed April 28, 1890. Serial No. 349,823. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH E. MARCY and HENRY A. JONES, citizens of the United States, and residents of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Boiler-Feeders, of which the following is a specification.

The invention relates to improvements in boiler-feeders, and particularly in feeders for low-pressure boilers; and it consists in the construction, hereinafter described and claimed, involving a valve which is either opened or closed by the contraction or expansion of a metal rod or plate connected, either directly or indirectly, therewith, said valve and rod or plate being in the path of the water from the source of supply to the boiler, and said plate or rod being subjected to the expansive action of the steam or to contraction by the water.

In the accompanying drawings I have embodied the invention in two forms of valves, one representing the valve as connected through the medium of a lever with a rod or tube which operates to open or close the valve through its expansion or contraction. The second form of valve illustrates a plate of metal as the medium through which by its expansion or contraction the valve may be either opened or closed to regulate the supply of the feed-water.

Referring to the accompanying drawings, Figure 1 is a central vertical longitudinal section of a valve with its casing and connections embodying the elements of the invention, and Fig. 2 is a like view of a modified form of the same.

In the accompanying drawings, A designates a casing having an inlet B for steam at its upper side and an outlet C for water, said outlet being in connection with the boiler. (Not shown.) The inlet to the casing A is from the pipe D, which passes from the source of water-supply to the valve-casing E, in which is arranged the valve-seat F and the valve I, the latter being adapted to have a sliding movement toward or from said seat and being free at its outer end and at its inner end pivotally connected with the lever J, located within the vertical arm of the casing A. The lever J is fulcrumed at its upper end on the pivot K, and below said pivot is pivotally secured to the tube L, which extends longitudinally along the upper portion of the casing A, and is held at its outer end by being screwed into a threaded aperture in the casing, the extremity of the outer end of said tube L being closed by the cap M. I prefer the use of the tube L because of its quality to readily expand or contract under the influence of heat and cold; but it is obvious that a rod may be substituted in place of the tube, if desired, without departing from the invention.

The casing A will be provided with a removable plug N to permit the introduction of the lever J, and at the upper end of the pipe D is provided an additional plug O, which facilitates the introduction of the valve I in proper position to engage the seat F.

In the use of the valve illustrated in Fig. 1 the water will flow upward through the pipe D, thence into the casing A, and then through the pipe C to the boiler, steam in the mean time being admitted to the casing A through the pipe B. The effect of the steam entering the casing A is to heat the tube L and cause its longitudinal expansion and the corresponding movement of the lever J on its fulcrum K, the said movement of said lever pushing the valve I from its seat F and leaving the passage clear for the entrance of the water to the casing A from the pipe D. As long as the water is low in the boiler, the steam from the pipe B will have its full effect on the tube L, and thereby retain the valve I open, permitting an uninterrupted flow of the water from the pipe D. When, however, a sufficient quantity of water has entered the boiler, the water will not then be able to flow from the casing A, but will rise in said casing and envelop the tube L, the effect being to chill and contract said tube and draw the lever J inward to its former position, thereby closing the valve I against its seat F and cutting off the supply of water. When the water rises within the casing A and envelops the tube L, it is obvious that the latter will be not only contracted under the influence of the water, but will be protected from the action of the steam until such time as additional water is required in the boiler, when the escaping water to the boiler from the casing A will leave the tube L exposed and subject it

to the action of the steam from the pipe B. At this time the tube L will be again expanded, and through the movement of the lever J the valve I will be opened to permit the inflow of water from the pipe D. The action of the valve I under the influence of the expansion and contraction of the tube L is carried on automatically, the condition of the water in the boiler regulating its operation. I preferably provide the tube L with apertures P, so as to render said tube more susceptible to the expansion and contraction under the influence of the steam and water, respectively.

In Fig. 2 the casing A varies somewhat in form from the casing A of Fig. 1, but is the same in all essential respects, being provided with the inlet-pipe Q for the water, the inlet-pipe R for the steam, and the outlet S to the boiler. Between the inlet Q and casing A is provided the valve-seat T and valve V, the latter having the vertical stem W and provided with the spring X for the purpose of assisting the valve to its normal position against its said seat T. The plug Y is provided for the purpose of facilitating the introduction of the valve V.

Within the casing A is secured in the upper part thereof, by screws *a*, the metal plate *b*, having the central aperture *d*, through which the upper end of the stem W may freely move, and having also seated in the longitudinal recess in its lower surface the plate *e*, which is held in the beveled ends of the said recess and is rigidly secured by the screw-threads to the upper portion of the stem W. The screws *a* extend through both the plate *b* and the plate *e*. In the modified form of the invention presented in Fig. 2 the water passes from the source of supply through the pipe Q and valve into the casing A, and thence flows through the pipe S to the boiler, the position of the valve, and consequently the extent of the flow of water, to the boiler being regulated by the expansion and contraction of the plate *e* under the influence of the steam from the pipe R and the water. Steam being admitted through the pipe R, the plate *e* will become heated and expanded, and, being rigidly confined at its ends, will during the expansion bow downward at its center, pushing the stem W with it and relieving the valve V from contact with its seat T, at which time the water will flow freely from the pipe Q into the casing A, and thence escape to the boiler through the pipe S. As soon as the proper quantity of water has been fed to the boiler, water will back up in the pipe S and casing A and envelop and chill the plate *e*, causing its contraction to its normal position, and the consequent elevation of the stem W and valve V, thereby cutting off the supply of water. As soon as the water has lowered in the boiler the water from the casing A will flow out through the pipe S and leave the plate *e* free to be again expanded by the action of the steam from the pipe R, thereby again opening the valve V and permitting the free flow of the water into the casing A from the pipe Q. During the contraction of the plate *e* the spring X facilitates the return of the valve V to its seat, and also the return of the middle portion of said plate *e* to its normal position adjacent to the lower face of the recessed plate *b*.

In Fig. 2 of the drawings the normal position of the plate *e* is shown by full lines and its position when expanded by dotted lines.

It will be observed that in the two forms of valves shown the expansion and contraction of the metal automatically controls the flow of water from the source of supply to the boiler, in each instance the steam serving at the proper time to expand the metal and the water to contract the same. In the form of valve shown in Fig. 1 the expansion and contraction of the tube longitudinally are depended on to effect the opening and closing of the valve, while in Fig. 2 the expansion of the plate *e*, confined at its ends, causes said plate to bow downward at its middle portion, and this action operates to open the valve.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The casing intermediate the boiler and source of water-supply and containing the steam-inlet, combined with the valve and a metal strip or other substance in connection therewith, said strip being within said casing and exposed to the expanding and contracting action of the steam and water, for the purpose of regulating the opening and closing of said valve, which is located at the water-supply inlet, substantially as and for the purposes set forth.

2. The casing A, having the inlets for water and steam, the outlet for water to the boiler, and the metal strip L, the latter being within said casing and exposed to the action of the steam and water, so as to expand and contract, combined with the valve located at said inlet for water, and the lever connecting said valve and strip, whereby the expansion and contraction of the latter operate the former, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 25th day of April, A. D. 1890.

JOSEPH E. MARCY.
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Witnesses:
CHAS. C. GILL,
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