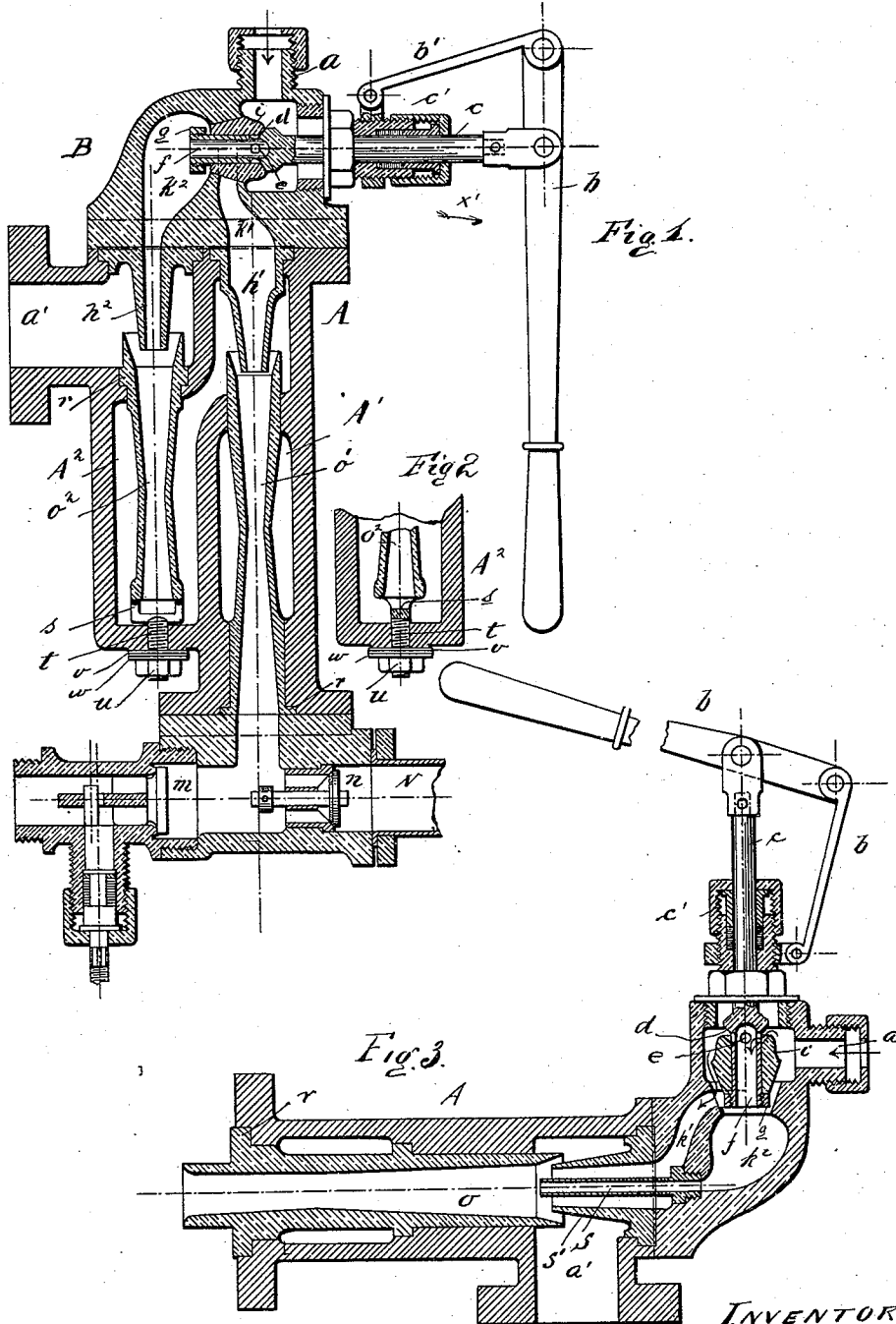


(Model.)

F. KELCH.
INJECTOR.

No. 472,949.

Patented Apr. 12, 1892.



WITNESSES:
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UNITED STATES PATENT OFFICE.

FRANZ KELCH, OF BERLIN, GERMANY.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 472,949, dated April 12, 1892.

Application filed November 18, 1891. Serial No. 412,259. (Model.)

To all whom it may concern:

Be it known, that I, FRANZ KELCH, a subject of the King of Prussia and German Emperor, and a resident of the city of Berlin, Prussia, Germany, have invented certain new and useful improvements in Injectors, of which the following is a specification.

This invention relates to improvements in injectors; and the object of my invention is to provide an injector which is so constructed that the steam can be admitted gradually, so as to be most effective, and a further object of my invention is to provide a new and improved contrivance for fastening the injector-tubes in the shell or casing.

The invention consists in an injector having two channels for live steam, a common valve for both channels, and a hollow laterally-apertured stem, on which said valve is loosely mounted. The invention also consists in the combination, with the injector-casing, of an injector-tube having cross-pieces at one end and a screw passing from said cross-pieces into the wall of the casing.

The invention also consists in the construction and combination of parts and details, which will be fully described hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view of an injector with two tubes and nozzles provided with my improvement. Fig. 2 is a detail transverse sectional view of the lower end of one tube, showing the means for securing the same, parts being broken out. Fig. 3 is a longitudinal sectional view of a single-tube injector with double nozzles provided with my improvement.

Similar letters of reference indicate corresponding parts.

The shell or casing A is provided with the two chambers A' A², containing the two injector-tubes o' o², tapered in the usual manner from both ends toward the center. In the upper end of the casing A the two nozzles h' and h² are held above and in line with the tubes o and o'. The head B is secured on the upper end of the casing A, and is provided with the two channels k' k², leading to the nozzles h' h², which channels can be closed by the cone-valve i, having its seat formed in the head at the upper ends of the channels k' and

k². One end of said valve i is tapered and fits against an annular seat d, formed on a stem c, passed through the stuffing-box c' and pivoted at its outer end to the lever b, which is connected by the pivoted link b' with the casing A. The stem c is provided in that part beyond the seat d with the bore f, the side openings e at the inner end of said bore, and the annular head g at the outer end of said bore. On the head B the steam-inlet neck a is formed, and on the side of the casing A the water-inlet neck a' is formed.

N is the pipe leading to the boiler, and n a check-valve in the same. m is the waste-valve. The injector-tubes can be secured in the casing in the manner shown in Fig. 1 at the left-hand side, when inserted through the top opening of the casing.

The tube o² is provided at its lower end with a U-shaped cross-piece s, which is made tapering, so as not to reduce unduly the size of the lower opening of the said tube. A screw t projects from said cross-piece through an opening in the bottom of the casing, through a packing-ring v, and a washer w, and a nut u is screwed on the projecting end of the screw. By drawing up said nut the tube is held firmly in its true position. The injector-tubes are all provided with the flanges r.

The operation is as follows: The stem c is moved in the direction of the arrow x' sufficiently to expose the openings e of the bore f, as shown in Fig. 3, so as to permit the live steam to pass through said openings e, the bore f, and the channel k' to the nozzle h², whereby a suction is created and water is drawn into the casing and then conducted to the tube o'. The stem c is then moved farther in the direction of the arrow x', so that the head g, acting on the valve i, inserts the same, permitting the live steam to pass through the channel k' to the nozzle h'. As soon as the waste valve m is closed the water opens the check-valve n and passes to the boiler. The single-tube injectors having a double nozzle, as shown in Fig. 3, also draw water by suction and my improved double valve is very well adapted for the same. The steam passing through the holes e first passes through the inner smaller nozzle s and by the condensation of the small quantity of escaping steam a vacuum is formed which draws the water by suction until

it surrounds the opening of the tube *o*. Then the valve *i* is opened, as shown, to admit steam in the outer nozzle *s* also.

Having thus described my invention, I
5 claim as new and desire to secure by Letters Patent—

1. In an injector, the combination, with a head-casing having two steam-channels, of a valve closing both channels, and a hollow
10 apertured stem on which said valve is loosely mounted, substantially as set forth.

2. In an injector, the combination, with a casing having two steam-channels, of a stem provided with an end head, a bore, and side
15 apertures leading to the bore, and a valve mounted loosely in the bore part of the stem, substantially as set forth.

3. In an injector, the combination, with a casing having two steam-channels, at the up-

per ends of which a seat for a common valve 20 is formed, a tubular laterally-apertured stem on which said valve is loosely mounted, and a head on the end of said stem, substantially as set forth.

4. In an injector, the combination, with a 25 casing, of a nozzle, a valve, an injector-tube provided at one end with a cross-piece, and a screw formed on said cross-piece and passed through the walls of the casing, substantially as set forth.

In testimony that I claim the foregoing 30 my invention I have signed my name in presence of two subscribing witnesses.

FRANZ KELCH.

Witnesses:

JOHANN HEINRICH,
ULRICH R. MAERZ.