

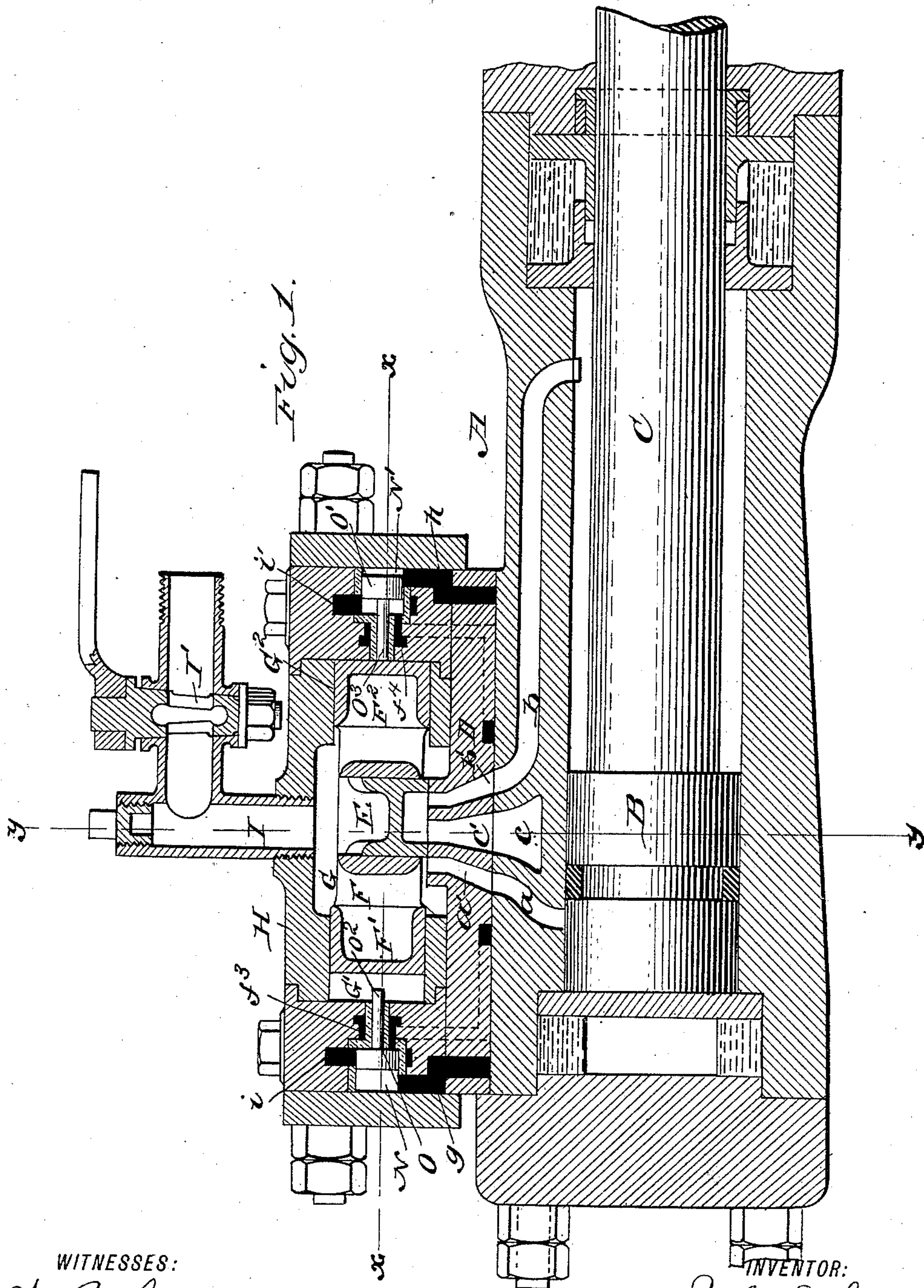
(No Model.)

3 Sheets—Sheet 1.

J. A. WIGGS, Jr.
STEAM ACTUATED VALVE.

No. 413,005.

Patented Oct. 15, 1889.



WITNESSES:

W. R. Davis.
C. Sedgwick

INVENTOR:

J. A. Wiggs Jr

BY

Allen & Co

ATTORNEYS.

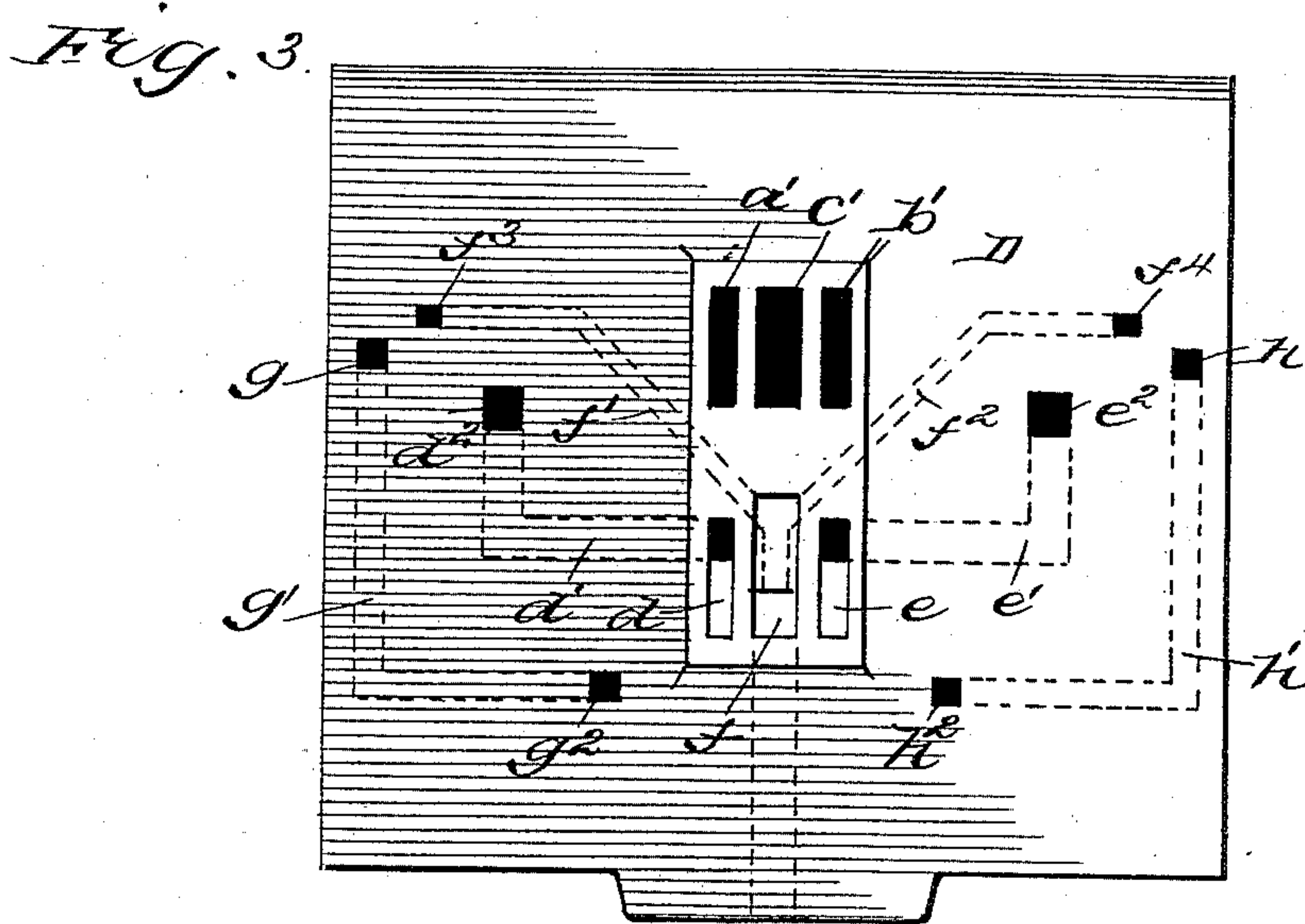
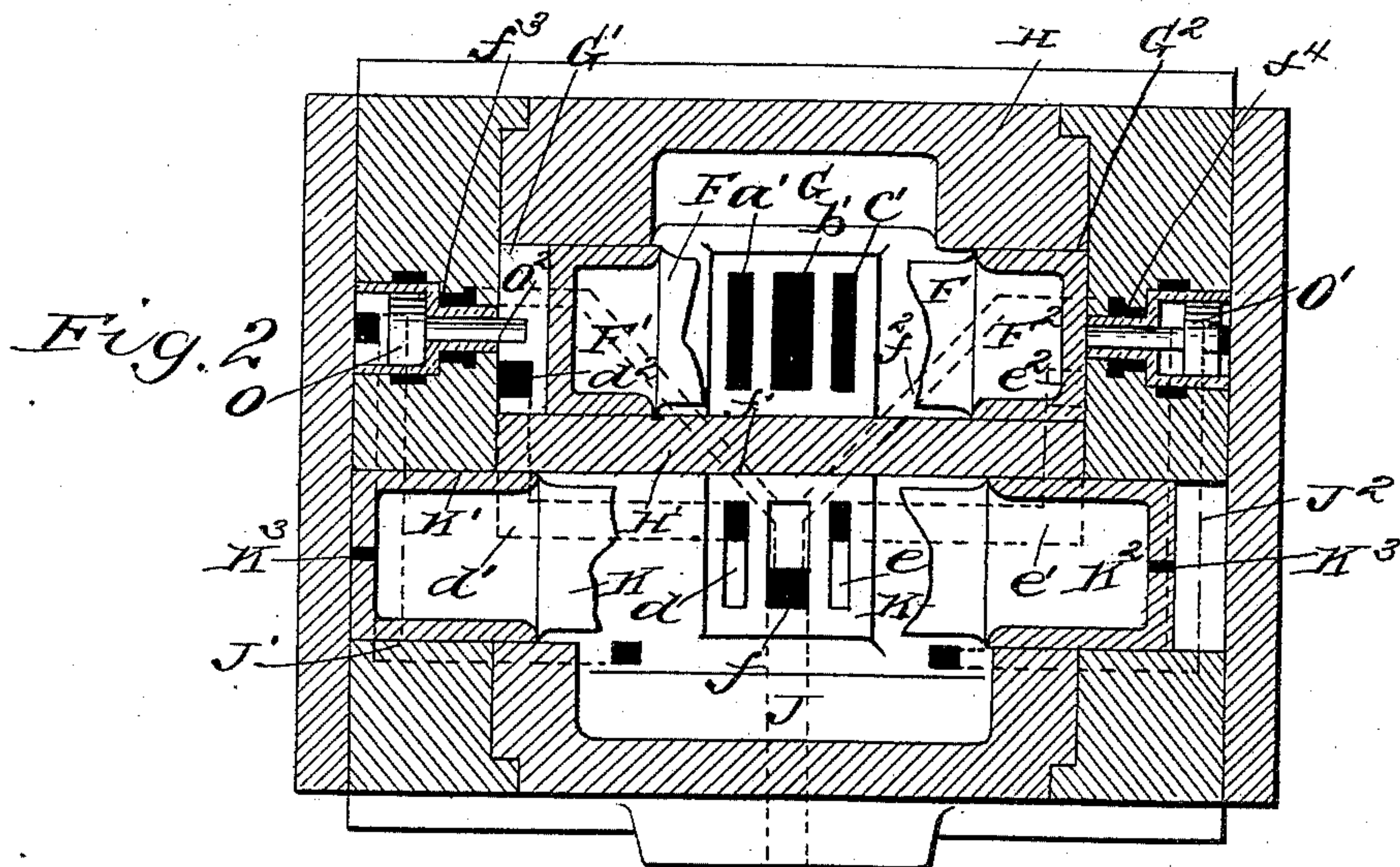
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STEAM ACTUATED VALVE.

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WITNESSES:

W. R. Davis
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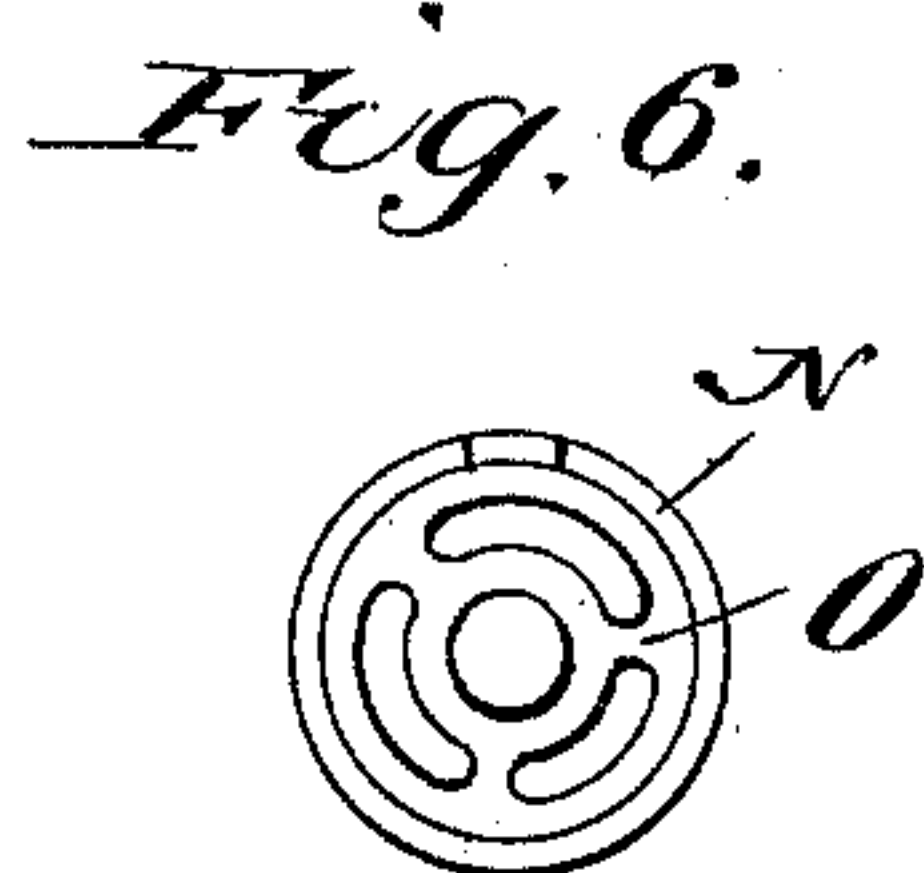
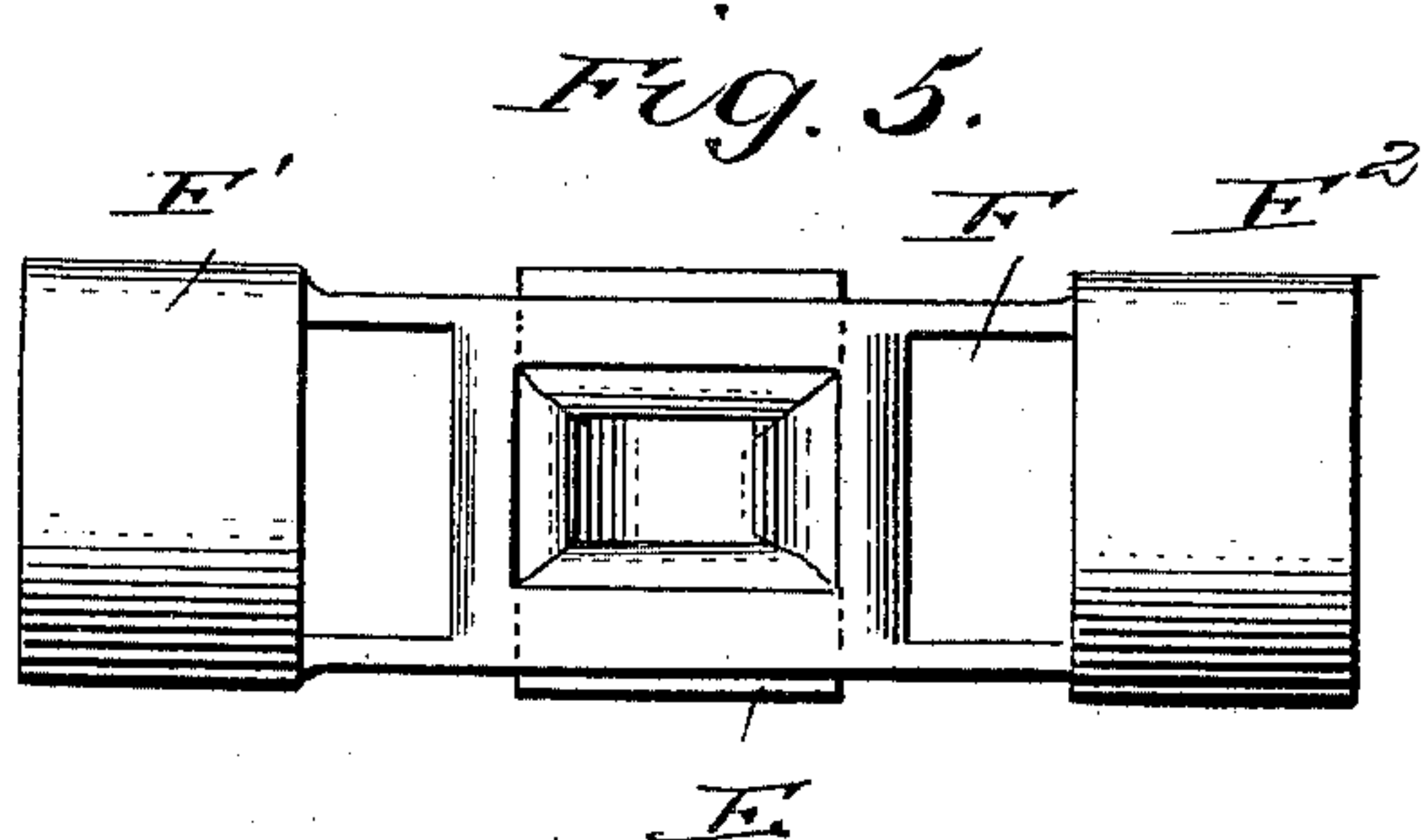
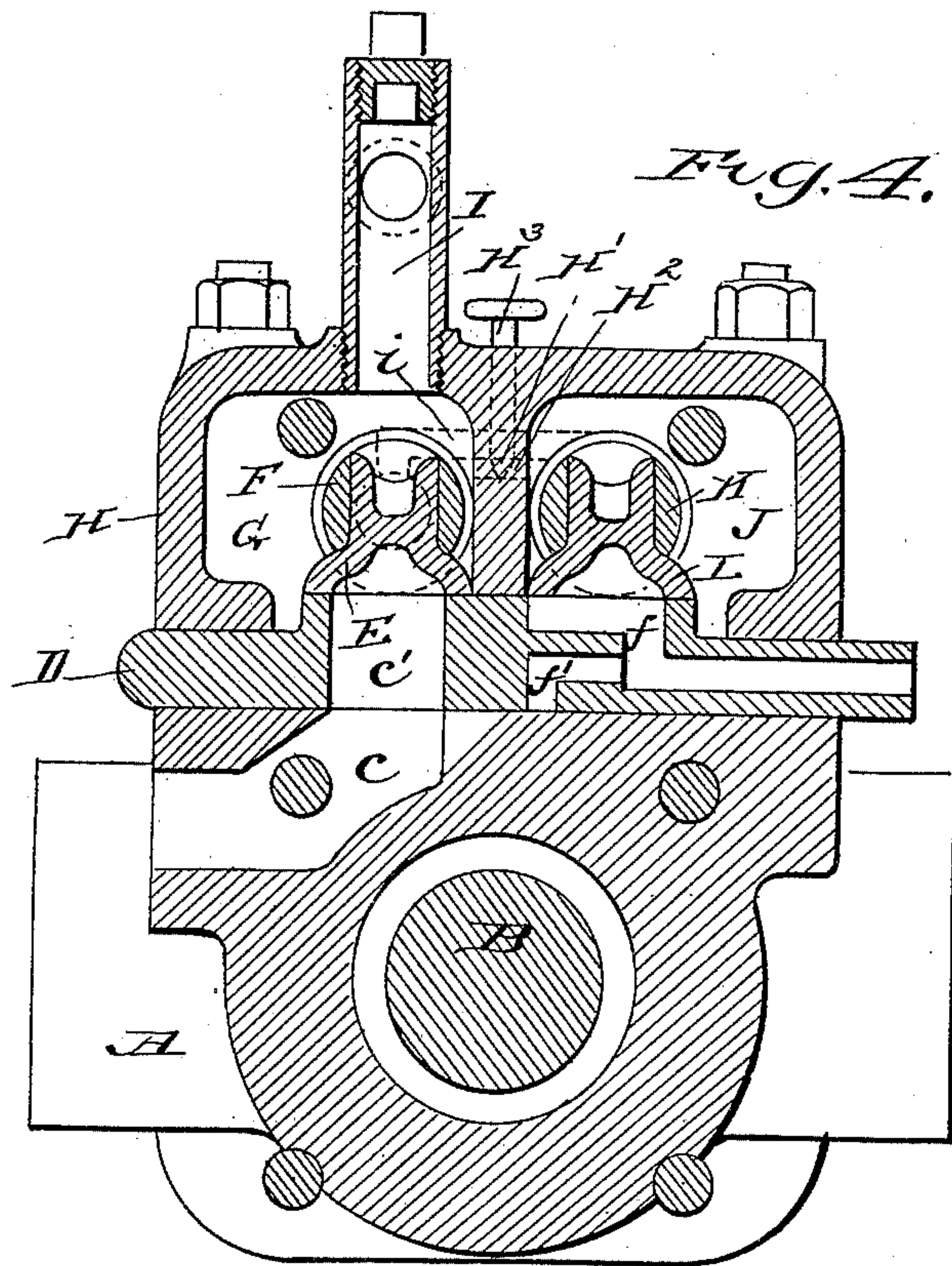
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3 Sheets—Sheet 3.

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STEAM ACTUATED VALVE.

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Patented Oct. 15, 1889.



WITNESSES:

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C. Sedgwick

INVENTOR:

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J. A. Wiggs, Jr.
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UNITED STATES PATENT OFFICE.

JAMES A. WIGGS, JR., OF BIRMINGHAM, ALABAMA.

STEAM-ACTUATED VALVE.

SPECIFICATION forming part of Letters Patent No. 413,005, dated October 15, 1889.

Application filed July 31, 1889. Serial No. 319,329. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. WIGGS, JR., of Birmingham, in the county of Jefferson and State of Alabama, have invented a new and Improved Steam-Actuated Valve, of which the following is a full, clear, and exact description.

The invention relates to valves for reciprocating engines; and its object is to provide a new and improved valve which is simple and durable in construction and very effective and automatic in operation.

The invention consists of a piston mounted to slide and carrying the main valve, tappet reversing-valves adapted to shift the said piston, and an auxiliary piston carrying the auxiliary valve for controlling the movement of the said tappet-valves.

The invention also consists in certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement as applied to a channeling-machine. Fig. 2 is a sectional plan view of the same on the line xx of Fig. 1. Fig. 3 is a plan view of the valve plate or seat. Fig. 4 is a transverse section of the improvement on the line yy of Fig. 1. Fig. 5 is an enlarged plan view of the main piston and valve, and Fig. 6 is a face view of one of the tappet-valve seats.

In the cylinder A operates, in the usual manner, the piston B, supported on the piston-rod C. The cylinder A is also provided with the usual inlet-ports a and b and the exhaust-port c , leading to the outside. The ports a , b , and c register with the ports a' , b' , c' , respectively, formed in the valve plate or seat D, secured on the top of the cylinder A. Over the ports a' , b' , c' operates a main slide-valve E, secured in the middle of the main piston F, held to slide in a compartment G of the steam-chest H. The piston F is partly open, and is provided with cylindrical ends F' and F^2 , mounted to slide in the cylinders G' and G^2 , formed in the ends of the compart-

ment G. Into the latter leads an inlet-pipe I, provided with the usual valve I' , for regulating the admission of the motive agent. The compartment G is divided by a partition H' from a compartment J, but is in communication with the latter by a transverse opening H^2 , formed in the said partition and adapted to be opened and closed by a valve H^3 of any approved construction. (Shown in Fig. 4.) In the compartment J is held to slide longitudinally an auxiliary piston K, carrying a slide-valve L, similar in construction to the slide-valve E, previously referred to. The cylindrical ends K' and K^2 of the auxiliary piston K are mounted in the cylindrical parts J' and J^2 , formed in the ends of the compartment J. The openings K^3 in the cylindrical ends K' and K^2 connect the interior compartment J with its cylindrical ends J' and J^2 . The auxiliary valve L, carried by the auxiliary piston K, operates over the ports d , e , and f , of which the latter leads to the outside, as is plainly shown in Fig. 4. The ports d and e connect with the channels d' and e' , respectively, leading to the ports d^2 and e^2 , respectively, opening into the cylinders G' and G^2 , containing the cylindrical ends F' and F^2 of the main piston F. From the middle port f lead in opposite directions the channels f' and f^2 , leading to the ports f^3 and f^4 , respectively, opening into the cylinders N and N', respectively, containing the tappet-valves O and O', respectively, provided with the inwardly-extending pins O^2 and O^3 , respectively, adapted to abut against the ends of the cylindrical parts F' and F^2 of the main piston F. Into the cylinders N and N' also open the ports g and h , connected with the channels g' and h' , respectively, leading to the ports g^2 and h^2 , respectively, opening into the chamber J and completely uncovered, so that the motive agent in the said compartment J can at all times pass through the said port to the cylinders N and N', so as to hold the tappet-valves O and O', respectively, on their seats. The cylinders N and N' are connected at their inner ends with the channels i and i' , respectively, leading to the outer ends of the cylinders J' and J^2 , respectively, as is plainly shown in dotted lines in Fig. 4.

The operation is as follows: When the machine is in the position shown in the drawings, the main valve E and its main piston F are in the right-hand position, while the auxiliary valve L and its piston K are in the left-hand position. The motive agent, entering the pipe I, passes into the compartment G and through the open piston F into the port a' , from which the motive agent passes into the port a and to one end of the cylinder A, thus forcing the piston B to the right. The tappet-valve O' is then in its outermost position, so that the motive agent in the cylinder end J^2 at the right-hand end of the piston end K^2 can pass through the port i' into the cylinder N' , and from the latter can exhaust through the port f^4 into the channel f^2 , and from the latter to the exhaust-port f , leading to the outside. The motive agent, which passes from the chamber G through the opening H^2 in the partition H' into the compartment J, now passes through the opening K^3 in the cylinder end K' to the cylinder end J' , thus forcing the auxiliary piston K with the auxiliary valve L to the right, so that the port d is closed and the exhaust-port f is opened, whereby the motive agent from the left-hand end of the main piston F is exhausted through the port d^2 , leading to the channel d' , the latter opening into the port d . The auxiliary slide-valve L now opens the port e and admits the motive agent to the right-hand end F^2 of the main piston F in the cylinder end G^2 , so that the said piston F moves with the main slide-valve E to the left, and by its cylindrical end F' strikes the projection O^2 of the tappet-valve O, moving the latter outward. The movement of the main valve E to the left opens the port a' , thus admitting the motive agent to the cylinder A of the engine. When the piston F strikes the tappet-valve O, it exhausts the cylinder end J^2 in the rear of the auxiliary piston K through the passage i' into the main auxiliary exhaust-port f by means of the passage f^2 . The tappet-valve O closes the pressure-port g in the end of the cylinder N. The expansion of the motive agent at the right-hand end of the auxiliary piston K causes a reversal of the said auxiliary piston and its slide-valve L, so as to close the exhaust-port f . The slide-valve L at the same time opens the port e , so as to admit the motive agent to the passage e' , leading to the port e^2 , and discharge the motive agent into the cylinder G' against the left-hand end of the piston F, thus causing a reversal of the said piston F to the right, carrying the main slide-valve E along and opening and closing the main inlet-ports a' and b' and the exhaust-port c' . When the main piston F leaves the tappet reversing-valve O or O' , then it is immediately forced against its valve-seat by the pressure on the rear end issuing from the ports g and h , respectively, at all times connected with the motive agent in the

compartment J, this movement of the tappet-valves always closing the ports i and i' , respectively.

The above-described movements will continue alternately as long as the motive agent is supplied through the opening H^2 in the partition H, and the speed at which the valve-actuating pistons move is certainly controlled by the valve H^3 , which increases or diminishes the area of the auxiliary supply-opening H^2 gradually.

I do not limit myself to the precise construction or forms shown, as they may be modified in many respects without departing from the scope or spirit of my invention.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a steam-actuated valve, the combination, with a main valve and a main piston carrying the said main valve, of an auxiliary piston carrying an auxiliary valve, and two tappet reversing-valves controlled by the movement of the said pistons and valves, substantially as shown and described.

2. In a steam-actuated valve, the combination, with a steam-chest provided with two compartments in communication with each other, of a main piston held to slide in one of the said compartments and carrying a slide-valve controlling the egress of the motive agent from or its ingress to the cylinder, an auxiliary piston carrying an auxiliary valve and held to slide in the other compartment of the steam-chest, and tappet-valves controlled by the said main and auxiliary pistons, substantially as shown and described.

3. In a steam-actuated valve, the combination, with a steam-chest provided with two compartments in communication with each other, of a main piston held to slide in one of the said compartments and carrying a slide-valve controlling the egress of the motive agent from or its ingress to the cylinder, an auxiliary piston carrying an auxiliary valve and held to slide in the other compartment of the steam-chest, tappet-valves controlled by the said main and auxiliary pistons, and means, substantially as described, for regulating the communication between the two compartments of the said steam-chest, as set forth.

4. In a steam-actuated valve, the combination, with two pistons and two slide-valves arranged to move in alternation and adapted to control the necessary supply-ports and passages, of reversing tappet-valves adapted to produce said alternating movement independently of the movement of the main piston, substantially as shown and described.

5. The combination, with two tappet reversing-valves, of a valve-operating mechanism therefor, consisting of a pair of reciprocating pistons, one of which is connected to and moves the main-valve of the engine, the other operating a similar valve for controlling the

movements of the main-valve piston independently of the movements of the cylinder-piston, substantially as shown and described.

5 6. The combination, with the main valve, of a main piston actuated by a motive agent and carrying the said valve, two tappet reversing-valves for reciprocating the said main piston, and a second similar piston and valve for imparting an alternating reciprocating
10 movement to the said main and auxiliary valve pistons independently of the movement of the cylinder-piston, substantially as shown and described.

15 7. The combination, with a main piston actuated by the motive agent, of two tappet reversing-valves arranged to open and close the main supply and exhaust ports independently of the movement of the cylinder-piston, and an auxiliary piston and valve
20 controlling ports and passages for actuating the said main piston in conjunction with the said tappet reversing-valves, substantially as shown and described.

8. The combination, with the main piston actuated by the motive agent, of two tappet
25 reversing-valves arranged to open and close the main supply and exhaust ports independently of the movement of the cylinder-piston, an auxiliary piston and valve controlling ports and passages for actuating the
30 said main piston in conjunction with the said tappet reversing-valves, and means, substantially as shown and described, for regulating the admission of the motive agent from the main piston to the auxiliary piston, sub-
35 stantially as shown and described.

9. The combination, with two pistons and valves, of two tappet reversing-valves for producing alternating movement of the said
40 pistons and valves, substantially as shown and described.

JAMES A. WIGGS, JR.

Witnesses:

PAUL PHILIP,
EDWD. C. PHILIP.