(No Model.)

2 Sheets—Sheet 1.

J. H. JOHNSON.

AUTOMATIC BOILER FEEDER.

No. 507,621. Patented Oct. 31, 1893.

Fig. 1.

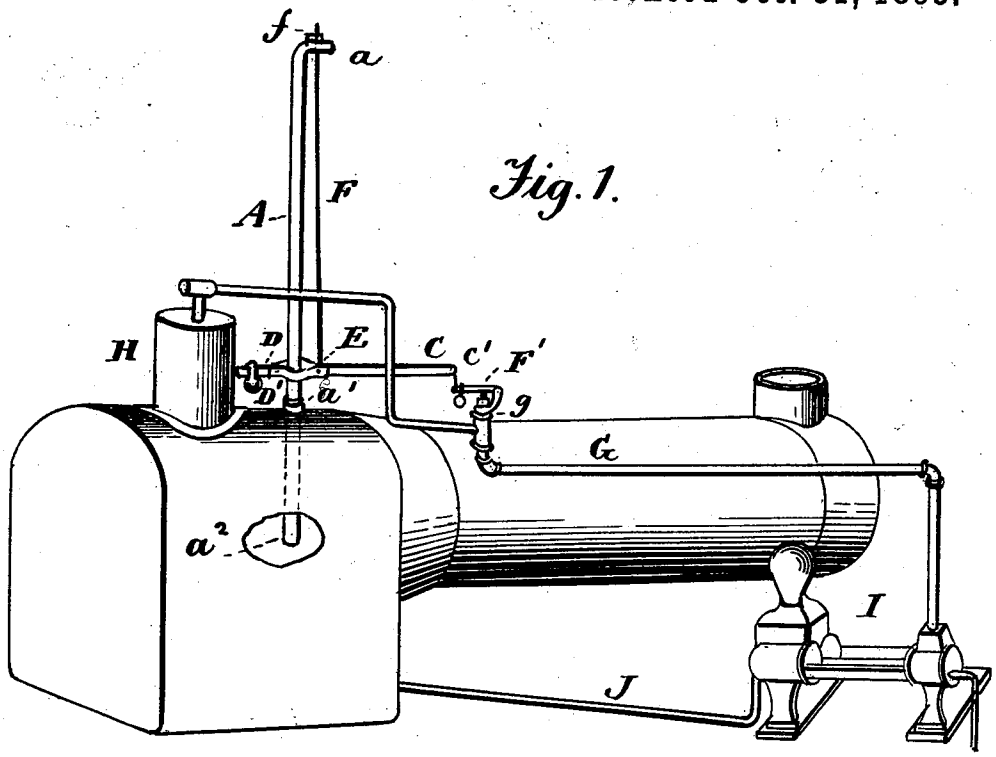
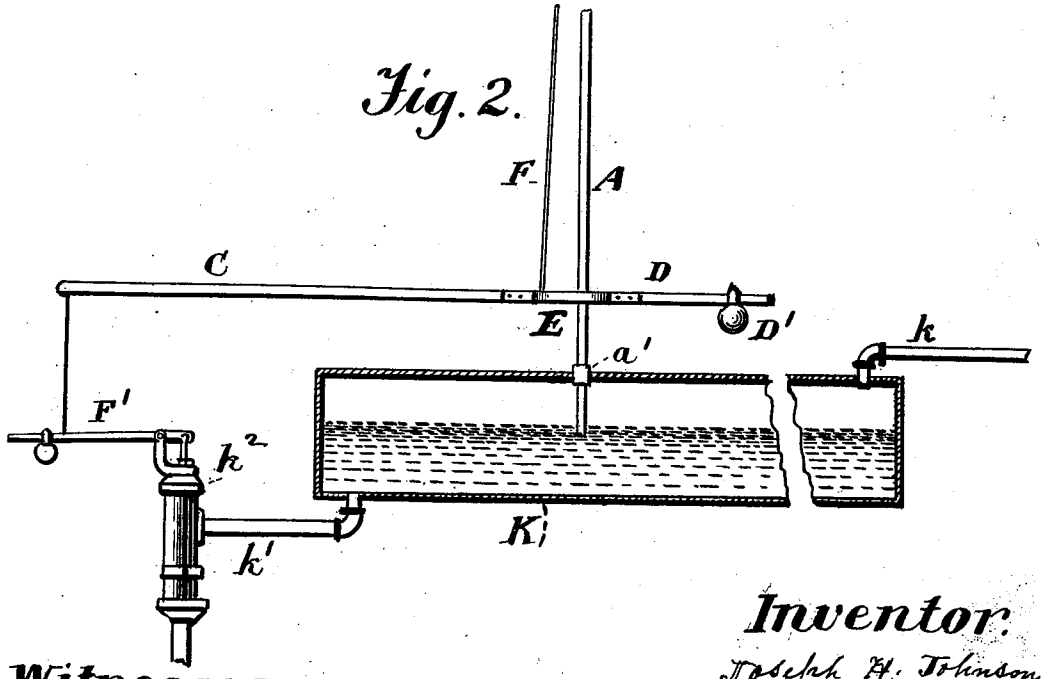


Fig. 2.



Witnesses.
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(No Model.)

2 Sheets—Sheet 2.

J. H. JOHNSON.

AUTOMATIC BOILER FEEDER.

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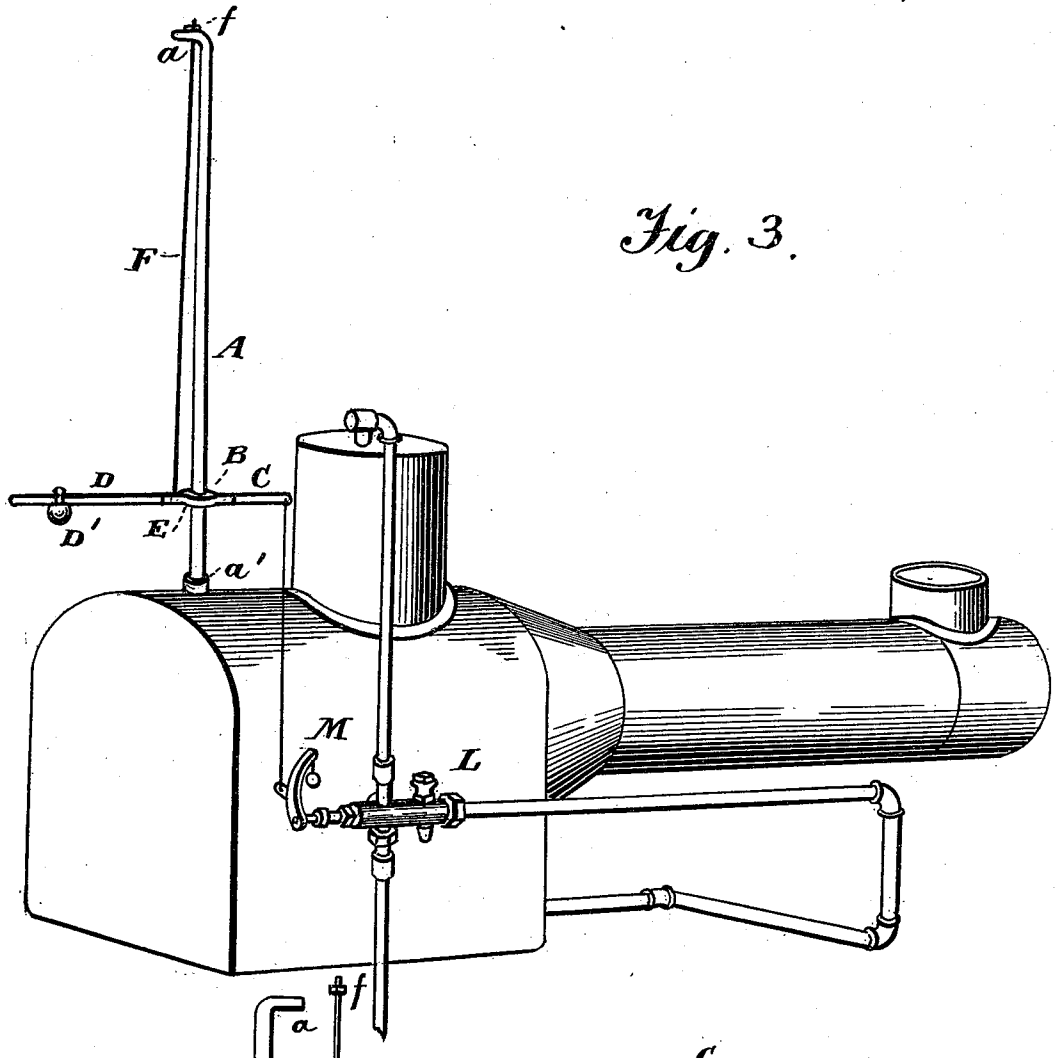
Fig. 3.



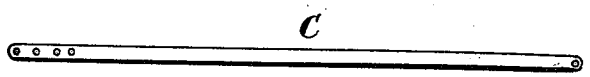
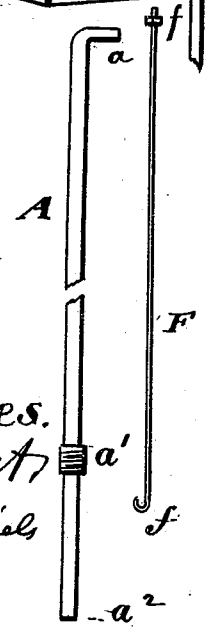
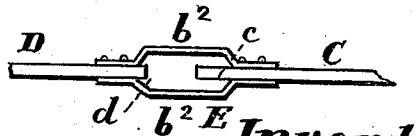


Fig. 4.





Witnesses.
A. Ruppert
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UNITED STATES PATENT OFFICE.

JOSEPH HENRY JOHNSON, OF BRADFORD, PENNSYLVANIA.

AUTOMATIC BOILER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 507,621, dated October 31, 1893.

Application filed April 1, 1893. Serial No. 468,660. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HENRY JOHNSON, a citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Boiler-Feeders; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The invention relates to the use of expansion and contraction of metal by a difference in temperature to open and close valves automatically, and consists in the particular means by which this object is attained.

Figure 1 is a perspective view of a boiler provided with my invention to feed water automatically thereto, the boiler being broken away to show the position of the expansible tube therein; Fig. 2 a side elevation of a water trap with the reservoir in section, to show the position therein of the expansible tube, and Fig. 3 a perspective view of a boiler with an injector to which my invention is applied. Fig. 4 is a detail view of the parts which connect the expansible tube with the valve mechanism.

In the drawings, A represents the expansible tube which is open at the lower end, curved at the upper and preferably threaded at a' so as to screw into the top of boiler and bring the open end a^2 at the desired height.

B is a clevis which is held at the desired position on the tube A by a set screw b'.

C D are lever arms connected by a two-part loop E, the said parts b^2 b^2 being rigidly secured on opposite sides of the ends c d, thus forming a lever consisting of the three parts C D E. The lever arm C has its end extended within the loop E and pivoted within the ears b b to form a fulcrum for the lever C E D, while within the loop is also connected the hook-end f of a rod F whose other end is connected with the curved end a of the tube A. On the lever arm is adjusted a balance weight D′ so as to hold the lever in a horizontal plane when the tube is not expanded longitudinally by the heat.

In Fig. 1 of the drawings, the open end a^2 of the metallic tube A is at the desired level of the water minimum and when the water level gets below the end a^2, steam will rush up the tube and raise its temperature so as to expand it longitudinally. This will raise the lever arm C whose free end c' is connected with that of the valve lever F′ so as to lift the stop-valve g of a steam pipe G leading from the steam dome H. The steam being thus allowed a free passageway to the pump I, the latter will pump an additional supply of water through pipe J into the boiler. This pumping will continue until the water level in the boiler is above the end a^2 of the expansible tube A, when the temperature of said tube will fall and it will be contracted so as to close the stop-valve g, of the steam pipe G and cause the pump to cease its operation.

In Fig. 2 of the drawings I show a water trap whose reservoir K is provided at the top of one end with a steam exit pipe k and at the bottom of the other end with a water outlet pipe k' which is valved at k^2. With this valve is connected the free end of the arm C of my mechanism so as to raise the valve lever F′ and close the valve, thus cutting off the egress of water from the reservoir whenever the water gets below the open end of the tube A.

In Fig. 3 of the drawings is shown a boiler to which water is fed by an injector L, without the use of a pump. The valve lever M which is ordinarily worked by hand, I connect by a rod with my lever arm C which opens it when the water sinks below its desired level in the boiler, thus letting on steam to operate the injector and feed the desired quantity of water to the boiler. Of course, the connection with arm C may be made directly with the valve instead of an intermediate lever.

My mechanism will work with all single-acting injectors having an automatic overflow, all balance valves, and all injectors or inspirators having an overflow or waste pipe, so that they may be left working steadily while the water is ejected automatically.

My invention may also be used in a gravity system of water feed.

Having thus described all that is necessary to a full understanding of my invention, what I claim as new, and desire to protect by Letters Patent, is—

The combination with a steam boiler, of the metallic tube A open at the lower end, and curved at the upper end, the clevis B made fast on said tube and having a cross-pivot between the ears *b b*, the loop lever C E D having one end of arm C fulcrumed on the clevis pivot and a balance weight on arm D, and the rod F connecting bent end of the tube A with the lever arm C; whereby the said arm C may be connected with a valve so as to open and close it in the manner described and for the purposes set forth.

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

JOSEPH HENRY JOHNSON.

Witnesses:

D. STEINBERGER,

JOSEPH LESCEED.