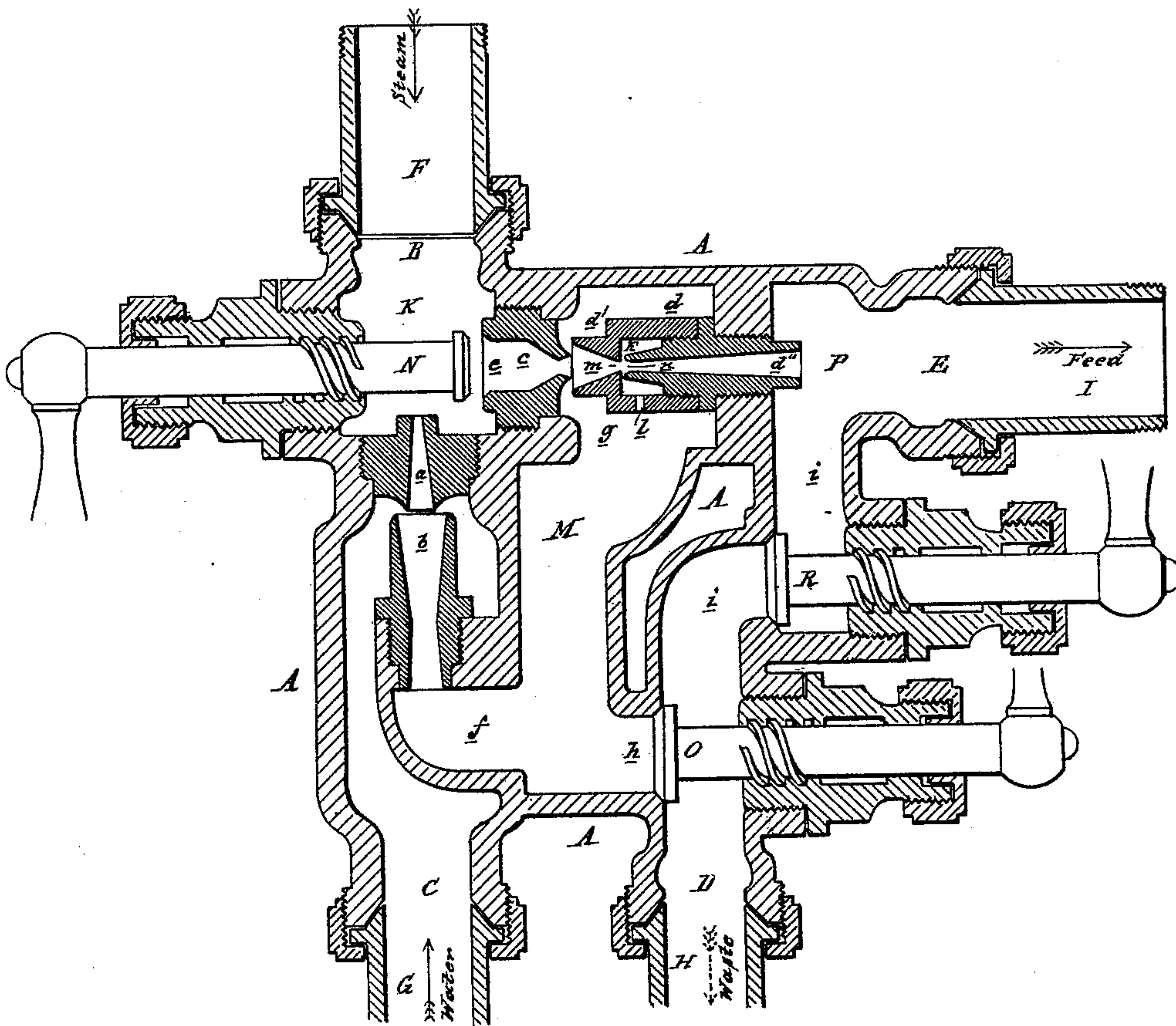


(No Model.)

J. JENKS.
Feed Water Injector.

No. 233,418.

Patented Oct. 19, 1880.



Attest:
W. Barthel
Charles J. Hunt

Inventor:
James Jenks
By Atty
R. S. Sprague

UNITED STATES PATENT OFFICE.

JAMES JENKS, OF DETROIT, MICHIGAN, ASSIGNOR OF ONE-HALF OF HIS
RIGHT TO GEORGE A. JENKS, OF SAME PLACE.

FEED-WATER INJECTOR.

SPECIFICATION forming part of Letters Patent No. 233,418, dated October 19, 1880.

Application filed July 31, 1880. (No model.)

To all whom it may concern:

Be it known that I, JAMES JENKS, of Detroit, in the county of Wayne and State of Michigan, have invented an Improvement in Feed-Water Injectors, of which the following is a specification.

My invention relates to that class of apparatus or devices known to the trade as "injectors;" and the invention consists in a new and useful construction and combination of parts by which I am enabled to lift water from depths at which ordinary lifting-pumps will draw it, and deliver it directly to a steam-generator by the attractive power of steam acting directly on the water, all as more fully hereinafter shown and described.

In the accompanying drawing, which forms a part of this specification, and in which my improved device is shown in vertical central section, A represents the outside casing, which incloses all the various chambers and passages of my apparatus, and it is provided with pipe-connections at B, C, D and E. At B direct connection is made by a pipe, F, with the steam-space of a generator, a globe-valve being employed to regulate or shut off the steam-supply to the device.

G is the suction-pipe, which extends to the well or source of water-supply from which the water is to be drawn. H is a waste-pipe, discharging into the open air. The pipe I connects the chamber E with the steam-generator. This is the feed-pipe proper, and it should be provided with a check-valve.

K is the steam chamber or chest, into which steam is admitted through the passage B. Below and in direct line with this chest is the lifting-injector *a b*, which lifts the water from the well, while at right angles thereto is the forcing-injector *c d*, for forcing the water into the boiler, the port *e* of the force-tube being closed by the valve N.

M is the suction-chamber, and communicates, through the passages *f* and *g*, with both the lifting-injector and the forcing-injector, while a passage, *h*, leads to the waste-D, a valve, O, opening or closing said passage.

P is the delivery-chamber, and communicates by the passage *i* with the waste-pipe H,

such communication being controlled by the valve R.

The forcing-injector *c d* is constructed of two parts, *d'* and *d''*, which are screwed together, as shown, with an annular chamber, K, between them, which at the lower side thereof is provided with an opening or small hole, *l*, communicating with or leading into the suction-chamber M. The apex *m* of the combining-nozzle *d'* and the apex *n* of the delivery-nozzle *d''* do not abut against each other, but are a slight distance apart, as shown.

In practice, when the device is properly connected for operation, steam is admitted through the pipe F, the valve N being closed and the waste-valves R and O opened, and will pass through the tube *a* into the combining-tube *b*, passage *f*, suction-chamber M, and passage *h* to the opening D, and will be discharged into the open air, thus exhausting the air in the parts through which the steam passes and from the pipe G. The water will then rise in the pipe G and through the combining-tube *b* and passages *f* and *h* and flow out of the waste-pipe H. As soon as this circulation is obtained the valve O is closed and the valve N is opened, when the steam will pass through the nozzle *c*, combining and delivering tube *d*, chamber P, passage *i*, and waste-pipe H, into the open air, thereby exhausting all the air in the parts named in this passage, and lifting the water by "suction," as it is ordinarily termed, into the suction-chamber M, and through the passage *g* into the combining-tube *d*, whence it will find its way out through the waste H into the open air. As soon as this circulation is established the valve R is closed, when the water will be forced through the pipe I into the tank or boiler. The opening *l*, which leads into the chamber *k*, will serve as an equalizer if more steam is thrown from the nozzle *c* into the combining-tube *d* than the water can condense. An additional jet of water is supplied between *m* and *n*. It will also be noticed that when the valve R is closed and the water is being forced into the boiler the pressure of the water will press against the valve and hold it firmly against its seat; but should any water pass that valve it will press against the

valve O, thereby acting as a factor to more firmly seat it, and pass out into the discharge rather than into the chamber M, where it would tend to destroy the working of the device.

5 What I claim as my invention is—

1. In an injector for lifting and forcing water, the combination of the steam-chest K with the valve N and suction and force tubes *a c*, such tubes being at right angles to each other, and with their axes in direct line, respectively, with the inflowing and outflowing water, as described.

2. In an injector for lifting and forcing water, the chamber M, communicating with the lifting and forcing tubes, in combination with the valve O and a passage to the open air for a discharge of water, substantially as specified.

3. In an injector for lifting and forcing water, the suction-tubes *a b*, having direct communication with the forcing-tubes *c d*, in combination with the valves O R, suction-chamber M, passages *f h i*, chamber P, passage *i*, and waste-pipe H, substantially as described.

4. In an injector for forcing and lifting wa-

ter, the forcing-tubes *c d* and chamber M, arranged as shown, in combination with the waste-pipe H, having a direct communication with the forcing-tubes *c d* through chamber P, and passage *i*, having valves O R, substantially as described.

5. In an injector for lifting and forcing water, the combination, with the pipe C, suction-tubes *a b*, and forcing-tubes *c d*, the latter having an annular chamber, *k*, with an aperture, *l*, of the chamber M, passages *f h i*, valves O R, and delivery-chamber P, substantially as described.

6. In an injector for lifting and forcing water, the arrangement and combination, with the chambers M and P, of the waste-valves R and O, adapted to be held firmly to their seats by the pressure of water, substantially as and for the purpose set forth.

JAMES JENKS.

Witnesses:

H. S. SPRAGUE,

CHARLES J. HUNT.