

(Model.)

B. M. THROOP.
INJECTOR.

No. 532,297.

Patented Jan. 8, 1895.

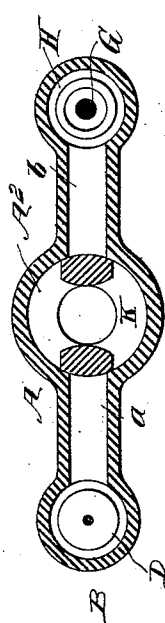


Fig. 1

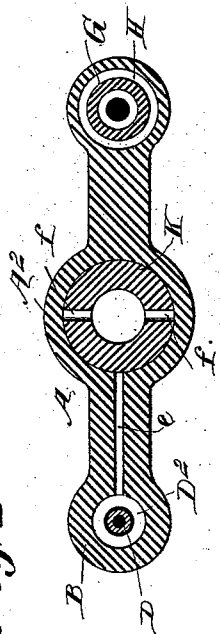


Fig. 2

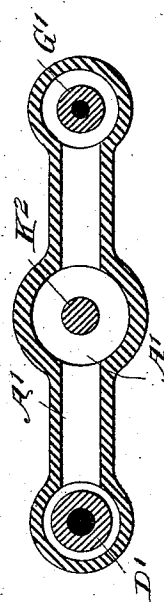


Fig. 3

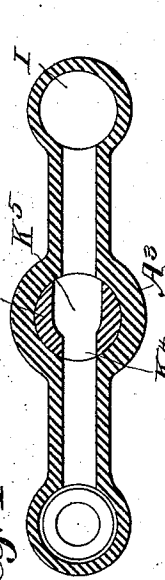
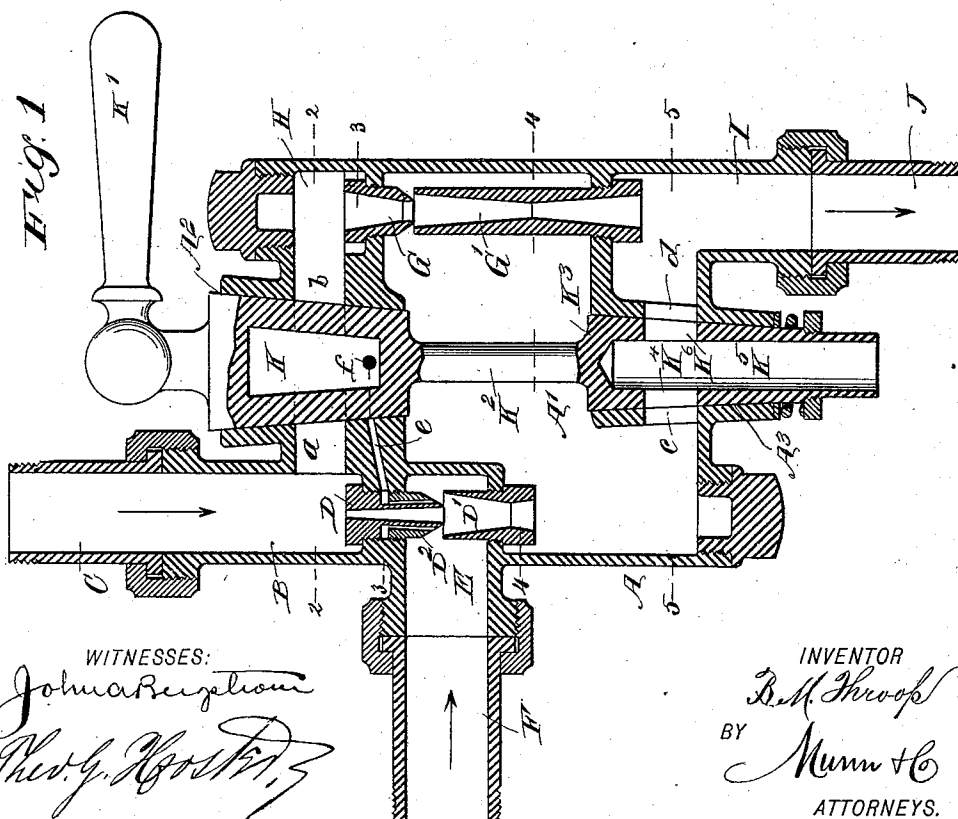


Fig. 4



Fig. 5



WITNESSES:
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BENJAMIN M. THROOP, OF GENEVA, OHIO.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 532,297, dated January 8, 1895.

Application filed May 21, 1894. Serial No. 511,977. (Model.)

To all whom it may concern:

Be it known that I, BENJAMIN MARTIN THROOP, of Geneva, in the county of Ashtabula and State of Ohio, have invented a new and Improved Injector, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved injector, which is simple and durable in construction, very effective in operation, and arranged to utilize the motive power to the greatest advantage.

The invention consists in certain parts and details, and combinations of the same, as will be hereinafter fully described and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a sectional plan view of the same, on the line 2—2 of Fig. 1. Fig. 3 is a like view of the same, on the line 3—3 of Fig. 1. Fig. 4 is a similar view of the same, on the line 4—4 of Fig. 1; and Fig. 5 is a like view of the same, on the line 5—5 of Fig. 1.

The improved injector is provided with an injector casing A, formed at one side with a steam inlet B, coupled in the usual manner with the steam pipe C of the boiler or other source of steam supply. In the bottom of the steam inlet B, is held the nozzle D operating in conjunction with the discharge nozzle D', the said nozzles D and D' forming a set of lift nozzles in the water inlet E, coupled or otherwise connected with the water supply pipe F.

The discharge nozzle D' of the set of lift nozzles discharges into the compartment A' of the casing A, into which also extend the nozzles G and G', forming a set of forcing nozzles, of which the nozzle G is the steam nozzle and connects with a steam chamber H, while the other nozzle G' is the discharge nozzle and opens into the outlet I, coupled or otherwise connected with the pipe J leading to the boiler or other place to which the water is to be forced.

The steam compartment H is adapted to be connected with the steam inlet B, by a conical valve K mounted to turn in a seat A² arranged in the casing A, the outer end of the said

valve being provided with a suitable handle K' under the control of the operator, for connecting the steam compartment H with, and disconnecting it from the steam inlet B. The connection between the steam inlet B and valve K is made by a port *a*, and a similar port *b* is adapted to connect the steam compartment H with the said valve K. See Figs. 1 and 2.

The lower end of the valve K is connected by a reduced stem K² with a second conical valve K³ mounted to turn in a valve seat A³ arranged in the lower end of the casing A, and extending into the compartment A'. This valve K³ is adapted to connect the interior of the compartment A' with, or disconnect it from the outlet I, and for this purpose the ports *c* and *d* are formed, of which the port *c* serves to connect the compartment A' with the port K⁴ in the valve K³, the said port K⁴ opening into an overflow aperture K⁵ formed centrally in the said valve K³ and leading to the outside of the casing. The other port *d* serves to connect the outlet I, with a port K⁶ formed in the valve K³, and likewise leading to the overflow K⁵ previously described.

The valves K and K³ are arranged in such a manner that when the valve K closes or disconnects the chamber H from the steam inlet B, then the valve K³ connects the compartment A' with the outlet I, and when a quarter turn is given to the valve handle K', then the steam inlet B is connected with the compartment H, and the compartment A' is disconnected from the outlet I.

The nozzle D previously described is provided with a pressure increase nozzle D², connecting at its upper end by a channel *e* with ports *f* opening into the interior of the valve K, the said channel *e* and ports *f* being connected at the time when a quarter turn is given to the handle K' and connection is established between the steam inlet B and compartment H.

The operation is as follows: When the device is in a normal position, as illustrated in the drawings, and the operator opens the valve in the steam supply pipe C to admit steam to the injector, then the said steam passes through the lift nozzles D D', to draw water through the pipe F into the water inlet E, and from the latter through the nozzle D' into the

compartment A'. The water can flow from the bottom of the latter through the ports *c* and K⁴ to the overflow K⁵ and to the outside of the casing. The operator now turns the valve handle K' either to the right or to the left so as to gradually close the port *c* by the valve K³, to permit water to accumulate in the compartment A' until it finally rises and flows through the nozzle G' into the outlet I, and through the still connected ports *d* and K⁶, to the overflow K⁵. As the port *c* is gradually closing, the ports *a* and *b* are connected with each other by the valve K, so as to admit steam into the compartment H, the steam passing through the nozzle G, to act on the water flowing down the nozzle G', thus forcing the water. As the operator continues to turn the handle K', the port *d* is gradually closed by the valve K³, so that water instead of going through the overflow K⁵, is now forced into the pipe J leading to the boiler or other place. The instrument has now reached its normal capacity, but as the operator continues to turn the valve K, the ports *f* will be brought into register with the channel *e*, so that steam can pass from the inlet B, port *a*, valve K, ports *f* and channel *e* to the increase pressure nozzle D², so as to give additional force to the water and thereby increase the capacity of the device. The handle K' has now been given a full quarter turn, so that the ports *c*, *d*, as previously mentioned are completely closed and the ports *a*, *b*, *f* and channel *e* are opened.

35 The injector described is very simple in construction, can be comparatively cheaply manufactured, and easily manipulated to force

water under either normal or increased pressure to the boiler or other place.

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

1. An injector, comprising an injector casing having a steam inlet, a water inlet and an outlet, and an interior compartment, a set of lift nozzles connecting the steam and water inlets with the said compartment, a set of forcing nozzles connecting the said compartment with the outlet, and a double valve arranged in the said casing and adapted to connect the steam inlet with the steam nozzle of the set of forcing nozzles and the said compartment with the outlet, substantially as shown and described.

2. An injector, comprising a casing having a central compartment into which water is discharged from the lifting nozzles, a set of forcing nozzles extending into the said compartment and discharging into the outlet of the casing, and a valve for connecting the said compartment with and disconnecting it from the outlet of the casing, substantially as shown and described.

3. An injector, comprising a set of lifting nozzles, a set of forcing nozzles, a valve intermediate the said sets of nozzles, and a steam pressure nozzle for the said set of lifting nozzles and having its steam inlet controlled from the said valve, substantially as shown and described.

BENJAMIN M. THROOP.

Witnesses:

HENRY MEANS,

NETTY HARRINGTON.