

(Model.)

2 Sheets—Sheet 1.

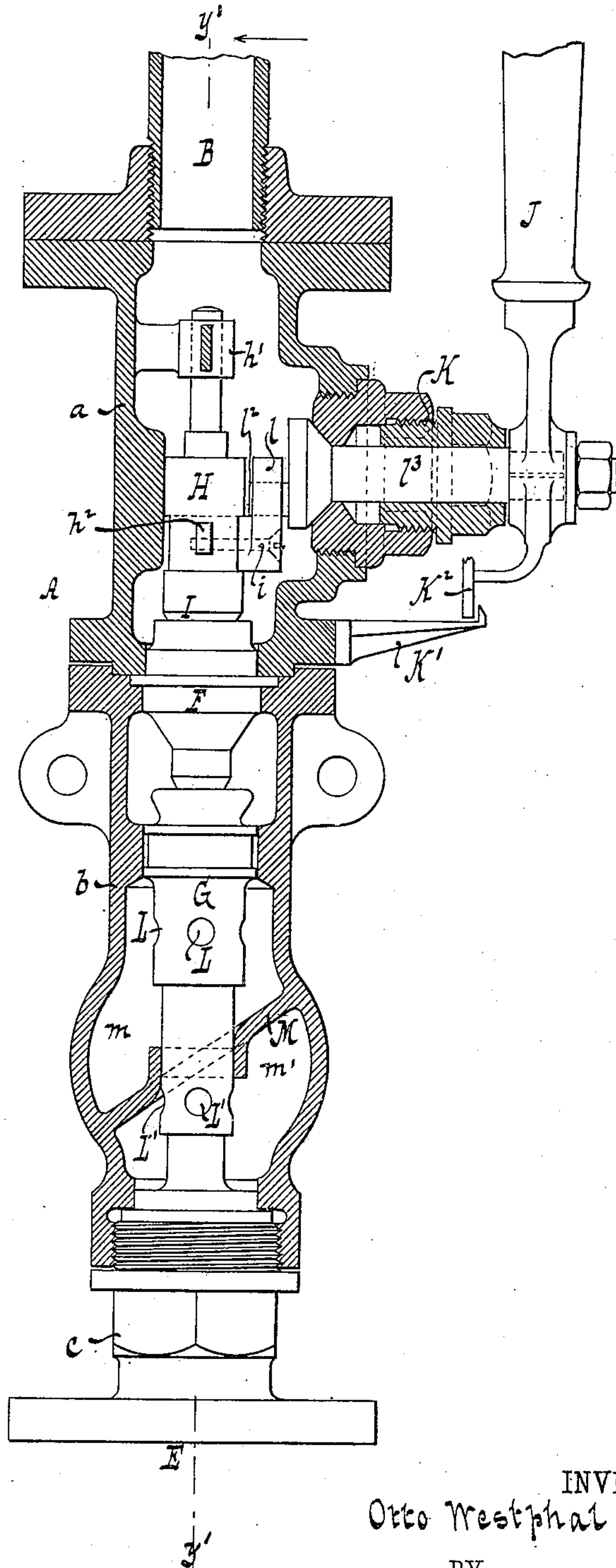
O. WESTPHAL.

INJECTOR.

No. 345,200.

Fig. 1

Patented July 6, 1886.



WITNESSES:

*Otto Hufeland*  
*William Miller*

INVENTOR

*Otto Westphal*

BY

*Van Patter & Co.*

ATTORNEYS

(Model.)

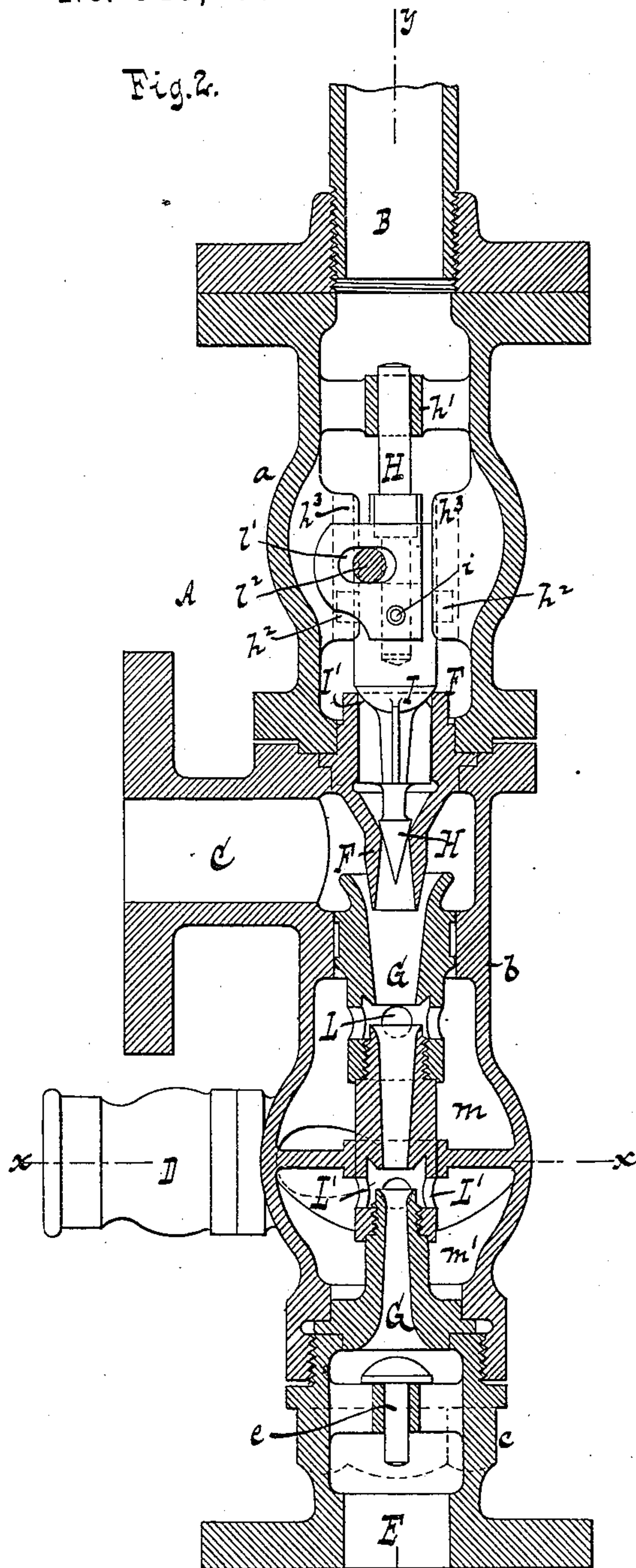
2 Sheets—Sheet 2.

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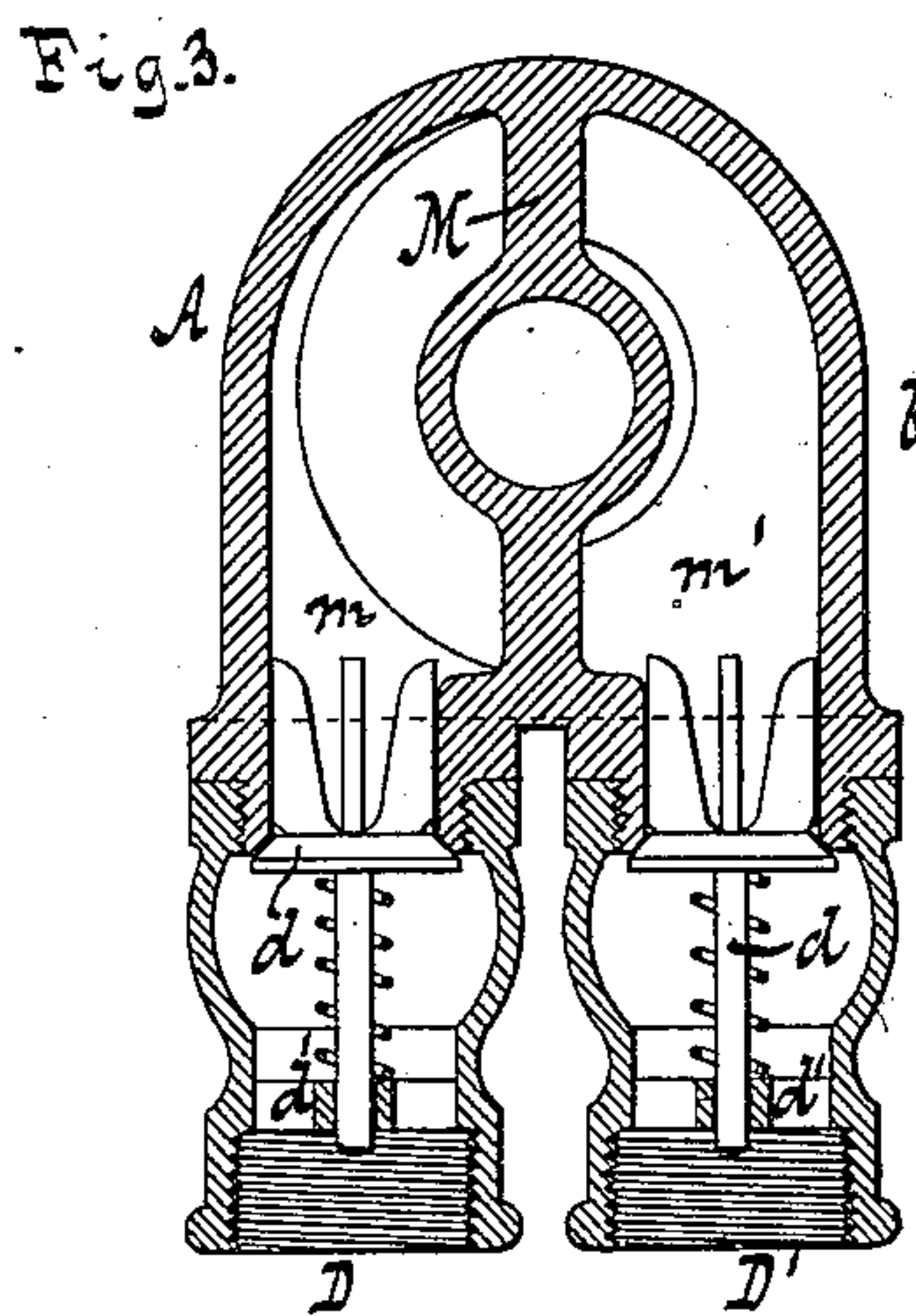
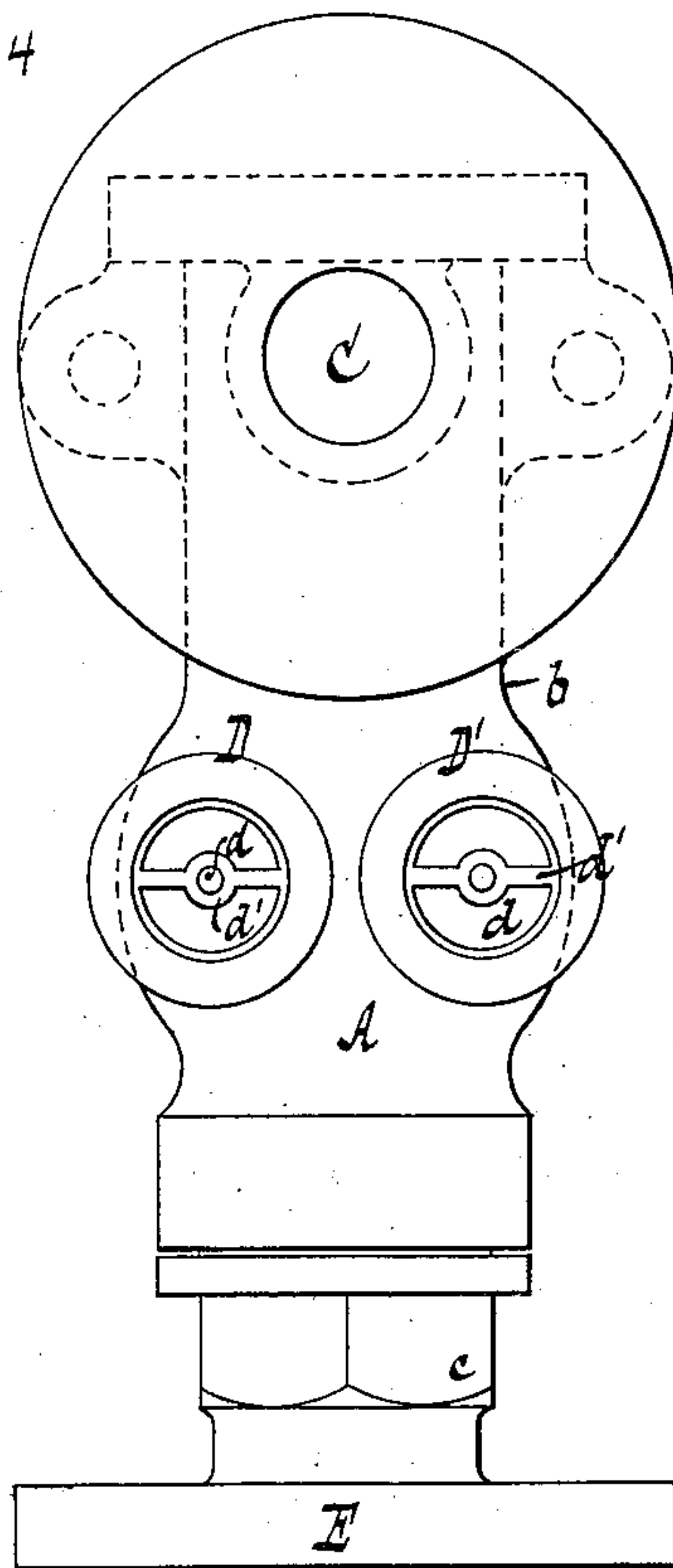


Fig. 4



INVENTOR

Otto Westphal

BY

Van Santvoord & Hauff

ATTORNEYS



# 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<sup>2</sup>, 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  $I'$ , 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  $l^2$ , having an eccentric-pin,  $l^3$ , 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,  $I'$ , 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  $l^2$ , having an eccentric-pin,  $l^3$ , 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,  $I'$ , 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  $l^2$ , 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.