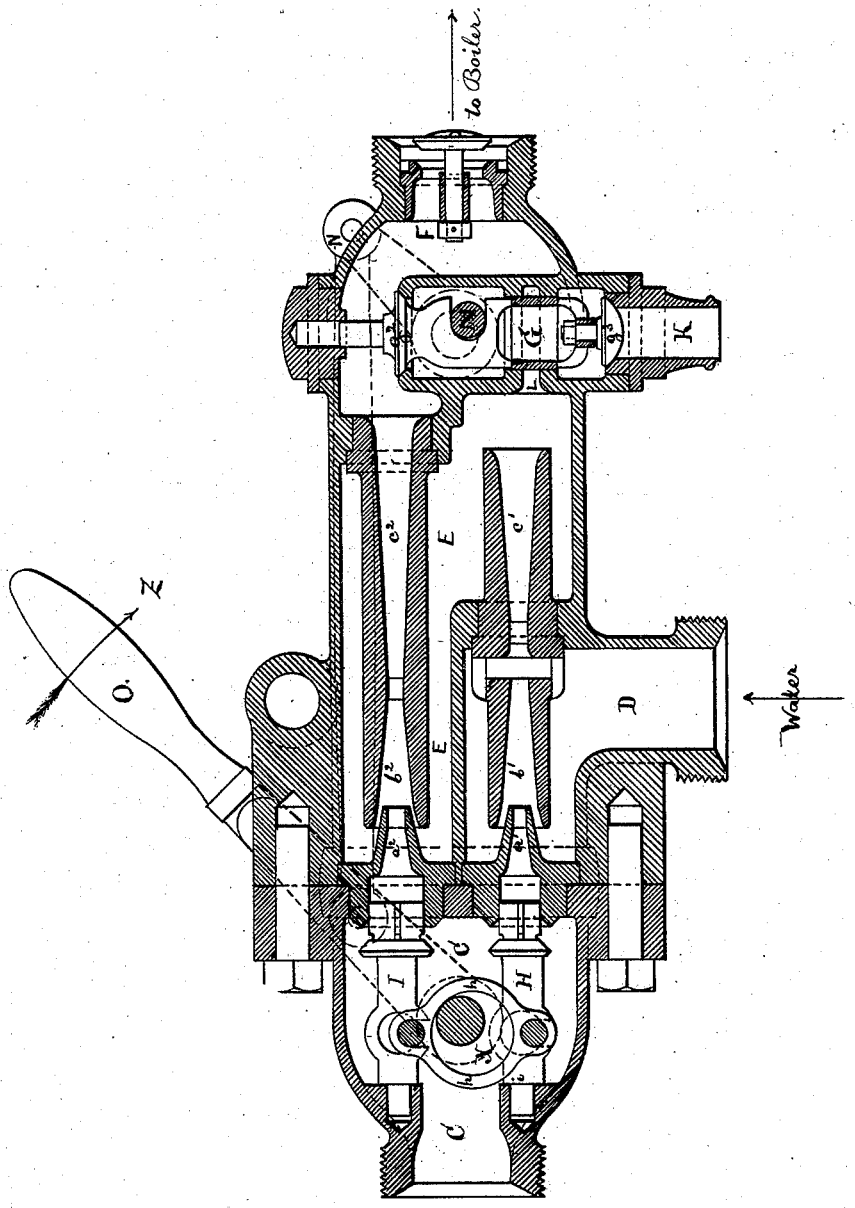
L. SCHUTTE.
Injector.

No. 211,267. Patented Jan. 7, 1879.



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UNITED STATES PATENT OFFICE.

LOUIS SCHUTTE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN INJECTORS.

Specification forming part of Letters Patent No. **211,267**, dated January 7, 1879; application filed November 12, 1878.

To all whom it may concern:

Be it known that I, LOUIS SCHUTTE, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Injectors, of which the following is a specification:

My invention relates to that class of injectors in which two devices are combined, one feeding into the other, the apparatus being of the type known as the "Korting Injector," for which Letters Patent were granted to Ernst Korting, November 21, 1876, numbered 184,631.

The drawing represents a longitudinal section of my improved device.

a^1 is the steam-nozzle, b^1 the combining-tube, and c^1 the diverging-tube, of the first apparatus; and a^2 is the steam-nozzle, b^2 the combining-tube, and c^2 the diverging-tube, of the second apparatus.

C is the common steam-chamber; D, the water-inlet; E E, a passage leading the discharge of the first instrument to the water-space of the second; F, the discharge; G, a starting-valve, and H and I the two steam-valves on nozzles a^1 and a^2. K is the overflow-pipe.

For the starting and working of the injector it is necessary that steam should first be admitted through the steam-nozzle a^1, while the nozzle a^2 remains closed, and at the same time the discharge end of the first combining-tube should communicate with the atmosphere. This is accomplished by raising the steam-valve H, thus admitting steam, and also raising the valve G and establishing a communication of the combining-tube b^1, through the passage L and overflow-pipe K, with the atmosphere.

The second operation is to force the water, (instead of directly into the atmosphere,) by way of the passage E, and through the second combining-tube, b^2, and discharge-tube c^2, into the atmosphere through the overflow-pipe K. This is accomplished by lowering the valve G until the passage L is closed, while the upper valve, g^2, and the lower valve, g^3, still remain open, affording an exit for the water from the second combining-tube, through the overflow K, into the atmosphere.

The third operation is to admit steam into the second steam-nozzle, a^2, by opening the second steam-valve, I; and the fourth operation, to close the communication with the atmosphere by lowering the valve G, closing the valves g^2 and g^3, and thereby causing the water to find its exit through the discharge F into the boiler.

The successive opening of the steam-valves H and I, I accomplish by connecting the two valves by a frame, *h h*, formed of two yokes connected by a pin at each end, which passes through a slot in each valve-stem, so that when the yoke is raised or lowered the valves are raised or lowered also, while by this arrangement sufficient side play is allowed to permit one valve to be raised without disturbing the other, the pin resting in the stationary valve-stem acting in such case as a fulcrum for the yoke. By means of this yoke, and acted upon by an eccentric, X, the valves are operated in the following manner: Both valves being closed, and the hand-lever O on the eccentric-shaft being moved in the direction indicated by the arrow Z, the valve H will be opened, while the valve I will remain closed, owing to the pressure of steam on its larger area, and by reason of the eccentric acting nearer to the valve H. This will continue until the upper part, *i*, of the valve-stem H strikes a stop, when, by a continued movement of the hand-lever O in the direction of the arrow Z, the pin in valve H will act as a fulcrum for the yoke, and thereby cause the valve I to be raised until it strikes its stop and assumes the position shown in the drawing.

The operation of opening and closing the starting-valve is accomplished by means of a crank, M, acting on the valve G, and operated by means of a lever, N, attached to the crank-shaft on the outside. This crank-lever may be replaced, if desired, by a screw formed upon the valve, a rack-and pinion movement, or any other mechanical appliance adapted to transmit a linear movement.

The object of the lower valve, g^3, is to obviate the necessity of a perfectly-tight fit for the slide closing the passage L, so that should there be a discharge through the passage L while the valve is closed—that is, while the injector is at work—it will be retained between the valves g^2 and g^3, owing to the higher pressure of discharge from c^2, acting upon the upper

side of g^2, against the lower pressure of discharge from c^1, acting against the lower side of g^2.

The hand-lever O, operating the steam-valve, and the crank-shaft N, operating the starting-valve, are placed in corresponding positions and connected by a connecting-rod, so that their corresponding movements and actions are controlled by the hand-lever O.

Having thus described my invention, what I claim is—

1. In combination with an injector, two steam-valves connected by a yoke or bar, which is acted upon by an eccentric or crank in such a way that one valve acts as a fulcrum for the yoke or bar while opening the other valve.

2. In combination with an injector, a starting-valve containing a slide-valve for closing the exit from the first apparatus, a valve for closing the outlet of the second apparatus, and an auxiliary valve closing the exit from the overflow-pipe, all connected and operating as described.

3. The combination, in an injector, of a steam-valve and a starting-valve, constructed as described, with devices connecting them with a single operating-lever.

LOUIS SCHUTTE.

Witnesses:
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