H. B. Adams,

Steam-Boiler Water-Feeder,

No. 22,477. Patented Jan. 4, 1859.

Fig. 5.

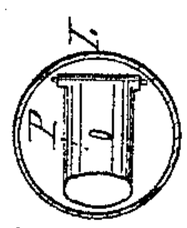


Fig. 2.

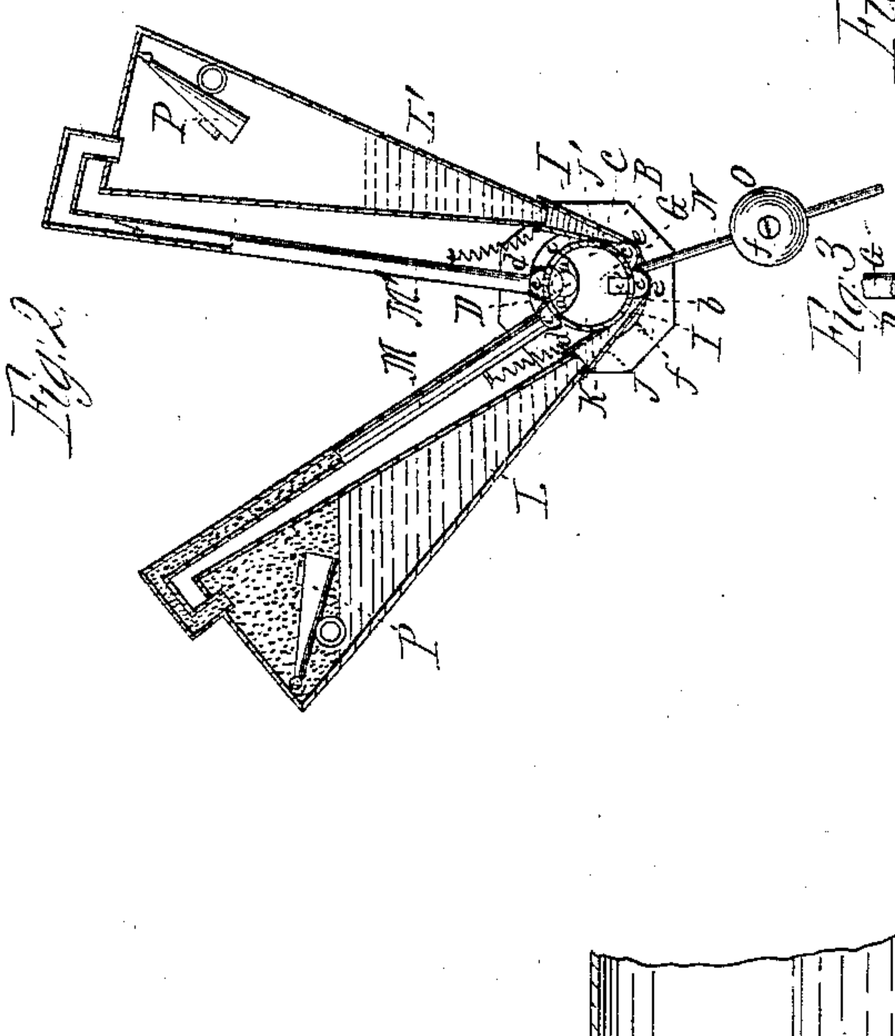


Fig. 4.

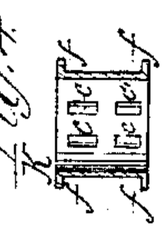


Fig. 3.

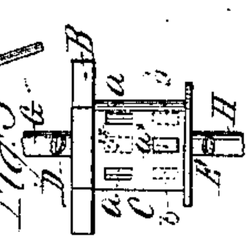
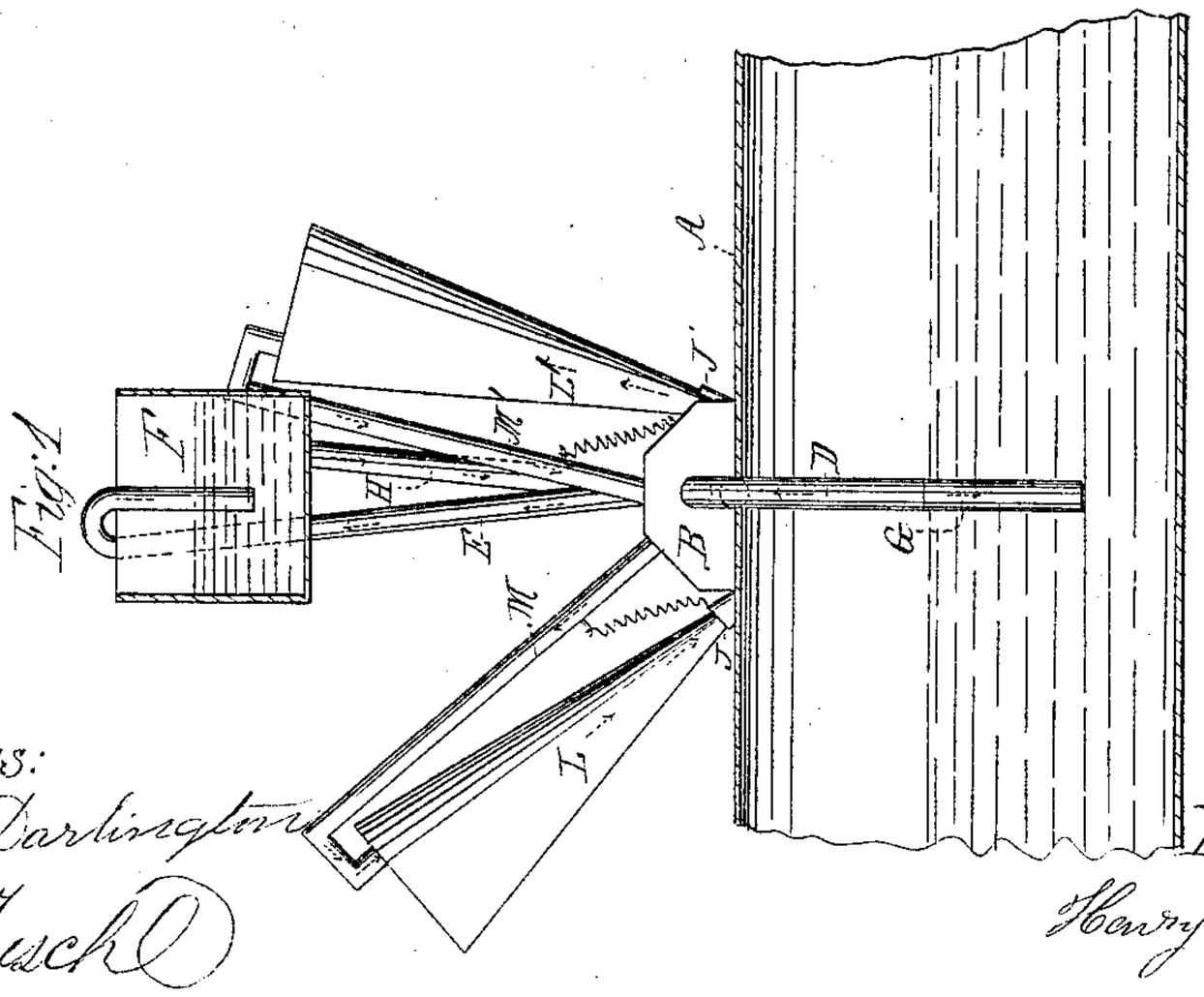


Fig. 1.



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY B. ADAMS, OF BROOKLYN, NEW YORK.

AUTOMATIC BOILER-FEEDER.

Specification forming part of Letters Patent No. 22,477, dated January 4, 1859; Reissued April 24, 1860, No. 946.

To all whom it may concern:

Be it known that I, HENRY B. ADAMS, of the city of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Automatic Boiler-Feed; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, represents a section of a steam boiler, with the boiler feed attached to it. Fig. 2, is a vertical central section through the oscillating chambers and through the valve arrangement. Fig. 3, is a plan or top view of ditto. Fig. 4, is an inverted plan of one half of the shell which constitutes the valve. Fig. 5 is an inverted plan view of one of the float valves in my oscillating chambers.

Similar letters of reference in the several figures indicate corresponding parts of my apparatus.

To enable others skilled in the art to fully understand and construct my boiler feed, I will proceed to describe it.

A, is a portion of a steam boiler the lower part of which is filled with water while the upper part contains steam. A plate B, is rigidly attached to the side of the boiler, and a cylinder C, extends from this plate, which is provided with six ports or openings, three of those ports being situated on the upper and three on the lower half of the cylinder C. The ports a, a, on the upper portion communicate with a pipe D, which extends to the inside of the boiler and down to the high-water line, so that when the water in the boiler reaches its highest point, said pipe D, is closed, but before this point has been reached, it communicates with that part of the boiler only which contains steam. The part $a^{\times}$, which is also situated on the upper part of the cylinder C, communicates with an exhaust pipe E, which extends to the water tank F, in order to heat the water contained therein. In the same manner, the port $b^{\times}$, on the lower portion of the cylinder C, communicates with a pipe G, which extends to the inside of the boiler and down near to its bottom, so that its opening in the boiler is always submerged in the water, and the ports b, and b^{1}, which are also situated on the lower part of the cylinder C, communicate with a pipe H, through which water is supplied from the tank F, or from another source, as occasion may be.

The cylinder C, is covered by a shell K, which is represented in the drawing in two halves, I, and I^{1}, and each of these halves is provided with four openings c, $c^{\times}$, and c^{1}, $c^{1\times}$, which connect by channels d, $d^{\times}$, and e, $e^{\times}$, the ends of which are closed by flanges f, which project over the sides of the shell K. The channels e, and $e^{\times}$, which are attached to the lower half I^{1}, of the shell communicate with tubes J, J^{1}, which are rigidly attached to the shell K, and which form sockets into which the oscillating chambers L, L^{1}, fit closely; and the channels d, $d^{\times}$, on the upper half I, of the shell communicate with pipes M, M^{1}, which extend upward and through the covers of the oscillating chambers so that they communicate with the upper portion of the same, and float valves P, are hinged to the covers of the chambers L, L^{1}, so that the openings of the pipes M, M^{1}, will be closed by the action of those valves, if it becomes necessary. A rod N, extends from the middle of the lower half I^{1}, of the shell and a weight O, slides on this rod so that it can be fastened on the same at any desired point by means of a set screw f^{1}.

The operation is as follows: The chamber L, L^{1}, are supposed to be filled to a certain height with water but so that the chamber L, contains considerably more than the other one L^{1}, so that the gravity of the water will cause this chamber L, to sink down to a position represented in Figs. 1 and 2. By this motion the openings c and $c^{\times}$, in the upper part I, of the shell are brought in such a position that the opening c, is placed right over the port a, so that it admits steam from the pipe D, through the port a, and the opening c, into the pipe M, which communicates with the upper portion of the chamber L, so that the pressure in the chamber L, is the same as in the steam boiler; and the opening $c^{\times}$, is brought right over the port $a^{\times}$, so that the upper portion of the chamber $L^{\times}$ communicates freely with the atmosphere, by means of the pipe M^{1}, the opening $c^{\times}$, the port $a^{\times}$, and the exhaust pipe E. At the same time the openings in the lower half I^{1}, of the shell K, are so arranged that the port $b^{\times}$, which communicates by the pipe G, with the water space in the steam boiler, is brought to communicate with the chamber L, so that the water contained therein (the

pressure in the said chamber being the same as in the steam boiler) flows into the boiler; and the port b^1, is brought in communication with the chamber L^1, so that the water from the tank F, has free access to this chamber by means of the pipe H, which communicates with the ports b, and b^1, as above described. As soon as the water enters the chamber L^1, it drives the steam contained therein out by the pipe E, and it may continue to flow into this chamber until it closes the float valve P. After a certain time the relative amount of water contained in the two chambers L, L^1, will be such that the chamber L^1, assisted by the action of the weight O, sinks down, whereby this chamber is brought in communication with the steam boiler, while at the same time the other chamber L^1, is brought in communication with the water tank. The time when this change takes place may be regulated by the weight O, as the difference in the amount of water contained in the two chambers must be larger if the weight is brought closer to the fulcrum, so that the change in the position of the chambers L, L^1, takes place at longer or shorted intervals according to the position of the weight O, said intervals being longer when the weight is closer to the fulcrum and shorter when the weight is farther from it. By these means water will be introduced into the boiler until the opening of the pipe D, in the boiler is closed up by the same, which takes place when it reaches its highest point. At this stage of the operation water will enter into the chamber L, or L^1, as the case may be, by the pipe D, and the weight of this chamber will be such that the operation ceases until water enough in the boiler is converted into steam, so that the pipe D, is left open and communicates with the steam space again, as above described. It is, however, easy to regulate the supply according to the consumption, by means of the weight O, so that the water in the boiler is continually kept at the proper height.

I am well aware that oscillating chambers have been used for the purpose of gaging or supplying water, therefore I do not claim broadly the use of oscillating chambers for the purpose of supplying water to a steam boiler. But

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

1. The arrangement and combination, substantially as herein shown and described, of the chambers L, L, shell K, and adjustable weight O, for the purposes set forth.

2. I also claim the combination of the valves P, with the chambers L, as and for the purposes herein shown and described.

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