(No Model.)

A. DE DION, G. T. BOUTON & C. TRÈPARDOUX.

STEAM BOILER FEEDER.

No. 306,722. Patented Oct. 21, 1884.

Fig. 1.

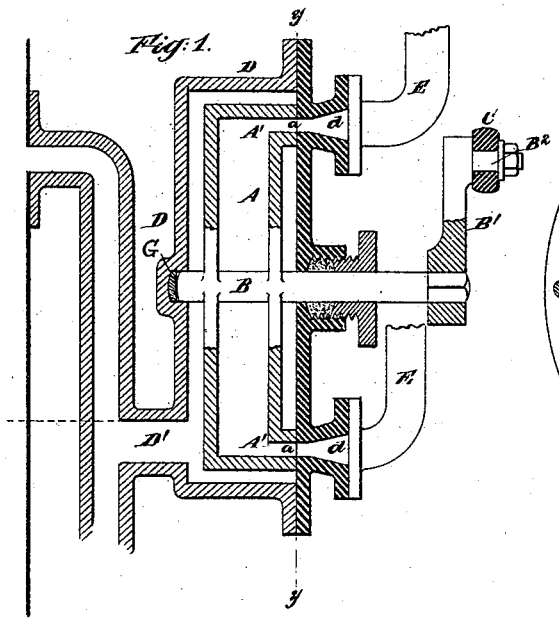


Fig. 2.

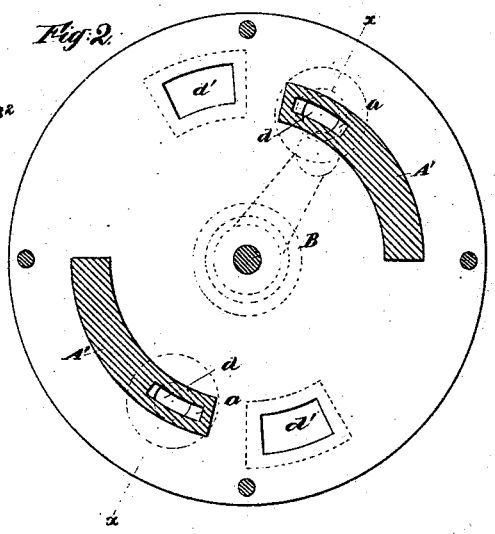


Fig. 3.

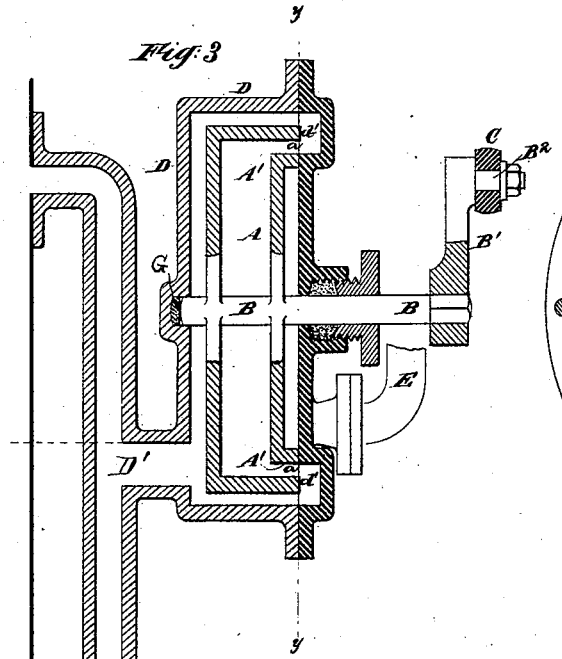
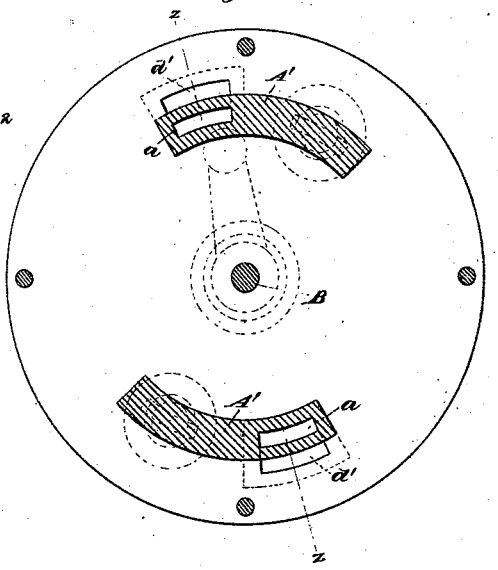


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT DE DION, GEORGES THADÉE BOUTON, AND CHARLES TRÈPARDOUX, OF PARIS, FRANCE.

STEAM-BOILER FEEDER.

SPECIFICATION forming part of Letters Patent No. 306,722, dated October 21, 1884.

Application filed January 21, 1884. (No model.) Patented in France February 6, 1883, No. 153,522, and in Belgium March 23, 1883, No. 60,892.

To all whom it may concern:

Be it known that we, ALBERT DE DION, GEORGES THADÉE BOUTON, and CHARLES TRÈPARDOUX, all citizens of the Republic of France, residing at Paris, France, have invented certain new and useful Improvements in Steam-Boiler Feeders, of which the following is a specification.

Our apparatus has an oscillating reservoir inclosed in a box put in communication alternately with the boiler and with an elevated reservoir containing feed-water. The reservoir is at each oscillation filled with water and emptied into the boiler so long as the water-level in the boiler is too low. The oscillating of the reservoir is effected by a mechanical connection to some suitable part of the steam-engine or other mechanism capable of imparting the requisite motion. In other respects the action is automatic. The inclosing case or box in which the oscillating chamber or vessel is contained connects with the boiler in such manner that when the water is low in the boiler steam will flow into the box and be discharged intermittently through the apparatus and water be intermittently inducted into the boiler. When the water is sufficiently high, the passage of steam into the box is arrested by the presence of the water, and the apparatus becomes ineffective, notwithstanding its oscillating motion, until the level of the water again falls.

The apparatus will work with hot water or cold. It is well adapted to allow the steam escaping to be condensed in the water, and thus raise its temperature before its admission to the apparatus.

The following is a description of what we consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a section on the line *x x* in Fig. 2. Fig. 2 is a section on the line *y y* in Fig. 1. Fig. 3 is a section on the line *z z* in Fig. 4. Fig. 4 is a section on the line *y y* in Fig. 3.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is a strong tight vessel, of circular form, mounted on a shaft, B, which extends across a strong tight chamber, D, having a neck, D′, in communication with the boiler, and fixed at the water-level thereof. The shaft B has an arm, B′, carrying a crank-pin, B^2, to which is connected a rod, C, which is connected to a moving part of a steam-engine, (not represented,) so as to impart an oscillating motion to the arm B′, and consequently to the vessel A.

On one face of the vessel A are two raised segments, A′, in each of which is a port or opening, *a*, communicating with the interior of the vessel.

In the adjacent side of the box or chamber D are two ports, *d*, which communicate by pipes E with a tank of water mounted at a higher level. These pipes are only partially represented, but will involve no difficulty. It is sufficient that the water-reservoir be higher and contain a sufficient quantity of water, ready to be delivered through the ports *d* when the conditions are favorable for its descent. In the same face of the box D, at a little distance from the ports *d*, are two cavities, *d′*. These are arranged as indicated in Figs. 2, 3, and 4.

Operation: Suppose the vessel A to be filled with water and in the position shown in Figs. 1 and 2. The motion of the rod C turns the vessel A in the direction of the arrow, Fig. 2. This moves the ports *a* out of communication with the ports *d* and presents a solid portion of each segment A′ to the latter ports, thus rendering these ports inoperative. A further movement of the vessel A brings its ports *a* into communication with the blank ports or cavities *d′*, which cavities are of sufficient width and so arranged as to allow free communication between the interior of A and the space exterior thereto within the box D. If the box D exterior to A is filled with water, by reason of the water-level in the boiler being above the neck D′, no movement will result; but if the level of the water in the boiler is low, so that steam can flow into the box D through the neck D′ and fill the space around the vessel A, the moment the ports *a* are presented to the blank ports or cavities *d′* the

steam will flow into the top of the vessel A through the uppermost of the ports *a*, and the contained water in A will flow out through the lowermost port *a*, and, accumulating in the bottom of the box D, will flow through the neck D′ into the boiler, and thus feed the boiler. When at a little later period the motion of the rod C in the opposite direction oscillates the vessel A back to its original position, the steam which fills the vessel A will escape through the ports *a d*, and, either rushing upward through the pipes E and escaping through the water of the tank, or being condensed thereby, empties the vessel A of its volume of steam. The water now flows in through the ports *d a* and fills the vessel A. The next oscillating movement of A brings the ports *a* again into communication with the cavities *d′* and allows the vessel to empty its water into the boiler. The round of operations continues indefinitely. Whenever the water-level in the boiler is low, steam will alternately fill the vessel A and be discharged or condensed and water take its place to be discharged into the boiler. When the water-level in the boiler is high, the vessel A will continue to oscillate by the action received through the rod C; but the vessel will not empty, and no effect will be produced.

Modifications may be made in the forms and proportions within wide limits without departing from the principle or sacrificing the advantages of the invention.

Instead of oscillating, the vessel A may turn always in the same direction, either intermittently or constantly. Instead of the two pipes by which the passage D′ communicates with the boiler, we can connect the passage directly to the boiler at the water-level. We prefer the two pipes shown, because the arrangement shown tends to avoid the disturbance due to the foaming and ebullition being felt in the box D, and gives purer steam when the apparatus is required to act efficiently, while it is equally effective in arresting the action by the rising of the water-level.

The invention is more particularly intended for feeding stationary boilers; but it may be used with some advantage for locomotives and boilers generally. It may introduce other liquids than water, and may feed other apparatus than boilers.

Our device is simple. The pressure of the steam or water in the chamber D is constant, and while the oscillating chamber A is in communication with the ports *d* to receive water the pressure holds the surfaces tightly together. Under opposite conditions, when the ports *a* are presented to the cavities *d′*, the strong boiler-pressure fills the interior of A, and no force is exerted by the pressure to hold the surfaces in contact. An elastic washer or cushion, G, applied against the end of the shaft B, exerts sufficient force to hold the surfaces gently together.

We attach importance to our cavities *d′*, as they allow a single chamber to serve by alternately filling and emptying.

The branched form of the connection D′ allows the device to take pure steam or pure water at the period while there is a momentary flow from the boiler into the case D, the upper branch connecting with the boiler above the line of froth and foam and the lower branch connecting with the boiler below said line. This construction prevents the froth and the like from being forced with the steam into the chamber and interfering with the working parts.

We claim as our invention—

The oscillating chamber A and operating means, in combination with the casing D, having two ports, *d*, and connected pipes E, and having also two blank ports, *d′*, the ports being arranged to serve relatively to the raised segments A′ and with the branched connection D′ with the boiler, as and for the purposes set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

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GEORGES THADÉE BOUTON.
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Witnesses:
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