(Model.)

2 Sheets—Sheet 1.

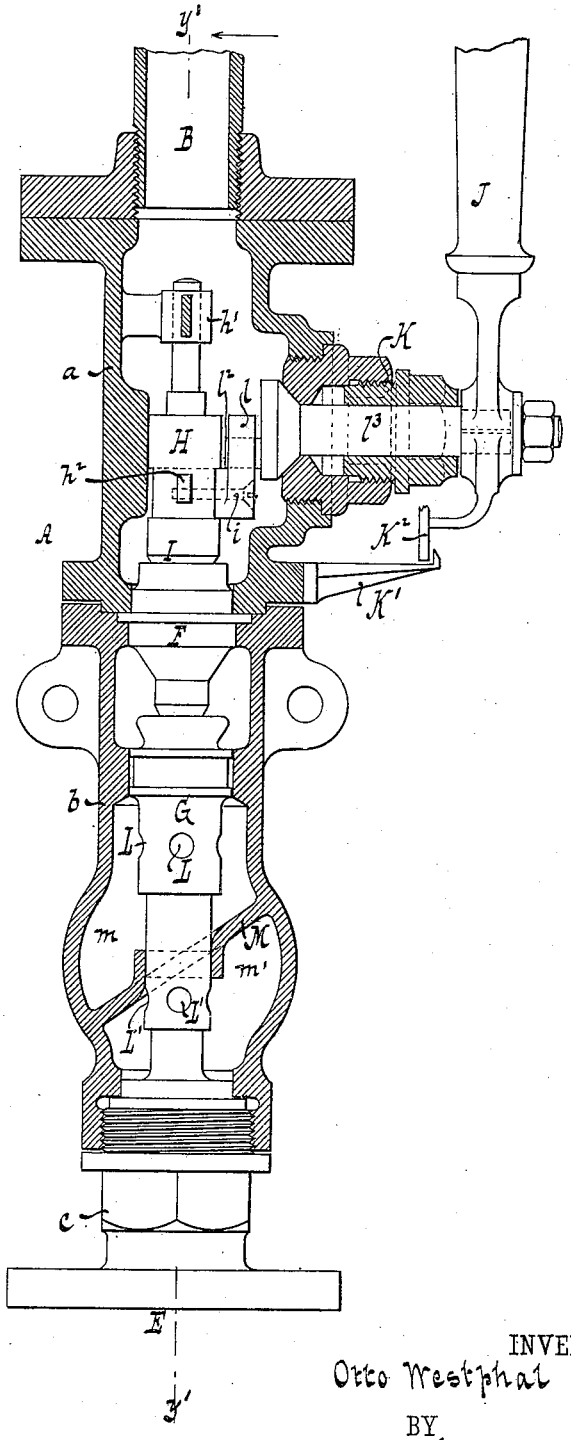
O. WESTPHAL.

INJECTOR.

No. 345,200.

Fig. 1

Patented July 6, 1886.



WITNESSES:

Otto Hupfeland

William Miller

INVENTOR

Otto Westphal

BY

Van Santvoord & Hauff

ATTORNEYS

(Model.) 2 Sheets—Sheet 2.

O. WESTPHAL.

INJECTOR.

No. 345,200. Patented July 6, 1886.

Fig. 2.

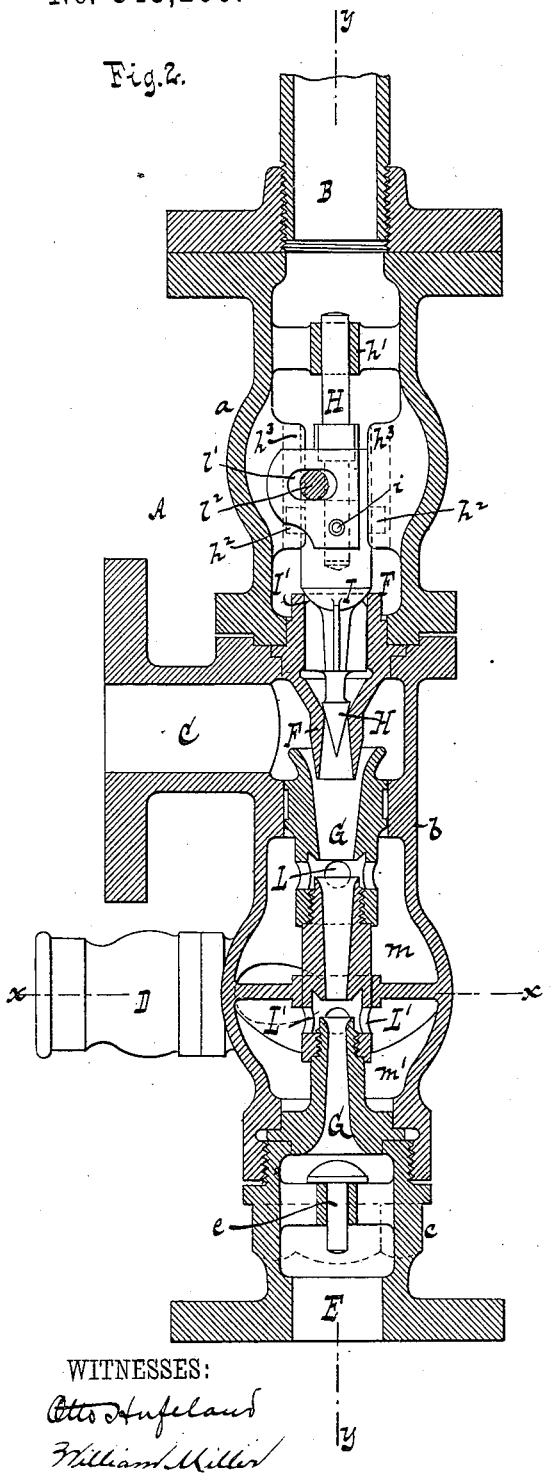


Fig. 3.

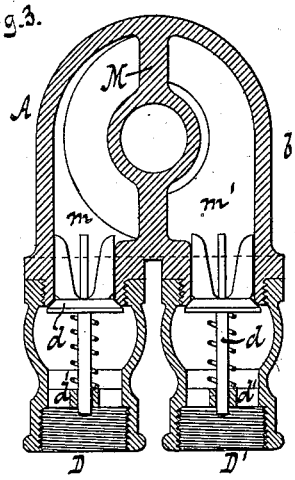
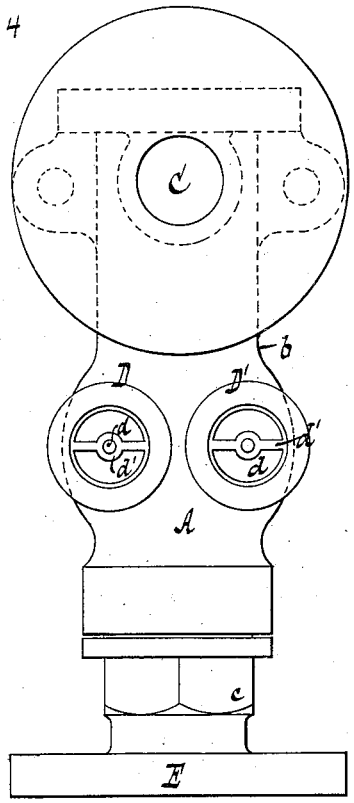


Fig. 4



WITNESSES:

Otto Hufeland

William Miller

INVENTOR

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UNITED STATES PATENT OFFICE.

OTTO WESTPHAL, OF BUCKAU, NEAR MAGDEBURG, GERMANY, ASSIGNOR TO SCHÄFFER & BUDENBERG, OF SAME PLACE.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 345,200, dated July 6, 1886.

Application filed December 17, 1885. Serial No. 185,957. (Model.)

To all whom it may concern:

Be it known that I, OTTO WESTPHAL, a citizen of Germany, residing at Buckau, near Magdeburg, Germany, have invented new and useful Improvements in Injectors, of which the following is a specification.

This invention relates to injectors such as are illustrated by my Letters Patent No. 312,591, dated February 17, 1885; and it consists in the combination of devices hereinafter described and claimed, reference being had to the accompanying drawings, illustrating my invention, in which—

Figure 1 is a vertical central section in the plane *y y*, Fig. 2, of the injector. Fig. 2 is a similar section thereof in the plane *y' y'*, Fig. 1. Fig. 3 is a transverse section in the plane *x x*, Fig. 2. Fig. 4 is a side elevation showing the overflow-nozzles.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the casing of the injector, which is cast in three sections, *a*, *b*, and *c*, for convenience of construction, and to facilitate access to the same for subsequent cleaning.

B is the live-steam-inlet pipe.

C is the water-supply inlet.

D D' are the overflow-nozzles, and E is the discharge-opening to the boiler, which is provided with a check-valve, *e*, to prevent the water from backing.

F is the steam-nozzle secured in the section *b* of the casing, and G is the combining-nozzle, which is situated directly below the steam-nozzle.

Into the steam-nozzle F extends a steam-cone, H, having a solid conical end and a stem which extends upward and has a bearing in a bridge, *h'*, extending across the section *a* of the casing. The stem is provided with guide-blocks h^2 and h^2, which work in suitable guide-ways, h^3 and h^3, located at either side of the section *a*. The stem is made sectional to facilitate its introduction into the casing, and it consists of a hub having its lower face turned to form a valve, I, which is adapted to bear upon a suitable valve-seat, I', formed in the mouth of the steam-nozzle F. The upper section extends into and is secured to the hub by a screw, *i*. The steam-cone H is raised or lowered so as to lift the valve I to and from its seat by a hand-lever, J, which is connected to said steam-cone. This connection consists of a head-piece, *l*, which is secured to one side of the stem of the cone H by the screw *i*, or may be cast thereon, and in the said head-piece is a slot, *l'*, which is engaged by a pin, l^2, eccentrically secured to a disk on a shaft, l^3, to which the lever J is secured. The shaft l^3 extends through a suitable stuffing-box, K, attached to the casing.

An index-arm, K', secured to the casing, and an index-plate, K^2, attached to a downwardly-projecting arm of the hand-lever J, serve to indicate the position of the valve I and steam-cone.

In the combining-nozzle are formed two series of circumferential overflow-orifices, L L', one series, L, of which is located near the mouth of the same, while the other series, L', is located near the discharge thereof.

Across the overflow-chamber formed in section *c* of the casing extends an oblique diaphragm, M, which divides this overflow-chamber into two separate compartments, *m m'*, so that the overflowing water from the series of discharge-orifices L enters compartment *m*, and the overflow from orifices L' enters compartment *m'*, whereby the two overflows are completely separated from each other. The overflow-nozzle D, previously mentioned, is in communication with compartment *m*, and the overflow-nozzle D' is in communication with compartment *m'*. Each of the said nozzles D D' is provided with an outwardly-opening valve, *d*, which valves are shown as spring-pressed disk-valves, the stems of which are properly guided in bridges *d'* in the nozzles.

By the use of the separate compartments *m m'* for the overflow and the separate overflow-nozzles D D', each communicating with one of the chambers, in conjunction with the valves *d* in said overflow-nozzles, the injector can be used to draw warm water, since the overflow-orifices L L' are thus cut off from the outer atmosphere. The separation of the overflow-orifices L and L' and the division of the overflow-chamber by the diaphragm also effect this result, that the amount of water which can be drawn through the water-supply or

suction pipe by the action of the injector need not be regulated by valves or cocks placed in said water-supply or suction pipe.

The injector constructed as herein described has this peculiarity, that it can be so set by the hand-lever J that no matter what the steam-pressure is, the injection will resume its action and cause a suction in the suction-pipe after it has been thrown out of action by accident—for instance, if by the entrance of air in the suction-pipe or by a sudden jar the live steam is caused to escape through the overflows.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the casing having the interior bridge, h', and the steam-nozzle F, having the valve-seat 1', of the steam-cone H, having a stem extending into and loosely guided by the bridge and provided with an attached valve, I, a laterally-projecting head-piece, l, secured to one side of the stem and provided with a slot, l', the shaft l^3, having an eccentric-pin, l^2, engaging the slot in said head at one side of the stem, and a lever, J, connected with the shaft, substantially as described.

2. The combination, with the casing having the interior bridge, h^2, and the steam-nozzle F, having a valve-seat, 1', of a steam-cone, H, having a sectional stem, the lower section provided with a valve, I, and the upper section loosely guided in the bridge, the head-piece l, secured to one side of the stem and provided with the slot l', the shaft l^3, having an eccentric-pin, l^2, engaging the slot in the head-piece at one side of the stem, and a lever, J, connected with the shaft, substantially as described.

3. The combination, with the casing and the steam-nozzle F, having a valve-seat, 1', of the steam-cone H, having a valve-stem composed of two sections, the lower one having an attached valve, I, the head-piece l, arranged at one side of the stem and having the slot l', the screw i, connecting the stem-sections and attaching the head-piece, the shaft l^3, having an eccentric-pin engaging the slot in the head-piece at one side of the stem, and a lever, J, connected with the shaft, substantially as described.

4. The combination, with the casing A, of the steam-nozzle F, the steam-cone H, and valve I thereof, means for adjusting the steam-cone, the combining-nozzle G, the overflow-chamber surrounding the same, the overflow-orifices communicating with said chamber, the diaphragm M, extending obliquely across said chamber, and the overflow-nozzles and valves, substantially as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

OTTO WESTPHAL.

Witnesses:
WILLIAMS C. FOX,
JOHN KRACKE.