R. GARSTANG.

BOILER-FEEDER.

No. 193,502. Patented July 24, 1877.

FIG. 1.

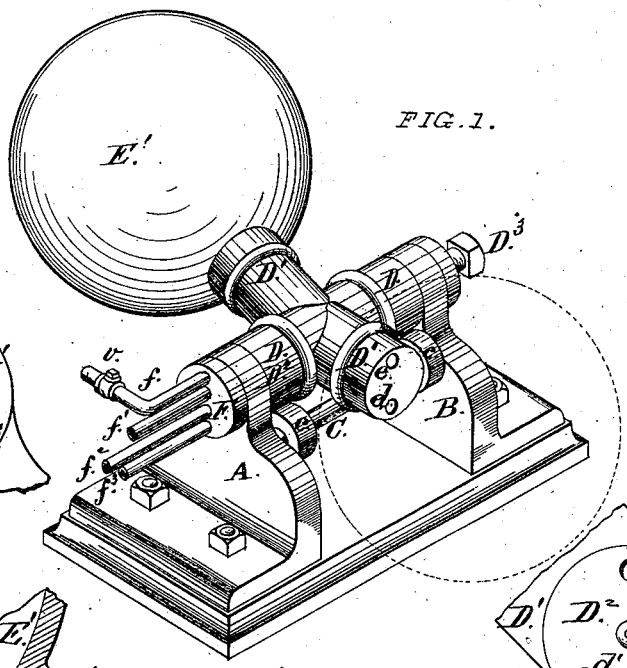


FIG. 4.

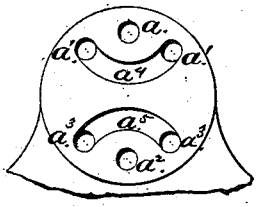


FIG. 5.

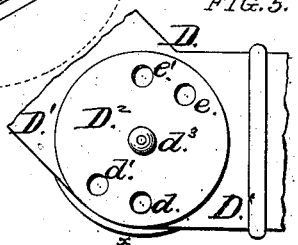


FIG. 2.

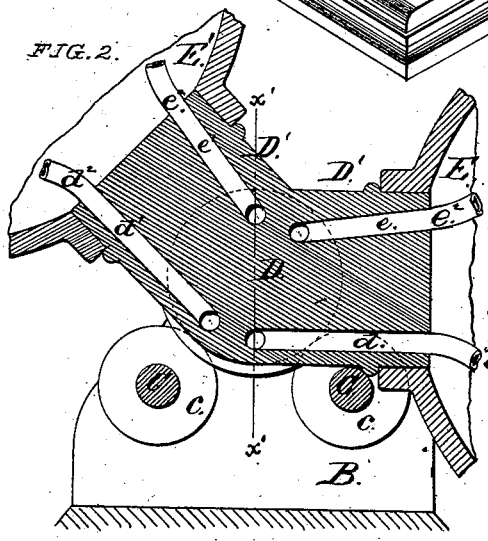
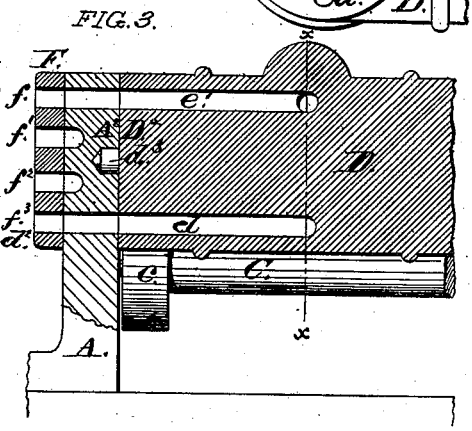


FIG. 3.



ATTEST:

Robert Burns
Chas Hall

INVENTOR:

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UNITED STATES PATENT OFFICE.

RICHARD GARSTANG, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN BOILER-FEEDERS.

Specification forming part of Letters Patent No. **193,502**, dated July 24, 1877; application filed April 11, 1877.

To all whom it may concern:

Be it known that I, RICHARD GARSTANG, of St. Louis, St. Louis county, Missouri, have invented a certain new and useful Improvement in Boiler-Feeders, of which the following is a specification:

My improvement relates to a boiler-feeder in which the water and steam alternately enter tilting vessels supported on a rock-shaft containing the water and steam passages, and forming an oscillating valve worked by the preponderance of weight of the water in each of the vessels alternately after the vessel is put in connection with the water-supply by the descent of the other vessel.

My invention consists, first, in constructing the rock-shaft with water and steam passages, connecting through one end of the shaft with ports formed in one of the supporting-standards, thus locating the water and steam passages on one side of the feeder, in the manner hereinafter described.

My invention consists, secondly, in combining, with said rock-shaft and the water vessels, shafts and rollers for sustaining the rock-shaft and limiting the oscillatory motion of the same.

Figure 1 is a perspective view, with one of the globes removed; Fig. 2, a detail longitudinal section at *x x;* Fig. 3, a detail longitudinal section at *x' x';* Fig. 4, of ports in the standards; Fig. 5, a detail side view of ports in rock-shaft.

A and B are standards, supporting the apparatus. C C are two shafts, whose ends have bearing in the standards A B, and *c* are rollers thereon, on which the rock-shaft D, carrying the water vessels or globes E E, is supported, as shown. One end, D^2, of this shaft forms a valve, with its seat A^2 upon the inner face of the standard, the valve being fitted to its seat with a ground joint, and the face of the valve is kept in close contact with its seat by a heel-screw, D^3.

The oscillating valve D^2 turns on a gudgeon, d^3, which enters a bearing-socket at the center of the seat A^2. The rock-shaft has projecting arms D^1, to which the water-vessels E are attached, and through which the water-passages $d\ d^1$ and the steam-passages $e\ e^1$ extend to the main part of the rock-shaft, and then endwise of the same to one end, where they connect with the ports $a\ a^1\ a^1$ and $a^2\ a^3\ a^3$, extending through the standard A to the water and steam pipes $f\ f^1\ f^2\ f^3$, connected to the standard by a head, F, which is fitted to the standard with a gasket or other steam-tight joint.

The pipe *f* is the exhaust-steam pipe, and has in it a check-valve, *v*, to prevent the entrance of air into the globes E E', when the entrance of water may cause a partial vacuum. The pipe f^1 communicates with the steam-space of the boiler. The pipe f^2 connects with the water-supply tank, or other water-supply, and is in communication with whichever globe may be in the upper position, said globe being at the same time in communication with the exhaust-steam pipe *f*, to allow any uncondensed steam to escape from the globe, to give place to the entering water. The pipe f^3 is the boiler-feed pipe, and as this pipe, when it connects with the feed apparatus, is at even level, or elevated above the water-line in the boiler, it is evident that whenever the water falls below that line in the boiler the water will flow into it from that globe E or E' that may be in communication with it. As the water is exhausted from this globe it fills with steam, and the other globe, having become filled with water, descends, and its water-passage d^1 comes in communication with the boiler-supply pipe f^3, and the steam-passage e^1 is brought in communication with the steam-pipe f^1, so that the steam-pressure within the globe equals that within the boiler.

The ends of the water-passages $d\ d^1$, where they communicate with the globe-chambers, may have pipes d^2 turned down, and their ends opening into the lower part of the chamber; and in like manner the steam-passages may be in connection with the upper part of the chambers by upwardly-extending pipes e^2, the object being to prevent steam entering the water-passages or water entering the steam-passages. The ports $a^1\ a^1$ are connected together with a groove or passage, a^4, in the standard A, beneath the head F, and the ports $a^3\ a^3$ are similarly connected by a groove, a^5, so that ports a^1 are both in connection with

supply-pipe f^1, and ports a^3 in connection with water-supply pipe f^2.

The operation of the apparatus is as follows: Supposing the globe E to be in its lower position, with the arm D^1 resting on the shaft C beneath it, then the water-passage *d* will be in communication with ports a^2 and pipe f^3, and the steam-passage *e* will be in communication with port a^1 and pipe f^1, so that this globe will be receiving steam from the boiler and supplying water thereto. The other globe, E′, at this time will be in communication with the water-supply pipe f^2 and steam-exhaust pipe *f*, and will be receiving water and discharging steam. As soon as the preponderance of weight of water in the globe E′ over that in E causes E′ to descend and draw up the lighter globe E, the latter is put in communication with the water and steam space of the boiler, as described, and the globe E is put into communication with the water-supply and steam-exhaust pipes.

I claim as my invention—

1. The rock-shaft D D^1, having water-vessels E E′, and provided with steam and water passages in the portion D^2, in combination with standards A B, the portion A^2 of the standard A having suitable ports connecting with the passages in the portion D^2, all constructed and arranged substantially as set forth.

2. The rock-shaft D, constructed with passages *d* d^1 and *e* e^1, in combination with the standard A, having ports *a* a^1 a^1 a^2 a^3 a^3 and pipes *f* f^1 f^2 f^3, and the standard B, as and for the purpose set forth.

3. The combination, with the rock-shaft D, carrying water-vessels E E′, of the shafts C, provided with bearing-rollers *c*, sustaining the shaft D, and limiting the oscillatory motion of the same.

RICHARD GARSTANG.

Witnesses:
SAML. KNIGHT,
CHAS. HALL.