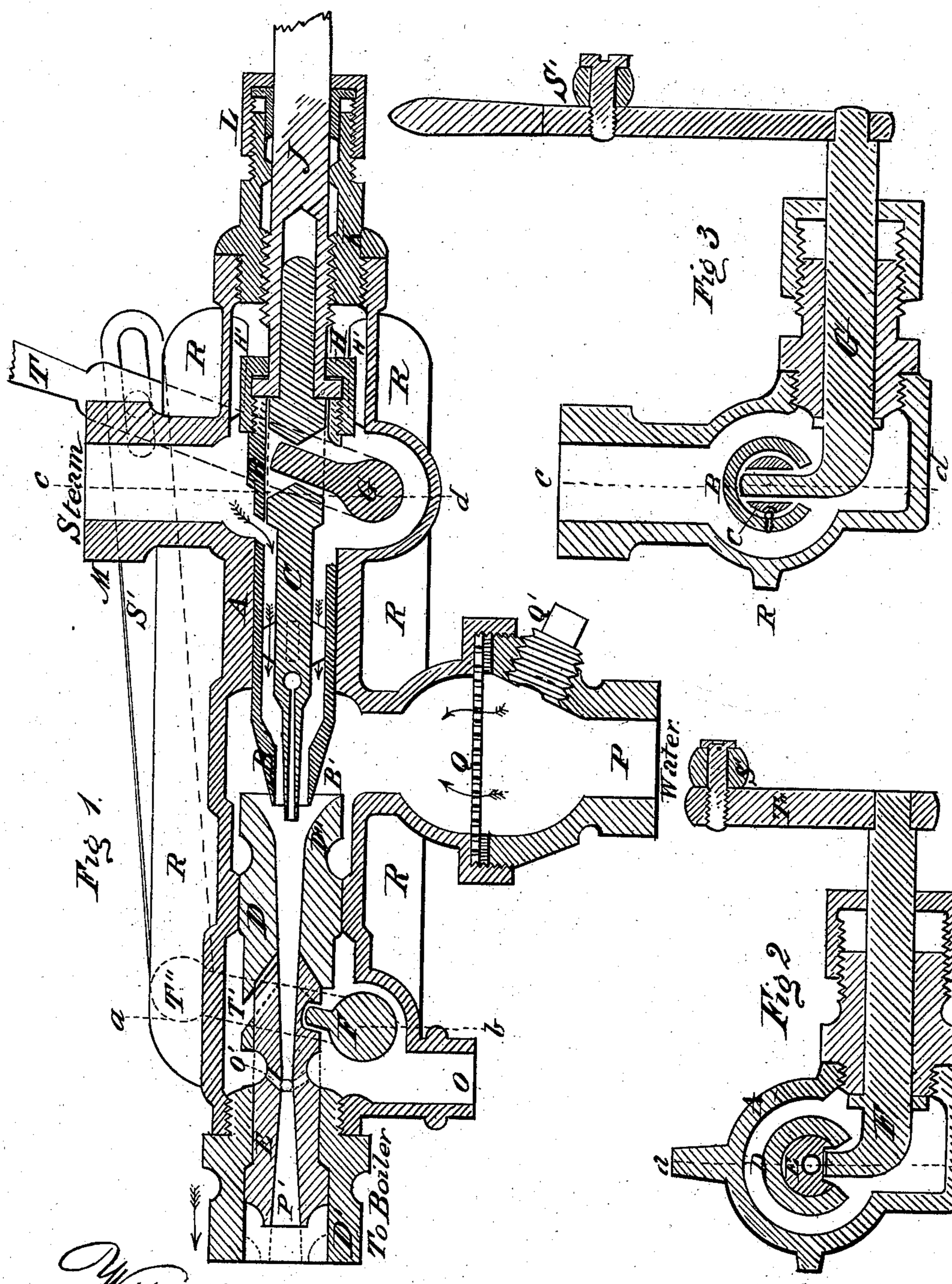
J. D. LYNDE.

Injector.

No. 198,891. Patented Jan. 1, 1878.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN INJECTORS.

Specification forming part of Letters Patent No. **198,891**, dated January 1, 1878; application filed September 3, 1877.

*To all whom it may concern:*

Be it known that I, JOHN D. LYNDE, of Philadelphia, Pennsylvania, have invented Improvements in Injectors for Supplying Steam-Boilers with Water, of which the following is a specification:

The object of my invention is to produce an injector which will readily lift the water in starting, and also be supplied with the necessary means of easy regulation of the steam and water supply, without reference to the cocks in the usual steam or water pipes; also, will be capable of working at any given pressure, and will start promptly, regardless of heat.

Another object of my invention is to prevent the clogging of the usual jet-tube. Nearly all previous injectors have some plan for raising the water in starting by the use of a small jet of steam, and much difficulty is experienced in the operation, the trouble being that the orifices of the water-tubes are necessarily so small but little power is available to exhaust the air from the injector and water-pipe, the steam-power being neutralized at the smallest part of the orifices; or, after the water is drawn, it is difficult to start the injector to feeding into the boiler, especially with warm water; also, in almost all cases the injector is altered from the set each time water has to be lifted in starting.

Referring to the drawings, Figure 1 is a longitudinal section. Figs. 2 and 3 are cross-sections through the lines *a b* and *c d*.

A is the body or shell, inclosing the working parts. B is the steam-tube, and is adjustable to regulate the water-supply at B′, and is moved as required by the valve-stem J and coupling H, working in the bonnet K, the same as an ordinary globe-valve stem. H is prevented from revolving by pins H′, attached to the body A; and tube B is prevented from unscrewing by the tooth on revolving pin G, which also actuates the jet-tube C, both for lifting the water in starting and regulating the supply of steam at the delivery end of tube B. The parts D and E combined form the water-tube, which has a bell-shaped mouth at D″, and a continuous tapering orifice, lessening for about two-thirds of the length of the tube, and then widening to the delivery end at P′. The part E is moved back and forth by the tooth and revolving pin F, which engages in a notch at the lower side of part E. O′ are overflow-holes. Q is a strainer, having meshes a little smaller than the smallest part of the orifice in the water-tube D and E. Q′ is a plug, which can be removed to clean out under strainer Q, if necessary. P is the water-pipe; R, ribs to strengthen body A.

To operate, the tube B is set according to the steam-pressure and the water required; and when starting, if water has to be lifted, the water-cock being open, the steam-valve is opened, and steam blown through until the pipes and injector are cleared of condensed water, and dry steam is blown out at overflow O; then the lever T is thrown in the direction of the water-flow or delivery end of injector, and as far as possible, which moves the jet-tube C, so as to close the mouth of tube B; also, it moves part E, making an opening into the overflow O. Steam then rushes through the small orifice in jet-tube C, which is tapered, being largest at the mouth, which prevents clogging by any particles of rust or scale from the steam-pipe, as anything that enters will go through. The jet of steam from tube C produces in the mouth of tube D an action similar to the jet or siphon pump, exhausting the air or steam from the water-pipe, which has a free escape through the openings formed at T′ by moving part E back, and water is readily lifted. When water flows solidly from the overflow O, the lever T should be slowly moved back, admitting steam from tube B, and immediately the part E will move back to its seat automatically, driven by the pressure produced at its larger end as the steam begins to drive the water through it, and allowed to move back by means of the slot in bar S′. The operator should then continue to move lever T back until nothing comes from the overflow and the injector is at work feeding water into the boiler. Nothing can pass strainer Q too large to go through the tubes.

The usual trouble with heated injectors is also entirely obviated, by being able to produce the strong draft on the water-pipe, which at once clears the pipe of steam and drawing the water, as described, without waiting for the steam to condense in the water-pipe.

I claim as my invention—

1. In an injector, the combination of the water-tube, consisting of the fixed part D and the movable part E, with the overflow O, all operating together, as and for the purpose set forth.

2. The jet-tube C, provided with a tapered opening, as shown, and a recess adapted to receive the tooth G, as described.

3. The combination of levers T and T″ with the bar S′, teeth G and F, and movable piece E, and jet-tube C, constructed as and for the purpose herein set forth.

4. The combination of the tube B, coupling H, valve-stem J, teeth G and F, lever T, bar S′, lever T″, and the parts C and E, as and for the purpose herein set forth.

5. In combination with the body A of the injector, the strainer Q, secured by the union-joint of the water-pipe P to the body A, as shown.

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Witnesses:
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