H. O. Demarest,

Steam-Boiler Water-Feeder,

No. 68,964. Patented Sep. 17, 1867.

Fig: 1.

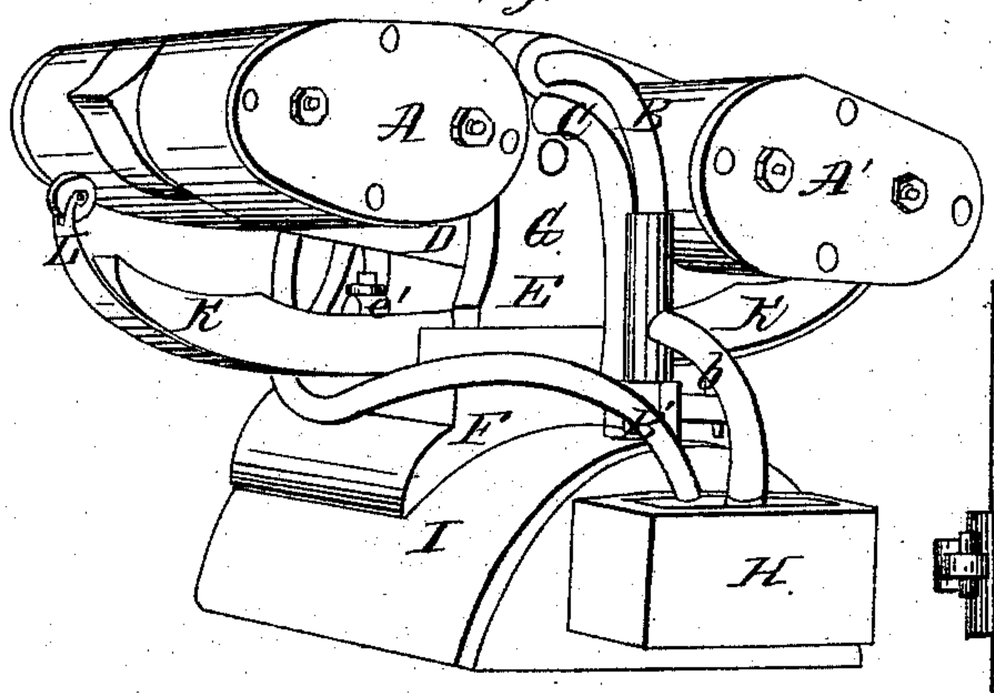


Fig: 3.

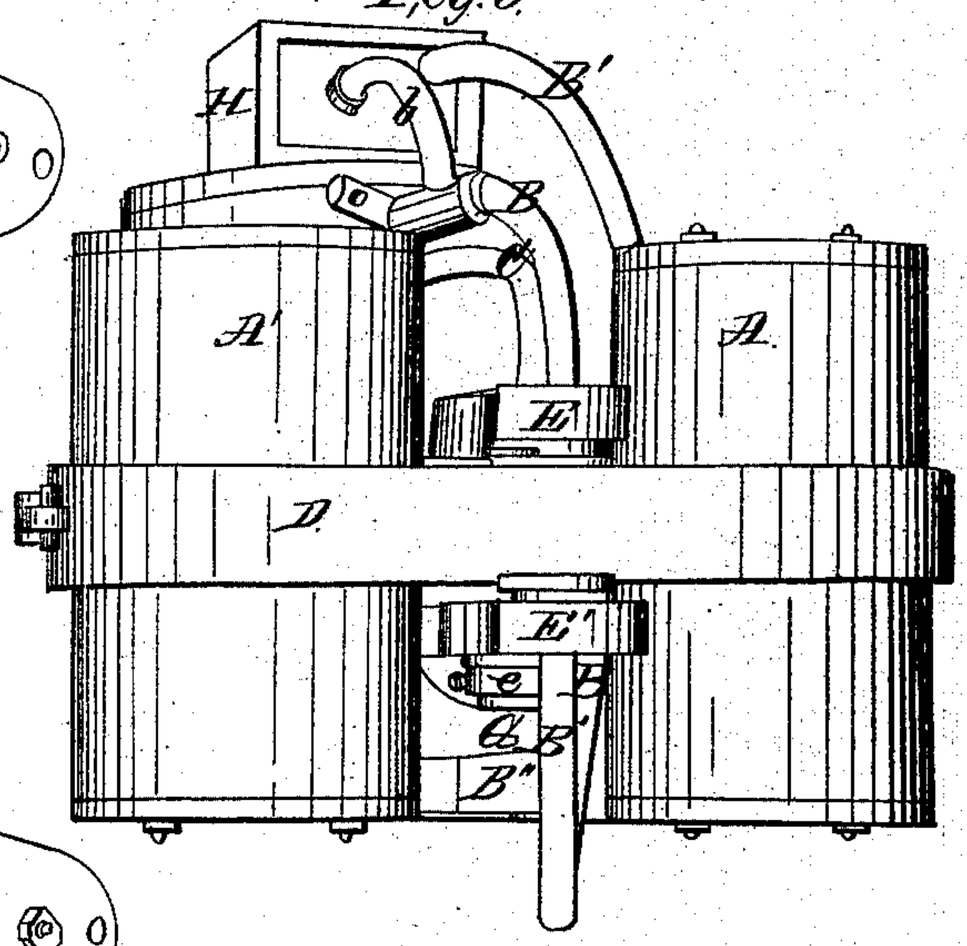


Fig: 2.

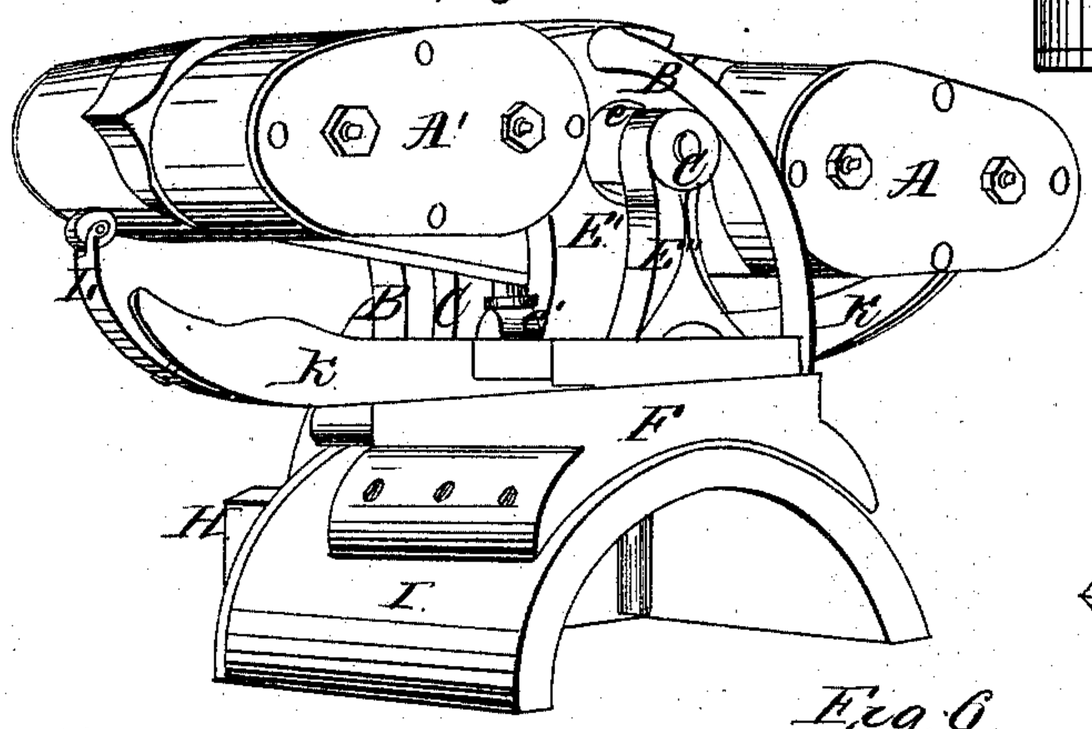


Fig: 4.

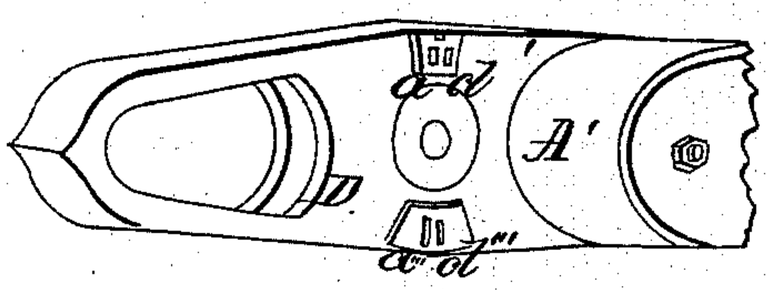


Fig: 6.

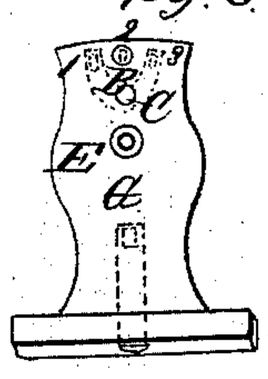


Fig: 7.

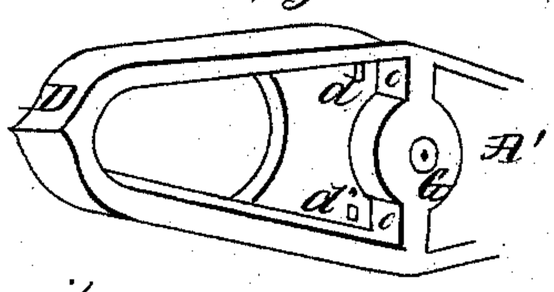
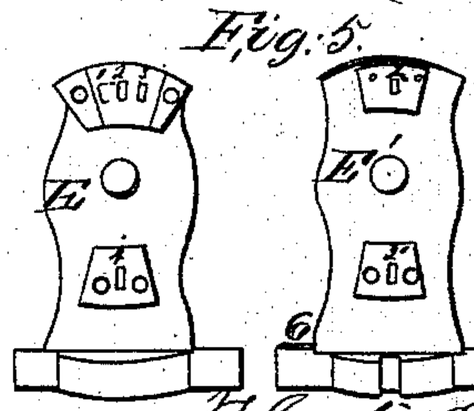


Fig: 5.



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HENRY O. DEMAREST, OF NEW YORK, N. Y.

Letters Patent No. 68,964, *dated September* 17, 1867.

IMPROVEMENT IN BOILER-FEEDERS.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, HENRY O. DEMAREST, of the city, county, and State of New York, have invented a new and useful Improvement in Automatic Boiler-Feeders; and I do hereby declare that the following is a full, clear, and exact description of the said invention, and of the construction and operation of the same, so as to enable any person skilled in the art to make and construct the same, reference being had to the annexed drawings, making a part of this specification, of which drawings—

Figure 1 is a front view of said machine.

Figure 2 is a rear view of said machine.

Figure 3 is a top view of said machine.

Figure 4 is a view of the chambers and their connection with each other, one chamber being removed to show in part the internal arrangement of said connection.

Figure 5 is a view of two of the heads or supports of said machine, the sides shown being those which are applied to the sides of said connection.

Figure 6 shows the internal arrangement of one of said heads or supports.

Figure 7 shows the internal arrangement of the connection above mentioned.

In said drawings, A and A′ are two hollow chambers, of equal weight and suitable capacity, said chambers being connected by the hollow lever D, and also fastened to it. Said chambers and lever are supported by and oscillate on the axis G which passes through the heads E, E′, and E″, the weight of said chambers and lever being supported by E and E″ alone. Communication through said lever is prevented by a partition in the latter, as represented by O O′ in fig. 7. D is said lever or connection. The ports or apertures *d d′ d″ d‴* go through said lever, one on each side of said partition, and also communicate through said lever with each chamber, *d* and *d″* with A, and *d′* and *d‴* with A′. E, E′, and E″ are heads or supports. E and E″ are firmly attached to the bed-plate F which rests upon the boiler I. Into the front of E enter the steam pipe C and the water pipe B, which pipes pass through E, C diverging into two branches (as represented in fig. 6) and opening out on the inside face of the head and near its top, at the ports 1 and 3, B opening out at the port 2. These ports are so constructed that when A′ is depressed the ports 1 and 2 in the head E are in the same line, and respectively communicate directly with the ports *d′* and *d* in the lever. When A is depressed the ports 2 and 3, in like manner, are in a line, and respectively communicate directly with the ports *d′* and *d* in said lever. The port 4 in the head E communicates with a pipe, (as represented in fig. 6,) which pipe leads inside of said head, into said boiler to a lower depth than the steam pipe C. When A′ is depressed the said port is in a line and communicates directly with *d‴* in the lever D. When A is depressed said port is in a line and communicates directly with *d″*. E′ is a movable head attached to the bed-plate F by screws passing through the slot 5, (as in fig. 5,) and on the other side of the head through a similar slot, and also by screws passing through the holes 6 and 7, these last-named screws having the washers *e′*, of a triangular form, with a rounding base, and playing freely therein and in the holes 6 and 7. *e* is a nut working upon threads in the axis G. Around the axis, and between the nut and the head E′, is a ring of India rubber or other elastic substance. By this arrangement the closeness of the contact between the heads E and E′ and the lever D can be increased or diminished at pleasure, and leakage between the faces of the heads E and E′ and the lever D is prevented. The port 2 in the head E′ goes through the head and communicates with the waste pipe B′. It is so constructed that when the chamber A′ is depressed said port is in a line and communicates directly with the port *d* in the lever D, (but on the face of said lever opposite to the face represented in fig. 4.) When A is depressed said port is in a line and communicates directly with the port *d′* in said lever, but on said opposite face. The port 2′ in said head communicates with a pipe which empties into the boiler at a point lower than the orifice of the steam pipe C. When the chamber A′ is depressed said port is in a line and communicates directly with *d‴* in the lever D. When A is depressed said port is in a line and communicates directly with *d″* in said lever. E″ is a head firmly attached to the bed-plate F, and with E sustains the weight of said chambers and lever. The pipe in the boiler communicating with the port 2′ is flush, or nearly so, with the outer surface of the boiler. Over said pipe is a ring whose inner circumference is larger than that of the pipe. Said ring is sunk flush into the bed-plate, and leakage is prevented by washers of India rubber or other elastic substances. C is a steam-feed pipe, communicating

freely with the steam in the boiler whenever its lower orifice is above the surface of the water, and is of such length that its lower extremity is at the level at which it is desired to keep the water. B is an injector communicating with the water-feed pipe *b*. The injector need not be used where a sufficient head of water can be obtained, the water being fed to the machine by a pipe in place of the injector. K is a rest which sustains either chamber when it is depressed. The springs L L, with the rollers attached, are so constructed and adjusted as to prevent oscillation until the elevated chamber becomes heavier than the depressed chamber by any given weight.

The operation of said machine is as follows: As soon as the water in the boiler is below the mouth of the steam pipe C steam passes through said pipe into the chamber which at that moment is depressed. At the same time the stop-cock of the injector B (or of the water pipe if the injector is not used) should be turned, and the water begins to enter the chamber which is elevated. Suppose A′ to be the chamber which is at this time depressed, then the steam from the boiler passes through the steam pipe C and the port 1 in the head E, and thence into the port *d*′ in the lever D, and thence into the chamber A′. The water in said chamber thereupon passes through the port *d*‴ in the lever D into the ports 4 and 2′ in the heads E and E′, and thence through the corresponding pipes into the boiler. If no water at this time happens to be in the chamber A′ said chamber will fill with steam from the steam pipe C. In the mean time water passes through the injector, (or water pipe,) through the port 2 of the head E into the port *d* of the lever D, and thence into the chamber A. As soon as this chamber fills or becomes heavier than the chamber A′ it depresses itself, the port *d*″ in the lever D comes into communication with the ports 4 and 2′ in the heads E and E′, and the water begins to discharge into the boiler. The chamber A′ being then elevated, it in turn fills with water passing through the port 2 in the head E into the port *d*′ in the lever D. As soon as the water in the boiler is above the mouth of the steam pipe C, the steam being prevented from entering the said pipe, the machine ceases to act. If, during the time the machine ceases to act, the injector (or water pipe) be not turned off, the water passes through the port 2 in the head E, through the port *d* or *d*′ in the lever D, as the case may be, and through the port 2 in the head E′ into the waste pipe B.

What I claim as new and as my invention, and desire to secure by Letters Patent, is—

1. The arrangement of the lever D, heads E and E′, and washer *e*′, substantially upon the principle and in the manner herein set forth.

2. The arrangement of the chambers A and A′, lever D, heads E, E′, and E″, nut *e*, screws and washer *c*′, discharge pipe, steam pipe C, and the injector pipe B, constructed and combined substantially as hereinabove set forth.

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