

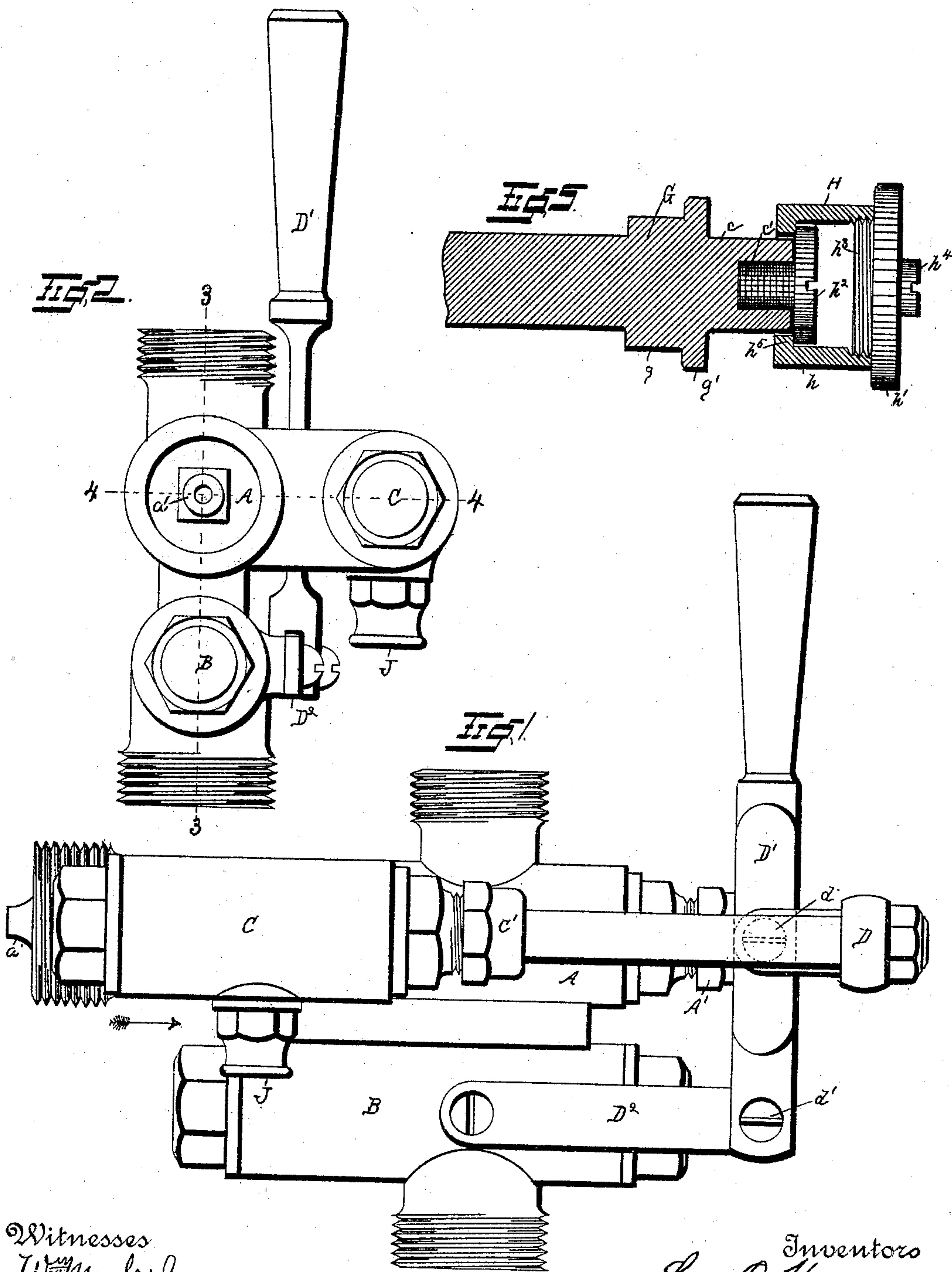
(Model.)

2 Sheets—Sheet 1.

L. O. HARMON & W. E. RHODES.
INJECTOR.

No. 495,486.

Patented Apr. 18, 1893.



Witnesses
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H. C. Hall

Inventors
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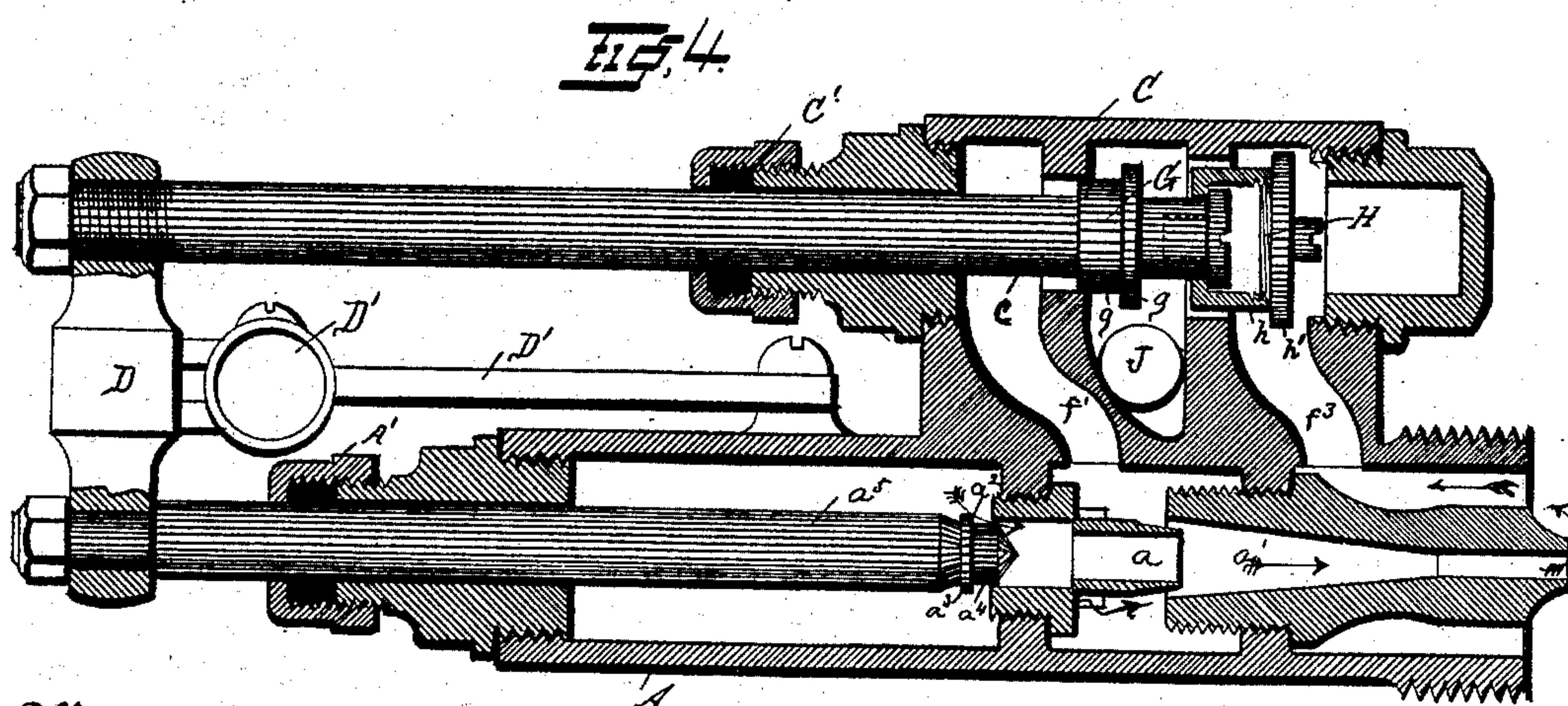
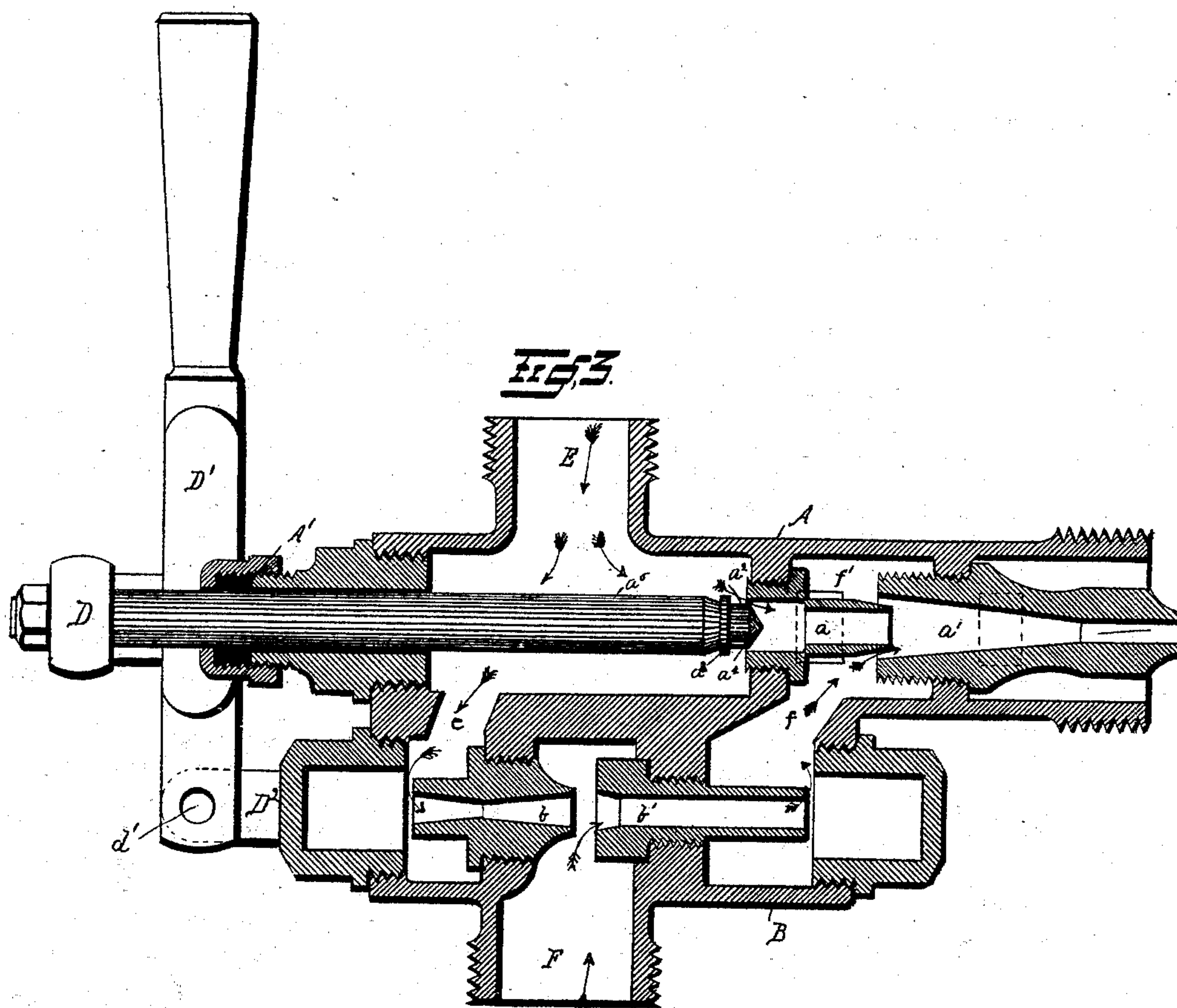
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L. O. HARMON & W. E. RHODES.
INJECTOR.

No. 495,486.

Patented Apr. 18, 1893.



Witnesses
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UNITED STATES PATENT OFFICE.

LEVE O. HARMON AND WILSON E. RHODES, OF ERIE, PENNSYLVANIA.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 495,486, dated April 18, 1893.

Application filed February 17, 1893. Serial No. 462,679. (Model.)

To all whom it may concern:

Be it known that we, LEVE O. HARMON and WILSON E. RHODES, citizens of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Injectors; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to injectors, and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

Our invention is illustrated in the accompanying drawings, as follows:

Figure 1 is a front elevation of the injector. Fig. 2 is a side elevation, looking from the left of Fig. 1. Fig. 3 is a section on the line 3—3 in Fig. 2, the point of view being at the left of that figure. Fig. 4 is a section on the line 4—4 in Fig. 2, the point of view being from above that figure. Fig. 5 is an enlarged section of the overflow valves, G, and H.

The body of the injector consists of the three connected cylindrical chambers, A, B and C; the axial plane passing through the chambers, A and B, forming substantially a right angle to that passing through the chambers, A and C.

The chamber, A, contains the force jets, aa' , and the steam valve, a^2 . The steam valve consists of the piston, a^4 , which fits loosely in its chamber, allowing a slight flow of steam, and a disk, a^3 , which forms a steam tight valve when seated. It has the stem, a^5 , which passes through the stuffing box, A' , and is connected to the bridge piece, D, from which it is operated by means of the handle, D' , pivoted to the bridge piece at d , and to the pivoted fulcrum, D^2 , at d' .

The chamber, B, contains the lifting jets, b and b' . These parts being of nearly, if not the same construction and arrangement as those now in common use a detailed description of them is not necessary to a proper understanding of our invention.

The chamber, C, contains the overflow valves, G and H, to which our invention more particularly relates. The valves, G and H, are carried by the stem, c , which is passed

through the gland, C' , and connected to the bridge piece, D, at the opposite end from the stem, a^5 , so that when operated, their movement is simultaneous and equal. The valve, G, is composed of the piston part, g , which forms a close fit with its chamber, and the disk, g' , which serves to more effectually close the valve when seated. The valve, H, consists of the piston part, h , which fits loosely in its chamber, allowing the passage of water, and the disk, h' , which when seated closes the valve. The valve, H, is free to move longitudinally on the stem, c , and is so placed with reference to the valve, G, that when the disks, g' and h' , are seated, it is nearly at the center of its longitudinal movement on the stem, so that when in this position, it is free from any longitudinal pressure from the stem. This valve then operates simply as a check valve, and is seated and held firmly in position by the pressure from the boiler exerted upon the face of the disk, h' . This longitudinal movement of the valve, H, on the stem is not so great, however, as to prevent its proper actuation by the stem, c , so that it is opened and kept open thereby until in its order it should be closed. The object obtained by this construction, is that the valve, H, is closed and kept closed automatically by boiler pressure, and thus insures against leakage from the boiler.

The connection of the valve, H, with the stem, c , may be of any desirable construction. We prefer, however, the one shown, which is as follows: The piston part, h , of the valve is sleeve shaped with an inner screw thread at its outer end and an inner annular shoulder, h^5 , at its inner end, which forms a sliding fit over the stem, c . The end of the stem, c , is provided with a screw threaded socket, c' , into which is screwed the flat headed retaining screw, h^2 , the head of which is slightly larger than the diameter of the stem, so as to engage the shoulder, h^5 , and retain the sleeve, h , upon the stem. The disk, h' , is provided with the screw threaded stud, h^3 , which is screwed into the sleeve, h , by means of the slotted head, h^4 . The relative lengths of the sleeve, h , and stud, h^3 , are such as to properly limit the longitudinal movement of the valve, H.

The operation of the device is as follows:

At starting, the steam valve, a^2 , is closed, and the overflow valves, G and H, are open. The steam is allowed to enter at E; passes through the port, e , and into the steam jet of the ejector, b . The water enters at F, and is lifted through the water jet, b' ; passes through the ports, f and f' , through the valve, G, into the overflow passage, J. A movement of the handle, D' , then raises the valve, a^2 , from its seat and allows a slight flow of steam into the force jet, a . This same movement of the handle closes the ejector overflow valve, G, and brings the parts to the position shown in the drawings. The water is then forced through the jet, a' , and passes through the port, f^3 , and through the valve, H, into the overflow, J. A further movement of the handle draws the piston, a^4 , out of its chamber and opens wide the valve, a^2 , seats the valve, G, and brings the stem to such a position that the valve, H, can close. The action of the water from the boiler then closes the valve, H, and the water is forced into the boiler. By placing the overflow chamber, C, at an angle to the plane of the axes of the injector and ejector chambers, the passages between the ejector and the overflow are shortened. The principal advantage, however, of this construction is the convenience it affords, for connecting the steam and overflow valve stems and adjusting the operating handle thereto. By this means, the shell of the ejector chamber can be used as the base for pivoting the fulcrum of the handle, and the handle pivoted to the connecting bridge piece directly above or beneath it and about midway between the valve stems. This locates it conveniently for operating, and makes its connections strong and compact.

What we claim as new is—

40 1. In a combined injector and ejector, the combination of an ejector overflow valve, a valve stem that carries said valve, and an in-

jector overflow valve that is carried by, and free to move longitudinally on, said stem, for the purposes set forth. 45

2. In a combined injector and ejector, the combination with the steam valves thereof, of the ejector overflow valve, G, stem, c , that carries said valve, injector overflow valve, H, that is carried by, and free to move longitudinally on, said stem, and means for operating said steam valves and overflow valves in unison. 50

3. In a combined injector and ejector, the combination of an ejector overflow valve, valve stem, c , that carries said valve, the sliding flanged piston sleeve, h , on said stem, retaining screw, h^2 , and disk valve, h' , attached to the sleeve, h . 55

4. In a combined injector and ejector, the combination of an injector chamber, an ejector chamber and an overflow chamber, so set that the axial plane passing through the injector and overflow chambers is at an angle to the axial plane passing through the injector and ejector chambers for the purposes set forth. 60 65

5. In a combined injector and ejector, the combination of an injector chamber, an ejector chamber, an overflow chamber so set that the axial plane passing through it and the injector chamber is at an angle to the axial plane passing through the injector and ejector chambers, steam and overflow valves, stems for said valves, bridge piece, D, connecting said stems, and handle, D' , that is pivoted to said bridge piece and the shell of the ejector chamber as a fulcrum. 70 75

In testimony whereof we affix our signatures in presence of two witnesses.

LEVE O. HARMON.

WILSON E. RHODES.

Witnesses:

WM. MARKS, Jr.,

J. M. SHERWIN.