

(Model.)

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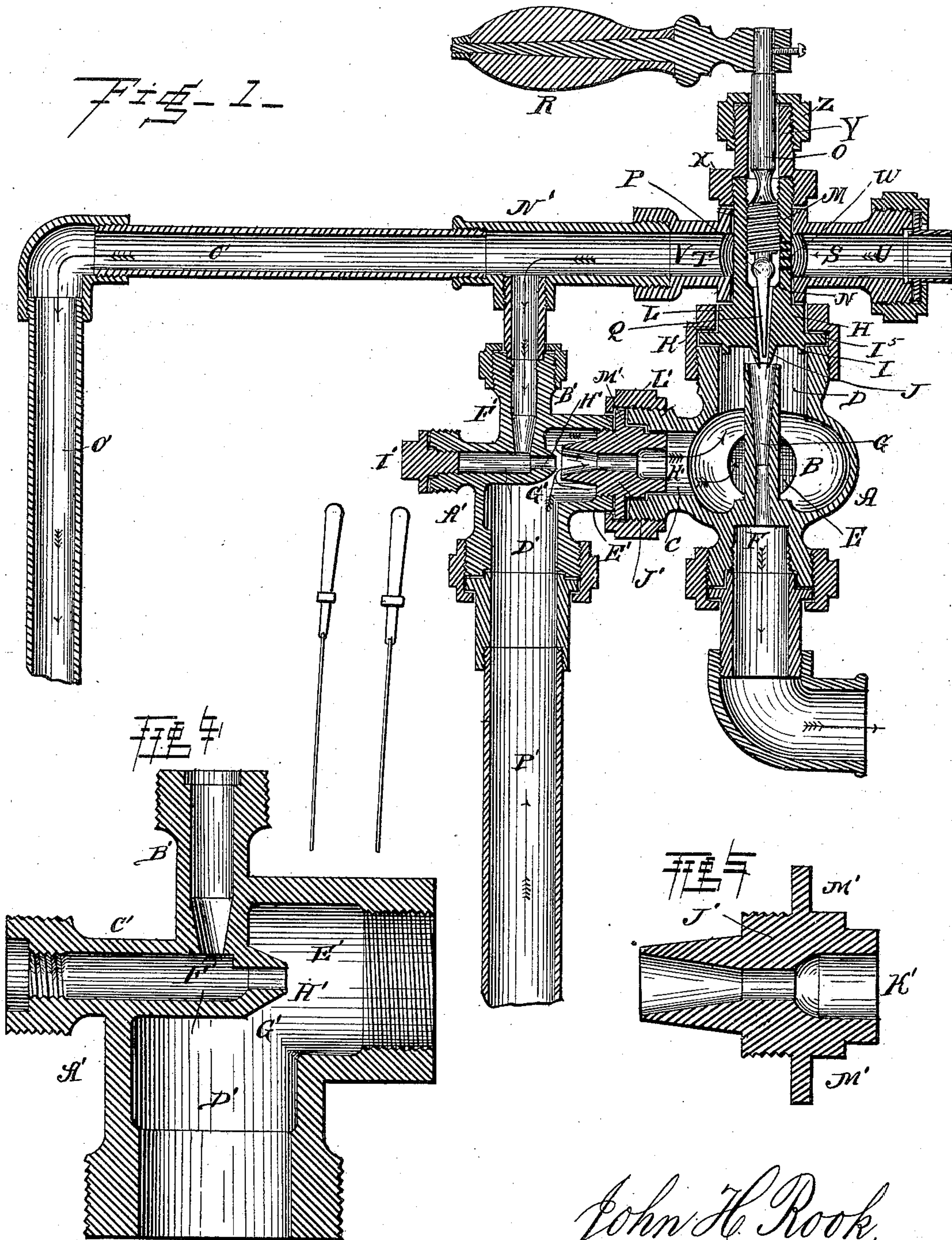
J. H. ROOK.

INJECTOR.

No. 309,406.

Patented Dec. 16, 1884.

Fig-1-



WITNESSES:

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By *Louis Bagger & Co.*  
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(Model.)

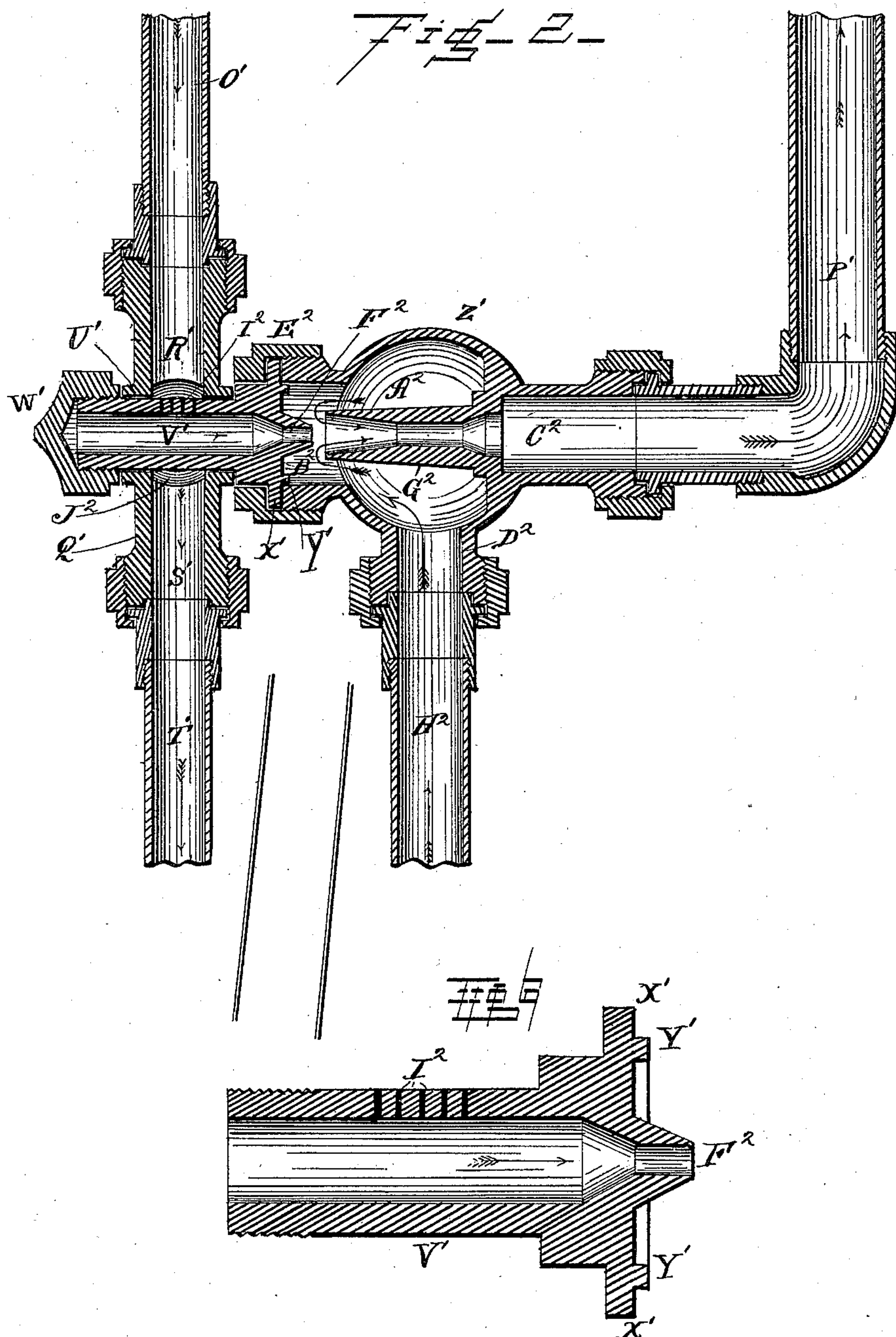
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J. H. ROOK.

INJECTOR.

No. 309,406.

Patented Dec. 16, 1884.



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(Model.)

4 Sheets—Sheet 3.

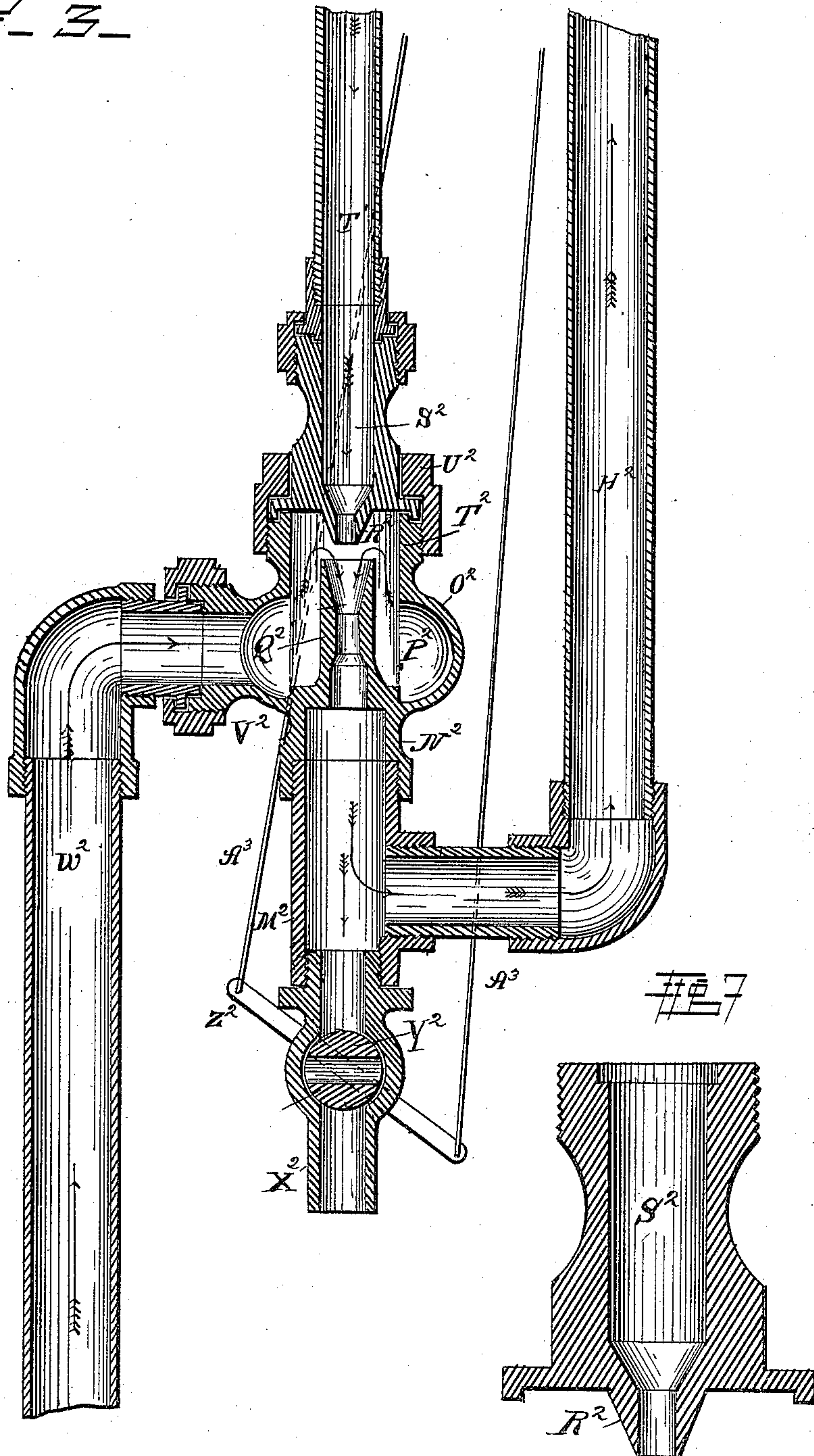
J. H. ROOK.

INJECTOR.

No. 309,406.

Patented Dec. 16, 1884.

Fig-3-



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(Model.)

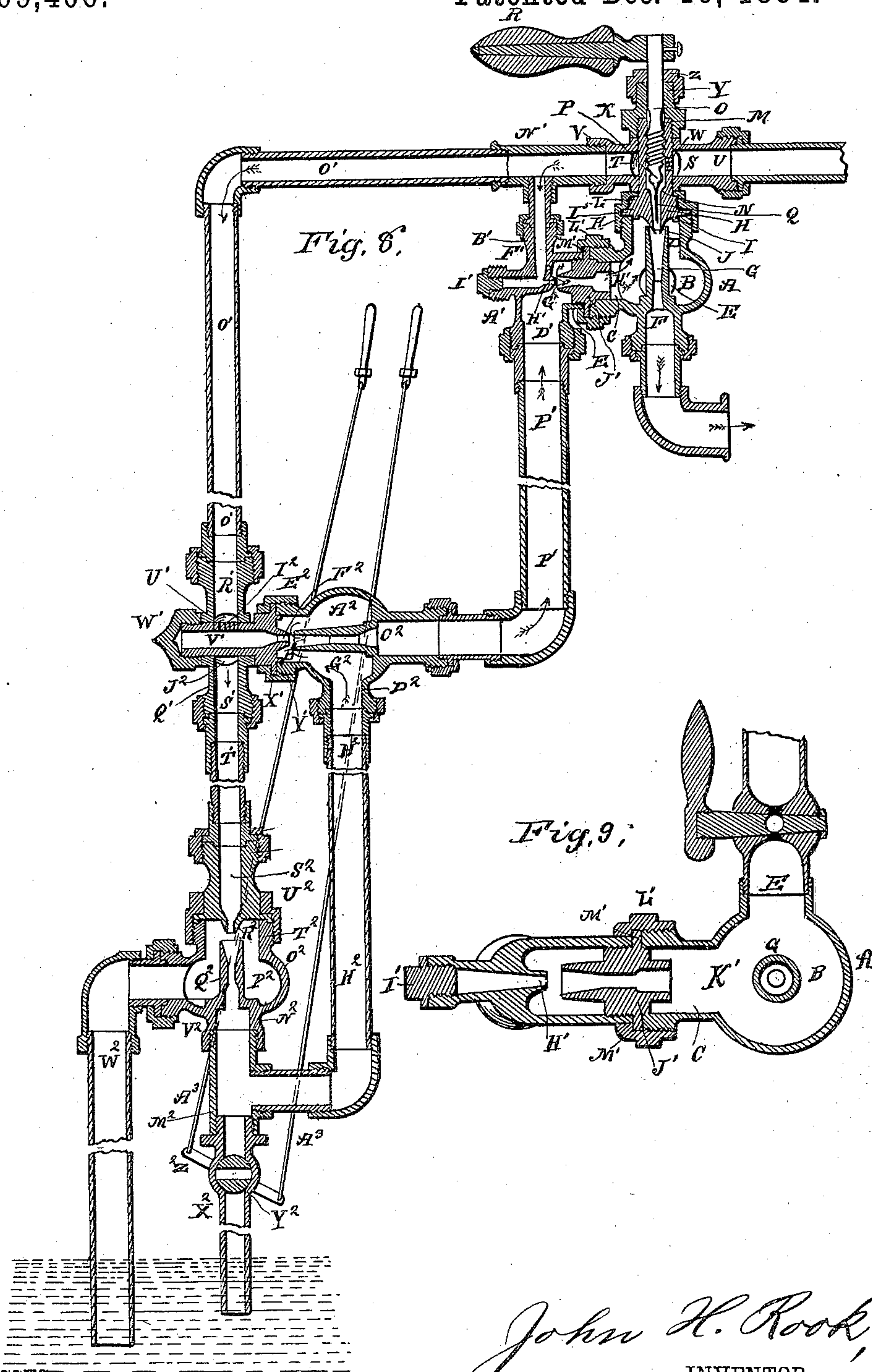
4 Sheets—Sheet 4.

J. H. ROOK.

## INJECTOR.

No. 309,406.

Patented Dec. 16, 1884.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN H. ROOK, OF JONESBOROUGH, INDIANA.

## INJECTOR.

SPECIFICATION forming part of Letters Patent No. 309,406, dated December 16, 1884.

Application filed August 4, 1884. (Model.)

*To all whom it may concern:*

Be it known that I, JOHN H. ROOK, a citizen of the United States, and a resident of Jonesborough, in the county of Grant and State of Indiana, have invented certain new and useful Improvements in Injectors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to injectors; and it has for its object to produce a device of this class which shall be serviceable for raising water from deep wells and injecting it into steam-boilers.

With this end in view, and with the further object of providing a device which shall possess superior advantages in point of simplicity, durability, and general efficiency, my invention consists in the improved construction and arrangement of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In its complete form, or when it is to be used for raising water from deep wells, my improved injector consists of three principal parts or sections, which may be designated, respectively, as the "top," the "middle," and the "bottom" sections. I would, however, have it understood at the outset that when desired or necessitated by the depth of the well from which the water is to be raised two or more of the middle sections may be used; also, that the middle and bottom sections may be dispensed with when the water is to be raised to a height not exceeding about twenty-five feet, or the height to which it may be raised by injectors of ordinary construction.

In the drawings hereto annexed, Figure 1 is a vertical sectional view of the top section of my improved injector with a portion of the connecting-pipes. Fig. 2 is a vertical sectional view of the middle section of the injector. Fig. 3 is a vertical sectional view of the bottom section, and Figs. 4, 5, 6, and 7 are detail sectional views, on a larger scale, of several parts of the injector. Fig. 8 is a vertical sectional view of my improved in-

jector, showing the sections composing the same connected and in their relative position for operation; and Fig. 9 is a horizontal sectional view taken on the line *xx* in Fig. 1 of the drawings.

The same letters refer to the same parts in all the figures.

The topmost section of the device, which is located near the boiler and constitutes the injector proper, comprises a casting, A, which is cored out so as to form a water-chamber, B, and branches C, D, and E, which latter forms an overflow provided with a stop-cock, which is not shown in the drawings. An additional downwardly-extending branch, F, forms a secondary water chamber or passage, from which a nozzle, G, extends upward into the water-chamber, nearly to the top of the same, or of the branch D, which forms an upward extension thereof. The branch D is screw-threaded exteriorly, and its upper end is ground so as to form a seat for the steam-cap H, the lower end of which is provided with an annular flange, I, to guide it to its seat, an annular connecting-flange, I<sup>2</sup>, and a downwardly-extending nipple, J, extending slightly into the upper end of the nozzle G. The steam-cap is secured to the branch D of the casting A by a union-nut, K, taking over the flange I<sup>2</sup>, as shown in Fig. 1 of the drawings. The steam-cap is constructed with a shoulder, L, and with an upwardly-extending tubular stem, M, formed with a valve-seat, N, above which it is interiorly screw-threaded for a portion of its length to receive a spindle, O, having a valve, P, from which a point, Q, extends downward into the nipple. The upper end of the stem or spindle O is provided with a handle, R, by means of which it may be conveniently manipulated.

S designates the steam-chest, which consists of a casting which is cored so as to form a chamber, T, mounted upon and surrounding the stem of the steam-cap, on the shoulder L of which the steam-chest rests, and provided with branches U and V, the former of which is connected by a suitable pipe with the steam-space of the boiler. When the device is in operation, steam is admitted to the steam-cap from the pipe or passage V, through an open-



ing or openings, W, in the side of the steam-cap facing the said branch or passage. I prefer, as shown in the drawings hereto annexed, to use a series of small openings, which will  
 5 act as a strainer and prevent the passage of scales and other impurities from the boiler. The steam-chest is secured in position around the steam-cap by a union-nut, X, having a shank, Y, which forms a bearing for the spin-  
 10 dle O, and the upper end of which is provided with a packing-box, Z, for the said spindle.

A' is a casting having four arms or branches, B', C', D', and E', and cored, so as to form passages, F', connecting the branches B' and C',  
 15 and G', connecting the branches D' and E'. The passage C' has a nipple, H', opening into the branch E' of the passage G'. The outer end of the branch C' is interiorly threaded and provided with a plug, I'. The opposite  
 20 passage, E', is also interiorly threaded and provided with a plug, J', having a longitudinal double-tapering perforation, K', the inner end of which registers with the nipple H', and the outer end of which enters the branch C of  
 25 the casting A, with which it is connected by means of a union-nut, L', taking over a flange, M', upon the said plug. The upper branch, B', of the casting A' is connected with the branch U of the steam-chest by means of a  
 30 T-coupling, N', one of the lateral arms of which has a steam-pipe, O', and the lower branch, D', of the casting A' has a downwardly-extending water-pipe, P'.

Q' is a casting which constitutes a portion  
 35 of the middle section of the apparatus. This casting, which may be designated as a "steam-chest," is provided with upwardly and downwardly extending branches R' and S', the former of which is connected with the steam-  
 40 pipe O', and the latter of which has a downward continuation, T', of the said steam-pipe. The casting Q' has a transverse seat, U', for a steam-cap, V', the outer end of which is threaded, so as to receive a closed nut, W', whereby  
 45 it is kept in position in its seat, and the inner end of which is provided with a flange, X', and a collar, Y', serving to guide it to its seat.

Z' is a globular casting, which is cored so as to form a water-chamber, A<sup>2</sup>, and branches  
 50 B<sup>2</sup>, C<sup>2</sup>, and D<sup>2</sup>, the former of which, B<sup>2</sup>, forms a seat for the steam-cap V', which is secured thereto by a union-nut, E<sup>2</sup>, taking over the flange X' of the said steam-cap. The latter is provided with a nipple, F<sup>2</sup>, registering with a  
 55 nozzle, G<sup>2</sup>, formed laterally in the casting Z', and opening into the branch C<sup>2</sup> of the same. The said branch C<sup>2</sup> is suitably coupled or connected with the water-pipe P', and the branch D<sup>2</sup> has a downward continuation, H<sup>2</sup>, of the  
 60 said water-pipe. The steam-cap V' has a series of openings forming a strainer, as at I<sup>2</sup>, facing the branch R' of the casting Q', and the latter is formed with a globular recess or chamber, J<sup>2</sup>, surrounding the stem or shank of the said  
 65 steam-cap, so as to admit of the passage of steam around the same and into the branch S'.

The branch S' of the casting Q' is provided with the downwardly-extending steam-pipe T', and the branch D<sup>2</sup> of the casting Z' has the  
 70 downwardly-extending water-pipe H<sup>2</sup>. The latter is connected by a T-coupling, M<sup>2</sup>, with the lower branch, N<sup>2</sup>, of a casting, O<sup>2</sup>, which is cored so as to form a water-chamber, P<sup>2</sup>,  
 75 having an upwardly-extending nozzle, Q<sup>2</sup>, registering with a nipple, R<sup>2</sup>, extending downwardly from a cap, S<sup>2</sup>, seated upon the upwardly-extending branch T<sup>2</sup> of the casting O<sup>2</sup>, and connected therewith by a union-nut,  
 80 U<sup>2</sup>, and the upper end of which cap S<sup>2</sup> is coupled or connected with the steam-pipe T'. The casting O<sup>2</sup> has a lateral branch, V<sup>2</sup>, from which a water-pipe, W<sup>2</sup>, extends downward into the well, and the lower branch, N<sup>2</sup>, of the  
 85 T-coupling M<sup>2</sup> is provided with a downwardly-extending overflow-pipe, X<sup>2</sup>, which is preferably extended below the level of the water in the well, in order to prevent the sediment of  
 90 the latter from being disturbed by the overflow water. The pipe X<sup>2</sup> is provided with a stop-cock, Y<sup>2</sup>, having an operating-lever, Z<sup>2</sup>, from the ends of the arms of which operating  
 95 cords or wires A<sup>3</sup> A<sup>3</sup> extend to within convenient reach of the operator at the top of the well.

The operation of this invention will be readily understood by those skilled in the art to  
 100 which it appertains when reference is had to the foregoing description, and to the drawings hereto annexed.

It has been already stated that when the de-  
 105 vice is to be utilized for raising water from deep wells and injecting the same into a steam-boiler the entire apparatus herein described is to be utilized, with the provision that in  
 110 very deep wells the middle section of the apparatus may be duplicated, or that as many of these sections may be used as may be found necessary, the number being governed by the  
 115 depth of the well, and the several sections being connected by steam and water pipes.

The operation of the device when used in  
 120 deep wells is as follows: The overflow-cock Y<sup>2</sup> is opened and the steam-valve P is closed, while a globe-valve (not shown in the drawings) is opened, so as to admit steam from the  
 125 boiler into the chest or chamber T, from which a portion of the steam finds its way into the steam-cap H, while a portion of the steam passes around the said steam-cap and through the downwardly-extending steam-pipe of the  
 130 same into the middle section, whence a portion of the steam escapes into the corresponding water-chamber, while the remainder of the steam passes down through the pipe T' to the  
 135 lowermost section the injector, and through the steam-nozzle of the said section, around which the water is thus caused to rise.

It is obvious that when the apparatus is applied to shallow wells the intermediate and  
 140 the bottom castings or sections may be dispensed with by an arrangement which is obvious to those skilled in the art, and which



may be briefly described as simply consisting in dispensing with the middle section or sections of the apparatus and making proper connections to correspond.

5 Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A water-lift comprising a series of injectors arranged one above the other and provided  
10 each with a steam-cap and a surrounding steam-chest, from which the steam may pass to and operate or actuate the injector next below, substantially as and for the purpose herein set forth.

15 2. In an injector, the combination, with the

water-chamber constructed with an upwardly-extending nozzle, of a steam-chest provided with a chamber surrounding the perforated steam-cap mounted upon the said water-chamber, and the coupling having branches connected, respectively, with the water-pipe and with the steam-pipe, substantially as and for the purpose herein set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in  
25 presence of two witnesses.

JOHN H. ROOK.

Witnesses:

ROBERT JAY,  
BENJ. F. BURK.