No. 637,250. Patented Nov. 21, 1899.

C. P. HALL.

AUTOMATIC COMPOUND FEEDER FOR STEAM BOILERS.

(Application filed Mar. 11, 1899.)

(No Model.)

Fig. 1.

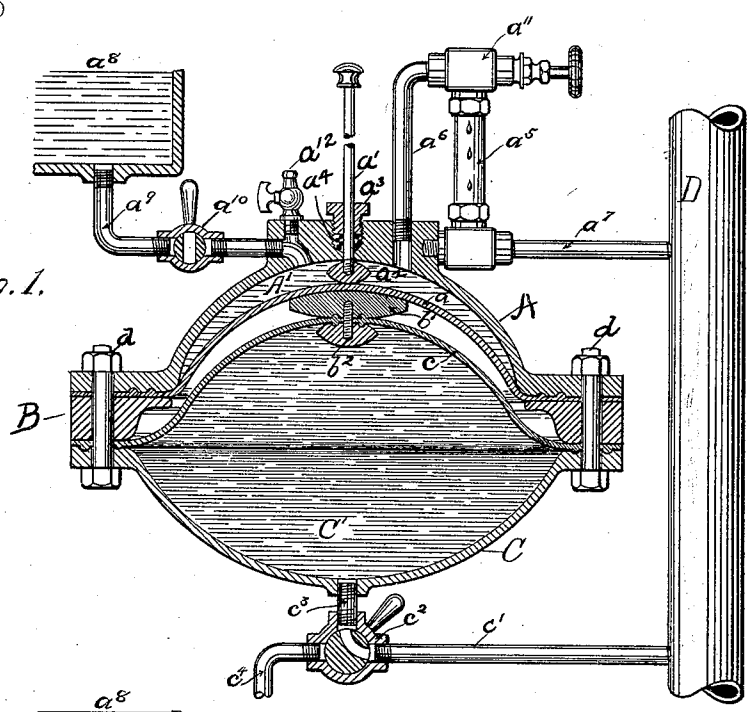
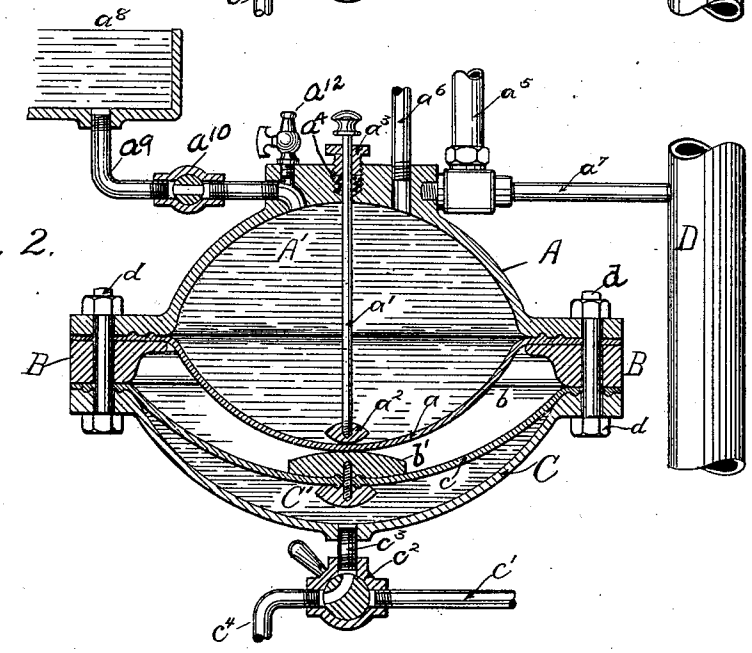


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHESTER P. HALL, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO HENRY B. PROSSER AND O. E. POOLE, OF SAME PLACE.

AUTOMATIC COMPOUND FEEDER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 637,250, dated November 21, 1899.

Application filed March 11, 1899. Serial No. 708,666. (No model.)

To all whom it may concern:

Be it known that I, CHESTER P. HALL, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented a certain new and useful Improvement in Automatic Compound Feeders for Steam-Boilers; and I do hereby 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.

My invention has reference to improvements in apparatus for automatically feeding scale-preventing boiler compound into a boiler in small but continuous or intermittent quantities, one type of such apparatus being shown in the application filed by me on the 14th day of March, 1895, Serial No. 541,796, said application having been patented on the 5th day of November, 1895, No. 549,479.

The purposes of the present invention are to simplify and cheapen the cost of the construction of the motor device of my automatic feeder and to make its operation more certain and therefore more reliable and to provide a new system of feeding the compound into the boiler, so that the quantity so fed is visible before becoming mixed with water.

With these and other objects in view the invention consists in the novel construction and combination of parts herein more fully described, and particularly pointed out in the accompanying claims.

I have shown one form of my device in the drawings which form a part hereof, in which—

Figures 1 and 2 are sectional elevations of my device.

A, B, and C form three parts of a casing composing a diaphragm-chamber. A and C are the upper and lower concave top and bottom portions of the chamber, respectively. The top A is much smaller in diameter than the bottom C. A conical ring B intervenes between the said top and bottom, its inside surface being designed to come flush with the inside surface of the largest diameter of each of the concave top and bottom pieces. A diaphragm a is placed between the top A and ring B. Another diaphragm c, somewhat larger in diameter, is placed between the bottom C and the ring B. The space b between the two diaphragms is preferably left open to the atmosphere. The construction described is held together by the bolts d in the manner shown. A spacing medium b' communicates between the two diaphragms, being attached to the lower one in this case by means of the nut b^2. An indicator-rod a', having a blunt or enlarged end a^2, rests upon the top surface of the diaphragm a and is passed into the chamber through the gland a^3 and packing a^4. A visible feed attachment a^5 communicates with the upper chamber A′ by means of a tube a^6 and with the water-feed pipe D by pipe a^7.

A reservoir a^8 contains a supply of the material to be fed into the boiler and is connected with the chamber A′ through the pipe a^9 and valve a^{10}. An air-cock a^{12} communicates with the chamber A′.

The bottom of the chamber C′ is connected with the water-feed pipe D by the pipe c', three-way valve c^2, and pipe c^3. A drip-pipe c^4 is connected to valve c^2, as shown.

The chamber A′ is designed to be filled with boiler compound, as shown in Fig. 2.

The operation of the device is as follows: In Fig. 1 diaphragms a and c occupy their highest position and chamber A′ is practically empty, while chamber C′ is filled with water. In Fig. 2 chamber A′ is filled with compound and chamber C′ is practically empty. Before filling the chamber A′ with compound it is desirable to fill the sight-feed attachment and connecting-fittings with compressed air to prevent water from pipe D from filling the attachment a^5 and from flowing into the chamber A′. This also permits the compound flowing into the boiler to become visible when passing through the glass tube of the sight-feed attachment.

Referring to Fig. 2, before any compound is admitted into chamber A′ water under pressure from pipe D is admitted into chamber C′ by opening valve c^2. Diaphragm c is thereby raised, and diaphragm a is also raised through the medium of the spacing-block b'. The air contained within chamber A′ is compressed as a result of the contracted space due to the raising of diaphragm a. Regulating-valve a^{11} is then closed, and the com-

pressed air is now pocketed between pipe D and regulating-valve a^{11}.

Referring now to Fig. 1, when it is desirable to fill the chamber A′ with compound valve a^{10} is opened. If it is a check-valve, which it may be, this is not necessary, as it will rise automatically. Then valve c^2 is turned into the position shown in Fig. 2, when the pressure will be turned off from chamber C′ and the water contained in chamber C′ will run out through pipes c^3 c^4 and valve c^2. In the meantime the fluid contained in reservoir a^8 will flow into chamber A′ through pipe a^9 and valve a^{10}. The outgoing liquid from chamber C′ and the weight of the incoming liquid into chamber A′ will cause the diaphragms to assume the position shown in Fig. 2, with the chamber A′ full and the chamber C′ empty. Now turn the valves again, as shown in Fig. 1, and close the air-valve a^{12} and open regulating-valve a^{11} and the device is ready to feed the liquid contained in chamber A′ into pipe D, and thence into the boiler. When the diaphragms have been depressed, the indicator a' should be inserted, as shown in Fig. 2. It will rise with the diaphragms and indicate the quantity of liquid contained in chamber A′. Diaphragm c, as before stated, is larger in diameter than diaphragm a. When in operative condition, they are both subject to the same pressure; but diaphragm c by virtue of its large area overcomes the effect of the resistance of diaphragm a in proportion to their difference in area, and thereby the system of diaphragms will be raised and the liquid contained in chamber A′ will be forced into pipe D in the manner described. The glass tube a^5 is filled with compressed air in the manner described, and the liquid compound as it is fed in drops is plainly visible. Should the air within the sight-feed attachment become exhausted, a fresh amount may be taken into chamber A′ by closing valves a^{10} and a^{11} and opening valves a^{12} and c^2, when the diaphragm a will descend, leaving an air-space above the liquid in chamber A′, and this air may be forced into the sight-feed device, as before, by closing valves a^{10} and a^{12} and opening valves a^{11} and c^2.

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

1. An automatic boiler-feed device, consisting of two hemispheroidal shells having chambers of different diameter, a ring for connecting the two shells together having corresponding diameters, a flexible diaphragm on each side of the said ring, a liquid to be fed into the boiler in one chamber, and a motor liquid in the other, and a system of pipes connecting the said chambers with the boiler, substantially as set forth.

2. An automatic boiler-feed device, consisting of two hemispheroidal shells, having chambers of different diameters, flexible diaphragms over the largest diameter of each shell, said diaphragms connected together at or near their centers, a means for retaining the said shells in proper relation, liquid to be fed into the boiler in one chamber, a motor fluid in the other and a system of pipes connecting the said chambers with the boiler, substantially as set forth.

3. In a device for feeding material into a boiler, or the like, under pressure; a reservoir containing the material to be fed, a device for forcing the material into the boiler; a transparent passage-way, through which the material passes, said passage-way containing air under pressure, and a means for regulating the amount of material so fed, substantially as set forth.

4. In a device for feeding material into a boiler, or the like, under pressure; a reservoir containing the material to be fed, a device for forcing the material into the boiler; a transparent passage-way containing compressed air, intermediate of the said boiler and said reservoir, whereby the said material may be fed into the said boiler, without coming into contact with water or steam until after it has been passed through the said passage-way, substantially as set forth.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 9th day of March, 1899.

CHESTER P. HALL.

Witnesses:
FORÉE BAIN,
M. F. ALLEN.