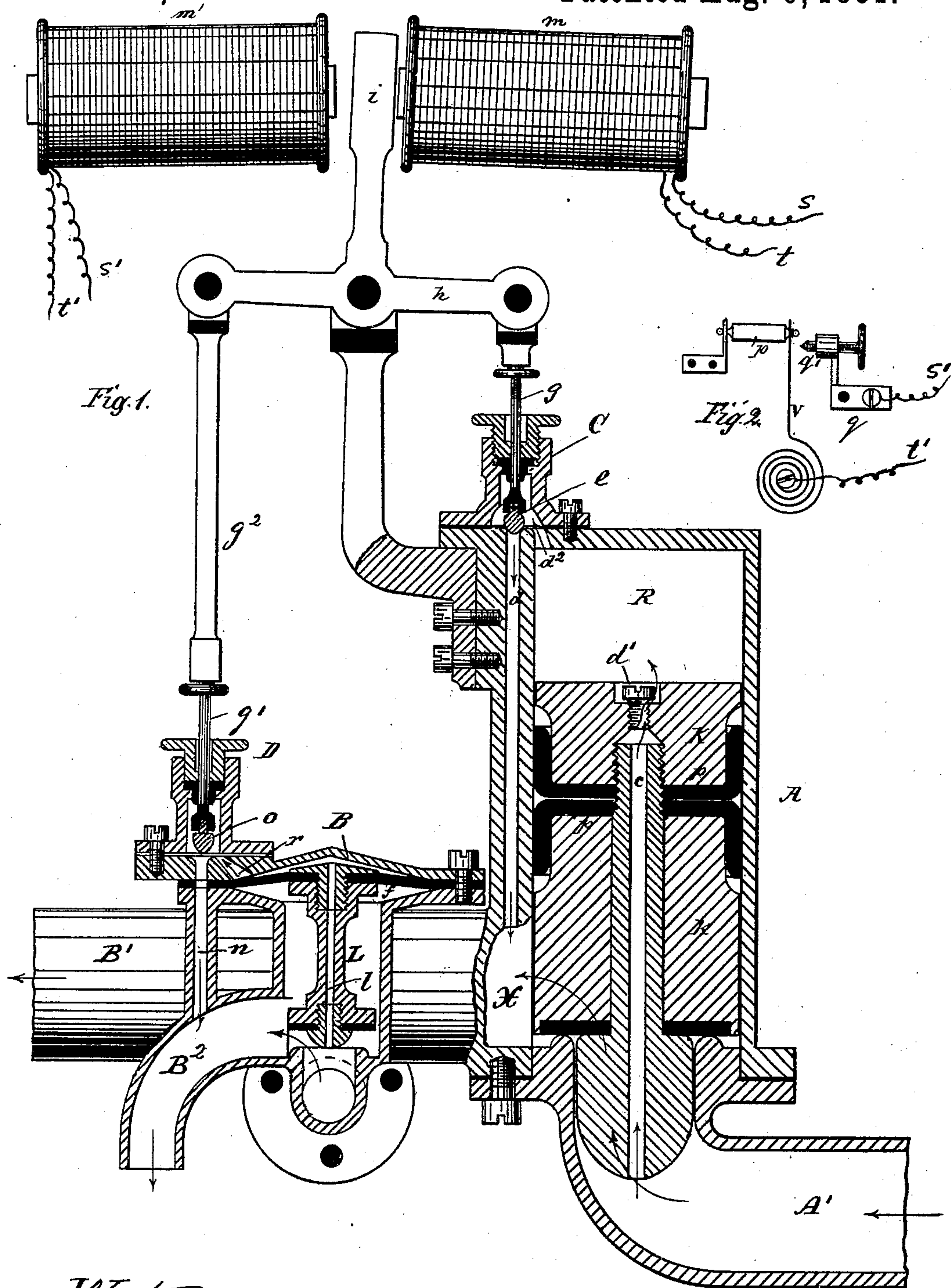


(No Model.)

J. A. FRIED.
HYDRAULIC VALVE.

No. 245,476.

Patented Aug. 9, 1881.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOH. ALOYS FRIED, OF FRANKFORT-ON-THE-MAIN, PRUSSIA, GERMANY.

HYDRAULIC VALVE.

SPECIFICATION forming part of Letters Patent No. 245,476, dated August 9, 1881.

Application filed March 1, 1881. (No model.) Patented in Germany January 9, 1880.

To all whom it may concern:

Be it known that I, JOH. ALOYS FRIED, a subject of His Majesty the Emperor of Germany, residing at Frankfort-on-the-Main, Prussia, in the Empire of Germany, have invented certain new and useful Improvements in Hydraulic Valves; 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, and in which—

Figure 1 represents a vertical section of my improved valve and the mechanism for operating it, and Fig. 2 is a detail view of one of the attachments for operating the valve automatically.

My invention has relation to hydraulic valves of that class in which two alternately-operating valves are employed—that is to say, by the operation of closing one valve the other valve is opened, and vice versa; and it consists, first, in the detailed construction and combination of parts of the valves *per se*; and, secondly, in the mechanism for operating the valves alternately by means of electricity, all as herein-after more fully described, and particularly pointed out in the claims.

In the annexed drawings, A' represents the main pipe, and B' one of the branch pipes, of a system of water pipes or conduits for supplying an ordinary dwelling. The object is to so arrange the pipes that when A' is open for the supply of water B' shall be closed as to its branch B², and vice versa. To effect this I provide the pipe A' with a cylindrical chamber, A, which has a plunger, K, provided with packing, so as to play water-tight up and down in the cylinder A, which is closed at top, but communicates at the bottom with the branch pipe B'. The plunger K has a central vertical bore or channel, c, the upper end or outlet of which may be regulated as to size or capacity by a screw, d'.

Upon the top of the cylinder A is arranged a valve, C, the plunger e of which is attached to the piston-rod g, the upper end of which is pivoted in one end of the walking-beam or three-armed lever, h, the upper arm, i, of which plays between the electro-magnets m and m'.

A passage, d², opens from the upper part or chamber, R, of the cylinder A into the valve or valve-chamber C, from which another passage, d, leads down, parallel with the cylinder A, into the contiguous part of the branch pipe B'. In the position of the apparatus as shown in the drawings this channel d is closed by the plunger e.

In the branch pipe B' is arranged a valve, B, the principle of the operation of which is identical with A, although differing in construction. The plunger L of this valve B has a central channel, l, and is seated at the inlet to the branch pipe B² of B'. The upper end of plunger L is secured in a rubber disk or diaphragm, f, in the upper part of the valve-chamber, from which a passage, r, leads into the supplemental valve D, which has a channel, n, leading down into the branch B². Valve D has a plunger, o, connected to the piston-rod g', which has a swiveled rod or link, g², connecting it with the walking-beam or lever h, as shown.

In the position of the apparatus as shown in the drawings the channels or passages r and n are both open, so that the water may pass through l and r into the supplementary valve-chamber D and out at n into B². By vibrating the walking-beam h i, the position and operation of the plungers e and o are reversed—that is, communication between A' and B' will be opened, and at the same time communication between B' and B² will be closed. This is effected in the following manner: The fluid entering A', with the position of the valves as represented in the drawings, passes through the channel c up into the chamber R above the plunger K, from which there is no outlet, the channel d being closed; hence the weight of the column of water in R, added to the gravity of the plunger, causes this to descend and close the openings H leading from A into B. At the same time and under the same condition of circumstances the plunger L is raised from its seat on B², because there is no pressure above the rubber diaphragm f, except that exercised by the tension of the diaphragm itself, the fluid in the valve-chamber B finding a free outlet through l r, valve D, and down into B² through n. On reversing the position of the walking-beam h i, by

transferring the electric current from m to m' , it will be observed that the channel d is opened while n is closed. The result is that the water in R now finds an outlet through d^2 , C , and d ,
 5 down into valve B of the branch pipe B' , which enables the pressure of the fluid under plunger K to raise it and open the inlet H , thus establishing communication between A' and B' ; but the channel n , now being closed, prevents escape of the water from under the plunger L , and the result is that the weight of the water in the upper part of chamber B above the diaphragm f will co-operate with the tension of said diaphragm to seat the plunger L
 15 upon the inlet to B^2 , so that communication between pipe B' and its branch B^2 is cut off.

In Fig. 2 I have shown a device for changing the current of electricity from one of the electro-magnets to the other automatically, thereby changing the position of the valves. Suppose that, as shown in the drawings, the electro-magnet m is active, the current passing through the two ends s t of its coil, under these circumstances one of the ends, s' , of the
 25 opposite electro-magnet, m' , being connected to a bracket, q , in which is mounted a set-screw, q' , and its other end, t' , being connected to the coil of a spring, v , as shown in the drawings, the current is of course broken, and the electro-magnet m' is inactive. The spring v is held at a short distance from the point of q' by a small strip of solder or other fusible or readily-melting metal, p , this device being arranged in any part of the dwelling where a
 35 fire may arise. In that event the heat melting the strip or retainer p enables spring v to fly back in contact with q' , thus completing the circuit and making the electro-magnet m' the active one. The batteries may of course be placed
 40 at any suitable point in the circuit independent of the location of this device, and by insulating (by a glass bead or small disk of hard rubber) the point of contact between p and v , and conducting the current through the coil s
 45 t by way of p , the magnet m will of course be rendered inactive simultaneously with the operation of m' . In this manner the pipes may

be so located and arranged as to open a stream of water at any desired point automatically in the event of fire.

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

1. The valve-chamber A , having the plunger K , constructed with the channel c , supplemental valve C , with its ducts d^2 d and plunger e , and means for operating said plunger e , in combination with the main A' and its branch B' , substantially as set forth.

2. The valve-chamber B , having the plunger L , constructed with the elastic diaphragm f and channel l , supplemental valve D , with its ducts r n and plunger o , and means for operating said plunger o , in combination with the pipe B' and its branch B^2 , substantially as
 65 set forth.

3. The combination of the valves A B , constructed as described, with the pipes A' , B' , and B^2 , and with the walking-beam h i , and means for operating said walking-beam in such
 70 a manner that when the valve A is closed B is open, and vice versa, substantially as and for the purpose herein shown and specified.

4. The combination of the electro-magnets m m' , walking-beam h i , piston-rods g g' g^2 , plungers e and o , valves C A and D B , having the plungers K and L , constructed and operating as described, and branched pipe A' B' B^2 , substantially as and for the purpose herein
 80 shown and set forth.

5. The combination, with the electro-magnets m m' , walking-beam h i , valves C A D B , and branched pipe A' B' B^2 , of the device p v q' q for changing automatically the electric current from one of the electro-magnets to the
 85 other, and thereby reversing the operation of the valves, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOH. ALOYS FRIED.

Witnesses:

Dr. RADERMACKER,
 D. SCHÄFER.