(Model.)

2 Sheets—Sheet 1.

T. J. SWEENY.

INJECTOR.

No. 459,601. Patented Sept. 15, 1891.

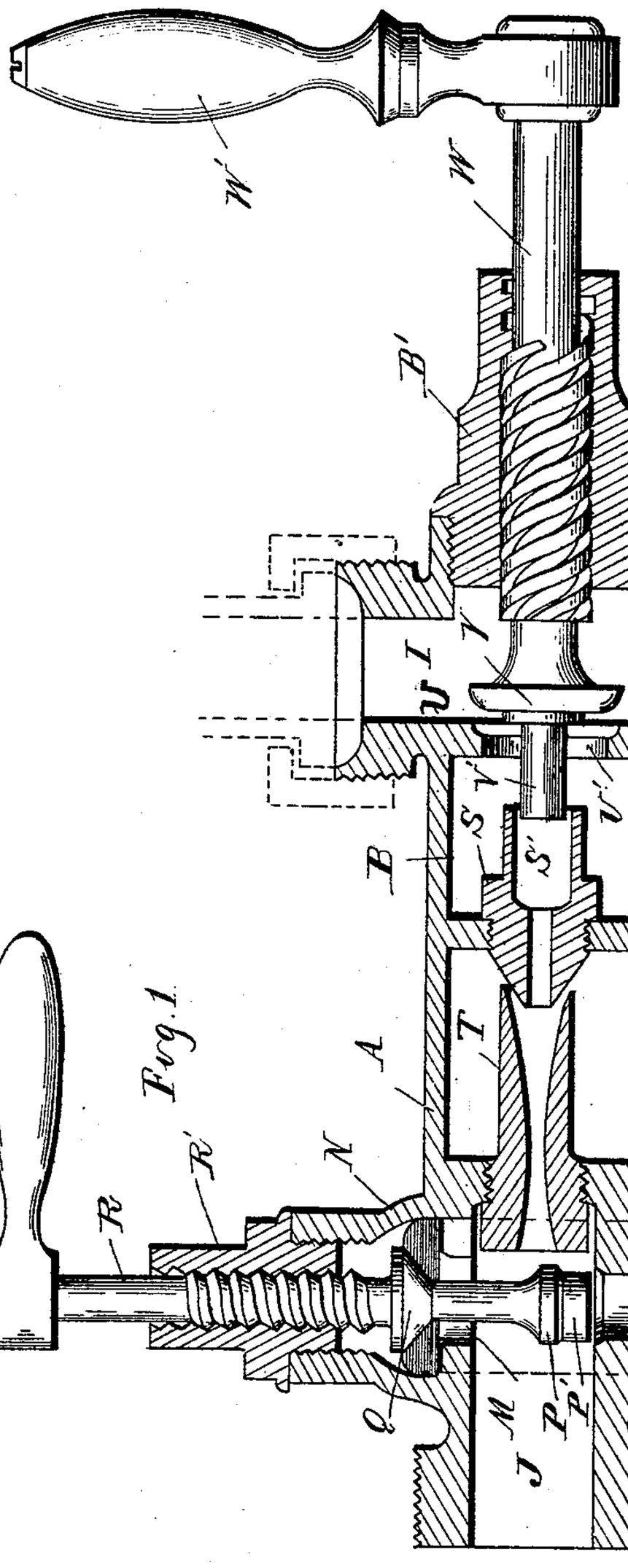

Fig. 1.

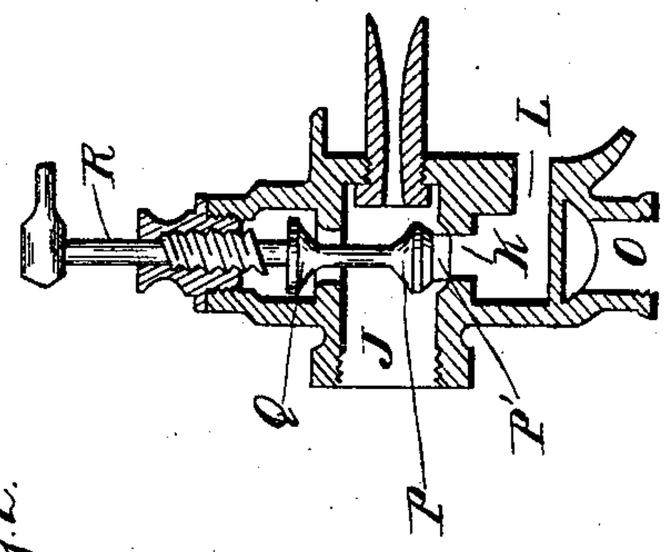

Fig. 2.

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(Model.) 2 Sheets—Sheet 2.

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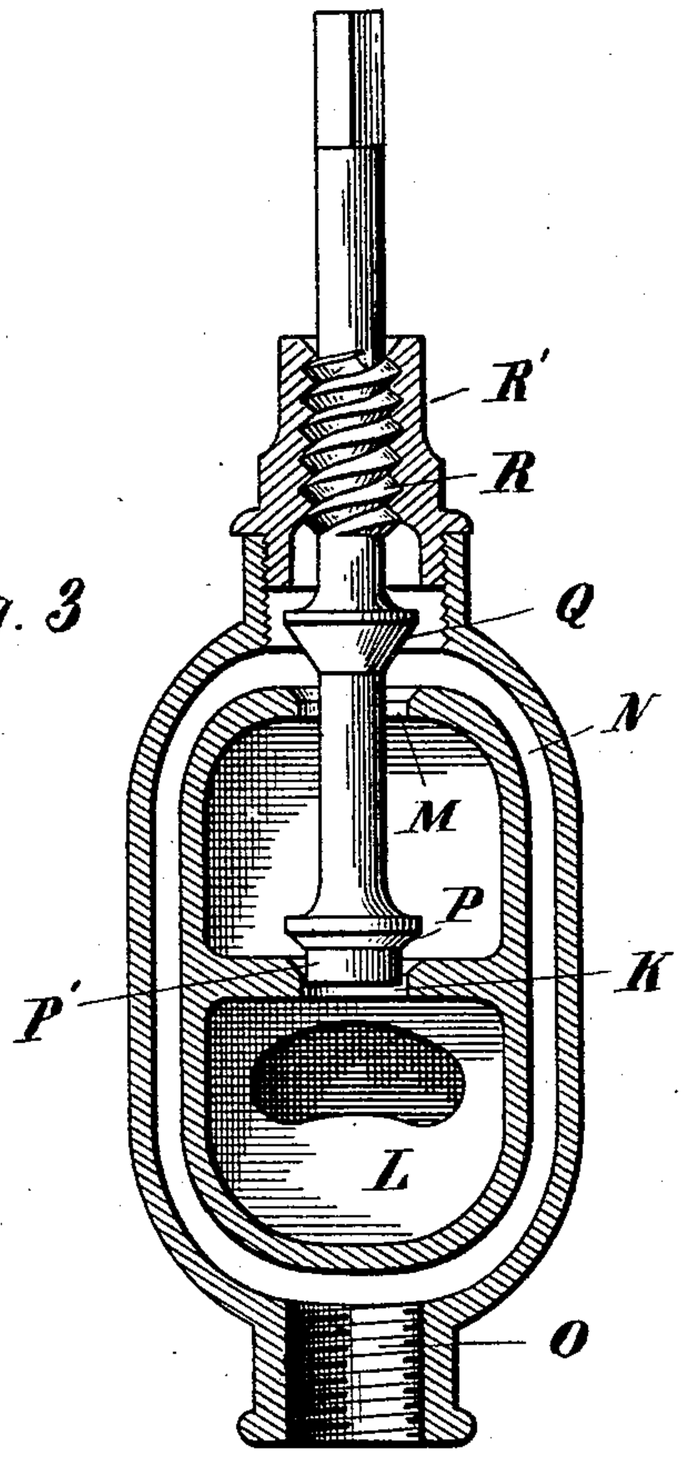
Fig. 3



Witnesses:
P. M. Hulbert
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UNITED STATES PATENT OFFICE.

THOMAS J. SWEENY, OF DETROIT, MICHIGAN, ASSIGNOR TO THE PENBERTHY INJECTOR COMPANY, OF SAME PLACE.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 459,601, dated September 15, 1891.

Application filed February 26, 1891. Serial No. 382,886. (Model.)

To all whom it may concern:

Be it known that I, THOMAS J. SWEENY, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Injectors, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in injectors; and the invention consists in the improved construction of the overflow and overflow-valve, and in the combination of different parts, all as more fully hereinafter described.

In the accompanying drawings, Figure 1 is a view of my improved injector in longitudinal section. Fig. 2 is a portion of the same view, with the overflow-valve in a different position. Fig. 3 is a longitudinal section of one of the valves.

A represesents the casing, comprising two barrels B and C, formed horizontally above each other and communicating with each other through the steam-passage D and main water-passage E. The lower barrel contains the forcing-tubes F and G and the water-inlet H, which communicates with a suitable water-supply pipe. The upper barrel has at one end the steam-inlet I, which communicates with a suitable steam-pipe, and at the opposite end it has the delivery-outlet J, which is connected through a suitable delivery-pipe into the boiler and is supplied with the usual check-valve. The delivery-outlet J communicates at its under side through a valve-port K and a water-passage L with the main water-passage E, and in its upper side it communicates through a main valve-port M with an overflow-passage N, which passes around outside the casing to a bottom outlet O, into which a suitable overflow-pipe is connected. The valve-ports K and M are in vertical line with each other and are controlled by a single valve-stem, which is provided at its lower end with a valve-disk P, adapted to seat upon the valve-port K, and which has an extension P′, which is adapted to enter the valve-port, and thereby wholly or partly close the same in advance before the valve-disk P becomes seated. The upper port M is controlled by a valve-disk Q, which is adapted to close the port simultaneously with the seating of the valve-disk P upon the port K. The valve-stem R projects through a suitable gland R′ in the casing. The upper barrel is provided with the steam-nozzle S and the delivery-nozzle T, secured in suitable division-walls in axial line with each other and projecting with their inner ends into the water-passage E a short distance apart. A division-wall U in the steam-inlet is provided with a main steam-port U′ in axial line with the tubes S and T, and this is controlled by a valve-disk V and valve-stem W, which works through a plug B′ in the end of the barrel and has a handle W′. The valve-stem has a cylindrical extension V′, which is adapted to project into the bore of the tube S.

In practice the parts being arranged as described, as shown, the injector is started as follows: Steam is first admitted by opening the valve enough to open the port U′ without opening the access to the steam into the tube S, the parts being then in the position shown in Fig. 1, with the overflow-valve completely open. The steam admitted through the port U′ flows through the passage D into the barrel C, through the tubes F and G into the water-passage E, and from there through passage L, ports K and M into the overflow. This draws the water through the supply-pipe and delivers it into the waterway E, and from there it will pass into the overflow. As soon as the water appears in sufficient volume the operator partly closes the overflow-valve until it is in the position shown in Fig. 2, in which the port K is now closed, or nearly so, while the main port M is still open. This forces the water around the tube T, and from the space between the tubes through the tube T into the passage J, and through the port M into the overflow. As soon as this secondary overflow is established the operator opens the steam-admission valve to its full extent, so as to admit steam also into the tube S, from which it passes into the delivery-tube T and establishes the jet, which, upon closing the overflow-valve, entirely forces its way into the boiler.

The valve-stem of the overflow and steam-admission valve may be provided with screw-threads of suitable pitch to effect the closing and opening of the same by a single turn, a

half-turn being required to partly close and open them; or, if desired, the stems may slide through their glands actuated by suitable levers, which in turn may be connected together and operated by a single lever. In this connection it may be stated that it is not necessary that the extension of the valve-stems into the port K and nozzle S should fit tightly. On the contrary, I make these extensions fit rather loosely, so as to provide for a slight leakage of water or steam. The tube S is provided with the enlarged bore S′, so as to receive a large-sized portion of the valve-stem. This in opening the steam-admission accelerates the action of the water.

It will be seen that in my construction the water at once fills all the water-passages in the casing before it issues through the overflow-pipe, and it will also freely pass through the injector-tube T, and thus an initial flow of water through said tube takes place immediately, which flow is increased by a leakage of steam through the tube S, and is still further increased as soon as the valve-stem R is screwed down to close or partly close the overflow-port K, and when the steam is fully admitted into the injector-tube T the jet is quickly established.

A single valve controls the initial overflow through the port K and the secondary overflow from the injector-tube, and by locating this valve and ports controlled thereby in the delivery end of the injector a separate valve-chamber is dispensed with, and no packing is required for the valve-stem, as all leakage through the port M is into the overflow.

What I claim as my invention is—

1. In an injector, the combination, with the casing, of an overflow-passage leading directly from the main water-passage through the delivery-passage to an overflow-outlet from the casing, a main overflow-port between the delivery-passage and the overflow-outlet, an initial overflow-port between the delivery-passage and the main water-passage, and an overflow-valve controlling both ports and adapted to close or partly close the initial overflow-port in advance of the main overflow-port, substantially as described.

2. In an injector, the combination, with the casing, of an overflow-passage leading from the main water-passage through the delivery-passage to an overflow-outlet from the casing, a main overflow-port in said passage between the delivery-passage and the overflow-outlet, an initial overflow-port in said passage between the delivery-passage and the main water-passage and in axial line with the main overflow-port, and an overflow-valve controlling both ports and provided with a valve-stem extension adapted to close or partly close the initial overflow-port in advance of the main overflow-port, substantially as described.

3. In an injector, the combination of the upper and lower barrel forming the casing, the main water-passage connecting the same, the delivery-passage formed in the end of the upper barrel, the delivery-tube discharging into said delivery-passage and projecting into the main water-passage, the initial overflow-passage from the main water-way into the delivery-passage and provided with an overflow-port in the bottom of said passage, a main overflow-port formed in the top of said delivery-passage in axial line with the initial overflow, and an overflow-valve having a stem provided with two valve-disks adapted to control the two overflow-ports, and having a valve-stem extension adapted to pass into the initial overflow-port to close said port in advance of the main overflow-port, substantially as described.

4. In an injector, the combination of the upper and lower barrel of the casing, provided with the forcing and lifting tubes in axial lines with said barrels, the main water-passage and steam-passage connecting the two barrels, the steam-inlet in the upper barrel provided with the main steam-port, the steam-admission valve provided with a valve-stem adapted to enter into the steam-nozzle, and with a valve-disk adapted to open the main steam-port in advance of the extension into the steam-nozzle, a main overflow-port in the top of the delivery-passage, an initial overflow-port in the bottom of the delivery-passage, and with a valve-stem extension adapted to project into the initial overflow-port and close said port or partly close it in advance of the main overflow-port, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS J. SWEENY.

Witnesses:

M. B. O'DOGHERTY,

P. M. HULBERT.