

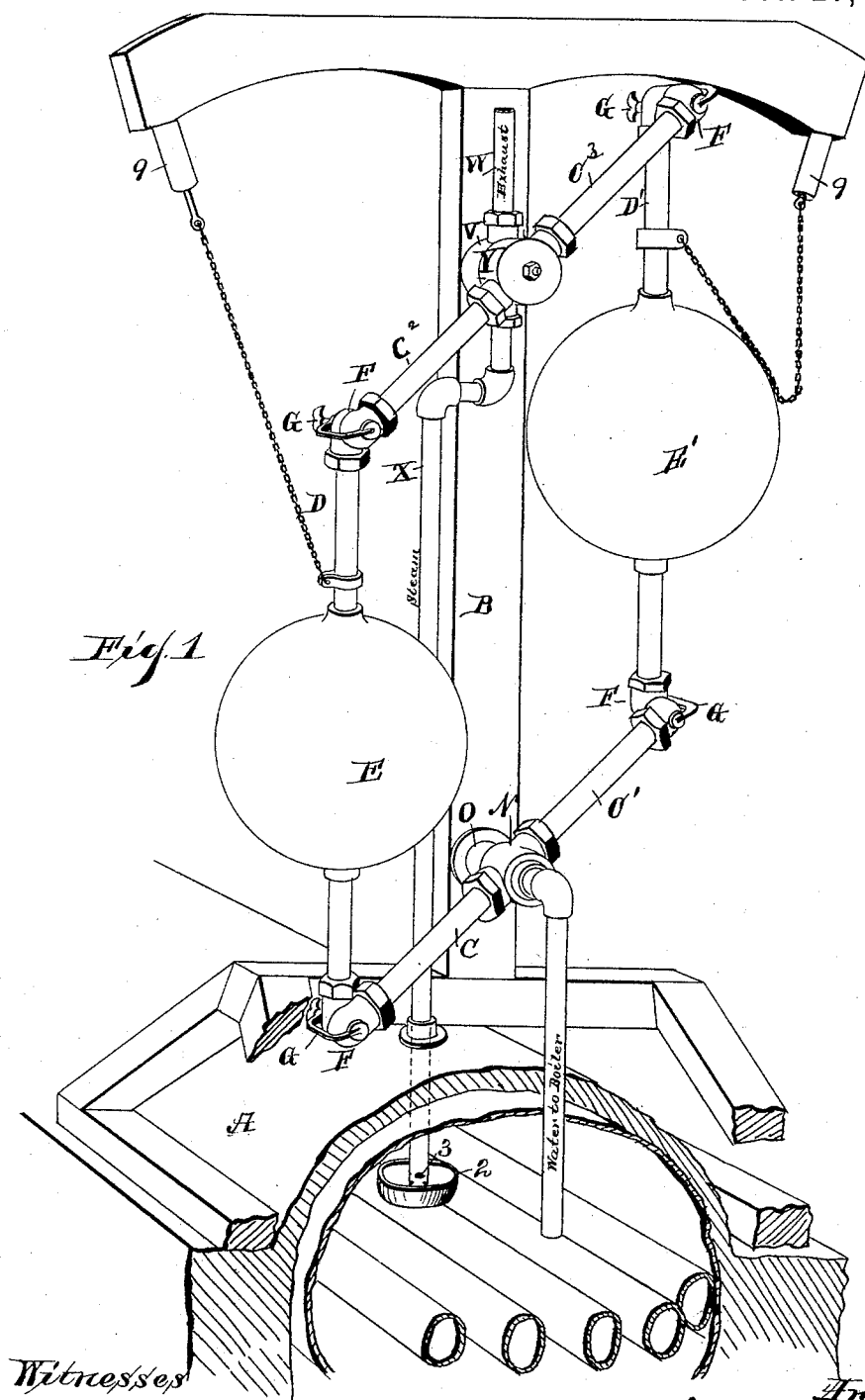
(No Model.)

3 Sheets—Sheet 1.

J. AUSTIN.
BOILER FEEDER.

No. 461,949.

Patented Oct. 27, 1891.



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(No Model.)

3 Sheets—Sheet 2.

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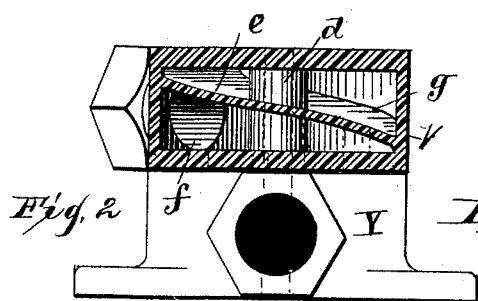


Fig. 2

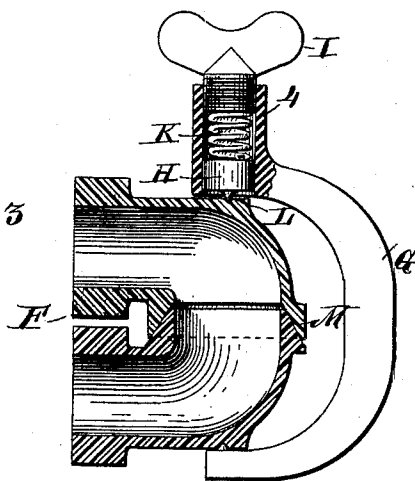


Fig. 3

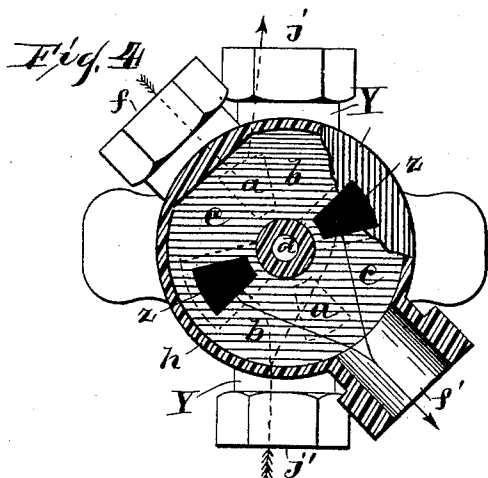


Fig. 4

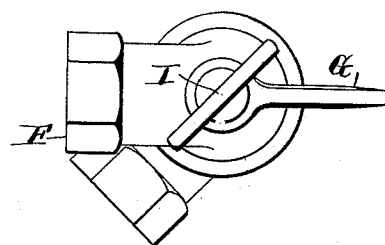


Fig. 5

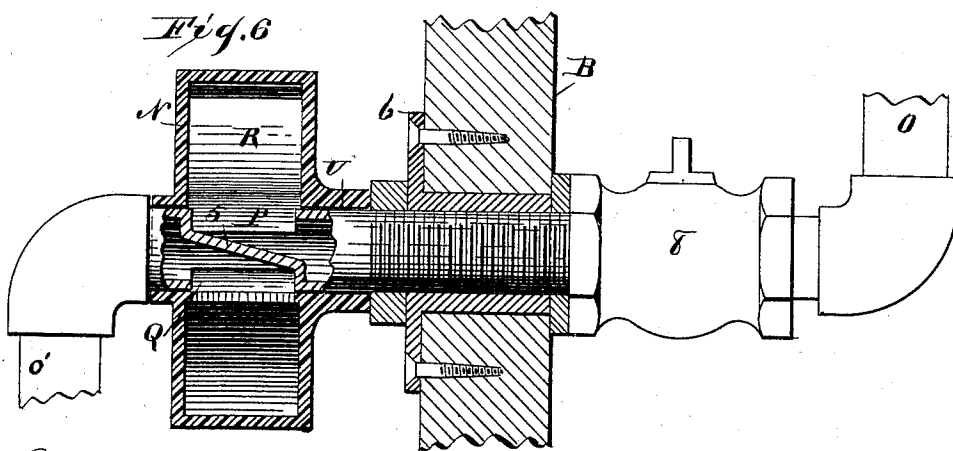


Fig. 6

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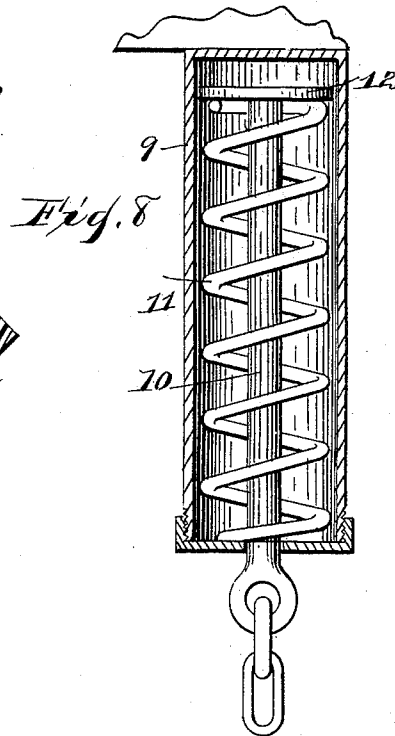
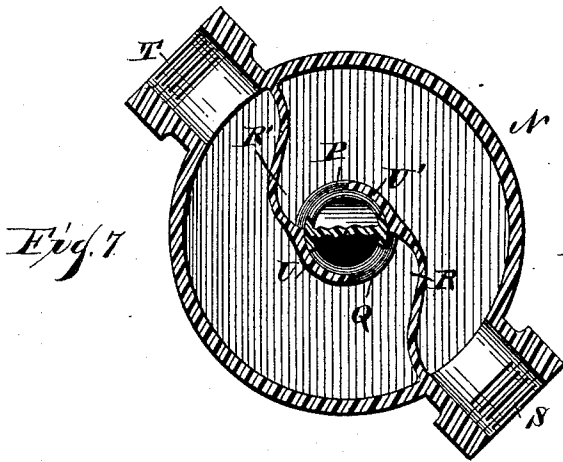
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UNITED STATES PATENT OFFICE.

JOSIAH AUSTIN, OF EAST LIBERTY, OHIO.

BOILER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 461,949, dated October 27. 1891.

Application filed October 20, 1887. Serial No. 252,934. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH AUSTIN, a citizen of the United States, and a resident of East Liberty, in the county of Logan and State of Ohio, have invented a new and useful Improvement in Boiler-Feeders, of which the following is a specification.

My invention is an improvement on my patent, No. 199,500, for feed-water for boilers.

Figure 1 is a perspective of my feeder mounted in a frame on the boiler; Fig. 2, side view of steam-gate, top half in section; Fig. 3, longitudinal section through the coupling; Fig. 4, top view of steam-gate, top wall removed; Fig. 5, top view of Fig. 3; Figs. 6 and 7, section through water-gate; Fig. 8, section through spring-case 9.

A is a boiler; B, standard thereon; C C', horizontal arms or pipes, which, with vertical pipes D D', form the frame supporting the water-chambers E E'; F F F F, swinging ball-joints; G, screw-clamps holding the two sections of the ball-joint together; H, pointed plug sliding in the cylinder in one of the clamps; K, spring bearing against the plug; I, thumb-screw for tightening up the plug and spring; L, socket or pivot-point in which the end of plug H bears; M M, the bearings of the parts of the ball-joints; N, the lower cross-head; O O', the pipe leading from the tank through the cross-head and from the cross-head to the boiler; P, port leading from the boiler into the cross-head; Q, port leading from the cross-head to the tank; U, that part of the inner shell of the cross-head that closes ports P Q in the pipe; R, opening to the rear of U to allow passage of water through ports P Q; S T, passage for water through ports P Q and leading to and from the chambers; V, the upper cross-head or center; W, steam-passage to the tank; X, steam-passage from the boiler to the cross-head; Y, a hollow plate mounted on pin *d* and attached to the cross-head V and having ports Z Z *a a* in its face; *b b c c*, faces or partitions between the ports Z Z *a a*; *e*, diaphragm in the hollow disk Y; *f g*, ports in the pipe opening through ports Z Z *a a*; V, hollow plate corresponding to plate Y, mounted on the same pivot *d*, and having ports with spaces between them corresponding to port Z *a* and partitions *b c*; 2, a shallow cup on bottom of steam-pipe; 3, holes in

the pipe inside the cup; 4, cylinder in which plug H plays; 5, diaphragm in pipe O in cross-head N; 6, thimble on pipe O, by which it is attached to standard B; 8, valve in pipe O; 9, casing for link or rod 10 and spring 11; 12, plate attached to rod 10 and resting on spring 11.

The hollow disk V is mounted on the pipe X, leading from the boiler and to the tank, and has a diaphragm *e* across it similar to the one in disk Y. Y is mounted on the oscillating arms C² C³, each one of which empties on different sides of the diaphragm.

My device is intended to feed water automatically to the steam-boiler regularly and utilize the waste steam for heating the water before it reaches the boiler. To this end I mount a standard B on top of the boiler, on which is pivoted an oscillating frame composed of the pipes C D, carrying the chambers E E'. The frame is pivoted in the cross-heads or centers N V, the pipes leading through them at right angles to the pipes C forming the pivots for the frame to oscillate on. The joints of the frame are made of the swinging ball-joints. (Shown in detail in Fig. 3.) This joint is composed of the two parts shown, each having a bevel-flange, the lower one having a convex bevel fitting snugly within the concave bevel of the upper one and turning on each other, the two being held tightly together by the spring-clamp G, having tapering points in its jaws that fit in sockets or pivot-points L in the upper and lower parts of the joints.

The pipe O, that forms the pivot for cross-head N, has a diaphragm 5 across it within the cross-head similar to the one shown in my patent, No. 199,500, and which is further shown in Fig. 6. This diaphragm is so placed in connection with the cross-head that the water will flow from it into whichever chamber is in the raised position. The water from the tank passes through pipe O into the raised chamber E until enough has accumulated to overcome the friction of the parts, when the chamber descends and the water passes out through a prolongation of pipe O' into the boiler. The construction of the cross-head, by which I am enabled to accomplish this is shown in Figs. 6 and 7. The cross-head is shown in the position assumed when the

chamber E' is full and in the lowered position, the valve U' being open and allowing the water that flows through pipe C' and port S from chamber E' to flow through port P to the boiler through pipe O'. At the same time the port Q is opened and the water flows from the pipe O, through the exit T, through pipe C, and into the empty chamber E until the water in chamber E' has been fed to the boiler and enough has accumulated in chamber E to overcome the friction of the parts, when the chamber E descends and the chamber E' ascends. As the chamber E descends the cross-head N is oscillated on pipe O in the other direction until the port P opens into opening R and port Q opens into opening R'. The water from the tank will then pass through port Q and opening R' and through exit S into pipe C and chamber E', while the water from chamber E will pass by way of opening R through port P into the boiler. It will thus be seen that the oscillation of the cross-head alternately in different directions (about one-fourth of a revolution) connects the feed-port Q first with chamber E and then with chamber E', and that the same movement connects at the same time the full chamber with the pipe emptying into the boiler by way of port P.

To overcome the steam-pressure of the boiler, I pass a steam-pipe from the water-line in the boiler to the upper center or disk composed of two parts Y V, the part Y having a diaphragm therein similar to the one in pipe O and being free to oscillate on the steam-pipe, while the disk V is stationary on the pipe. The hollow disk Y has ports Z Z *aa* in one face and partitions *bc* between them, and on the face of the disk V that fits against these ports are corresponding ports and partitions. As the disk Y oscillates one way the steam from the boiler is admitted through the steam pipe and ports Z Z and passes through pipe C² to the chamber E, Fig. 1, being emptied while the steam from the other chamber E' is admitted by way of pipe C³ through ports *a a* to the pipe W, passing to the tank for exhaust.

The steam-chambers and steam-centers V Y are so located in reference to each other that the centers will always be above the top of the chamber exhausting, so that any air that may collect in the pipe or chambers will freely flow up through the centers to the tank.

In my patent, No. 199,500, the diaphragm in the pipe passing through the lower cross-head is so placed that the water passing to the boiler flows from the lower port to the boiler; but I have discovered that by reversing this, and making the upper port connect with the boiler the pressure from the boiler has a tendency to sustain the weight of the balls and the water therein, thus preventing the bearings in the cross-head wearing flat, as they do when the pressure from the boiler and the

weight of the parts both bear thereon, and also reduces the friction at this point.

By locating a siphon or injector in the exhaust-pipe between the upper center and the tank and connecting it with a pipe (having a check-valve therein) leading to a shallow cistern or reservoir the exhaust-steam can be made to raise the water and fill the tank.

The agitation of the water when boiling violently sometimes closes the end of the steam-pipe while the water is lower than the water-line. To prevent this occurring I attach the cup 2 to the end of the pipe, the rim of the cup being located just at the water-line. The pipe has a number of holes 3 just above the level of the rim of the cup to admit steam to the pipe. The cup may have a hole in the bottom to empty it. This cup is located with its rim at the water-line to keep the water underneath the steam-pipe that leads to the feeder from being agitated and closing the pipe. An eddy is thus formed in the cup, into which the scum on the water will float and be drawn up the steam-pipe to the drums, whence it can be drained off to wherever desired. The mouth of the cup is not located above the water-line to keep the water out of it, but is designed to form an eddy in the water below the pipe leading to the steam-drums and to gather the scum which drifts into it and is carried up the steam-pipe. To lessen the shock of the descending chambers I attach to the top of each a chain, which is attached to a piston 10, playing on spring 11 in cylinder 9, that is attached to the top of my frame.

What I claim is—

1. The combination, with the steam and vacuum chamber, of the pipe extending down to the water-line in a boiler, inoperative when the water rises above the open end of the pipe and automatically operative when the water falls below the end of the pipe, and a plate or cup located below the end of the pipe to prevent the ebullitions of the water closing the pipe when the surface of the water in the boiler is below the end of the pipe, as and for the purpose set forth.

2. The ball-joints having their parts adjustable to take up near the clamp G, the pivot H, the bearing M, spring K, and thumb-screw I, as and for the purpose set forth.

3. The hollow disks V Y, the diaphragms *e*, the pin *d*, and ports *f g*, as and for the purpose set forth.

4. The hollow disks V Y, having diaphragms *e* diagonally across their interior, the steam-openings on each side of the diaphragm, and the ports Z Z *a a b c*, as and for the purpose set forth.

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Witnesses

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