

No. 616,682.

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J. L. MOHUN & C. S. CLARK.
VALVE.

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No Model.)

Fig. 1

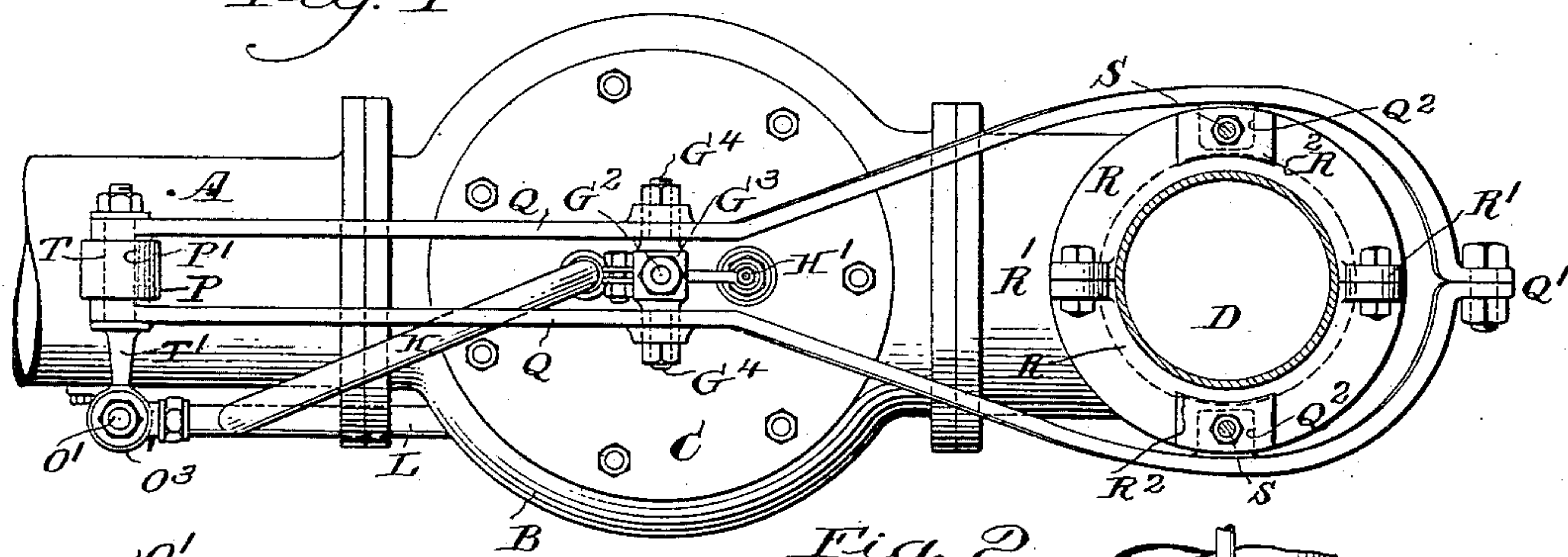


Fig. 2

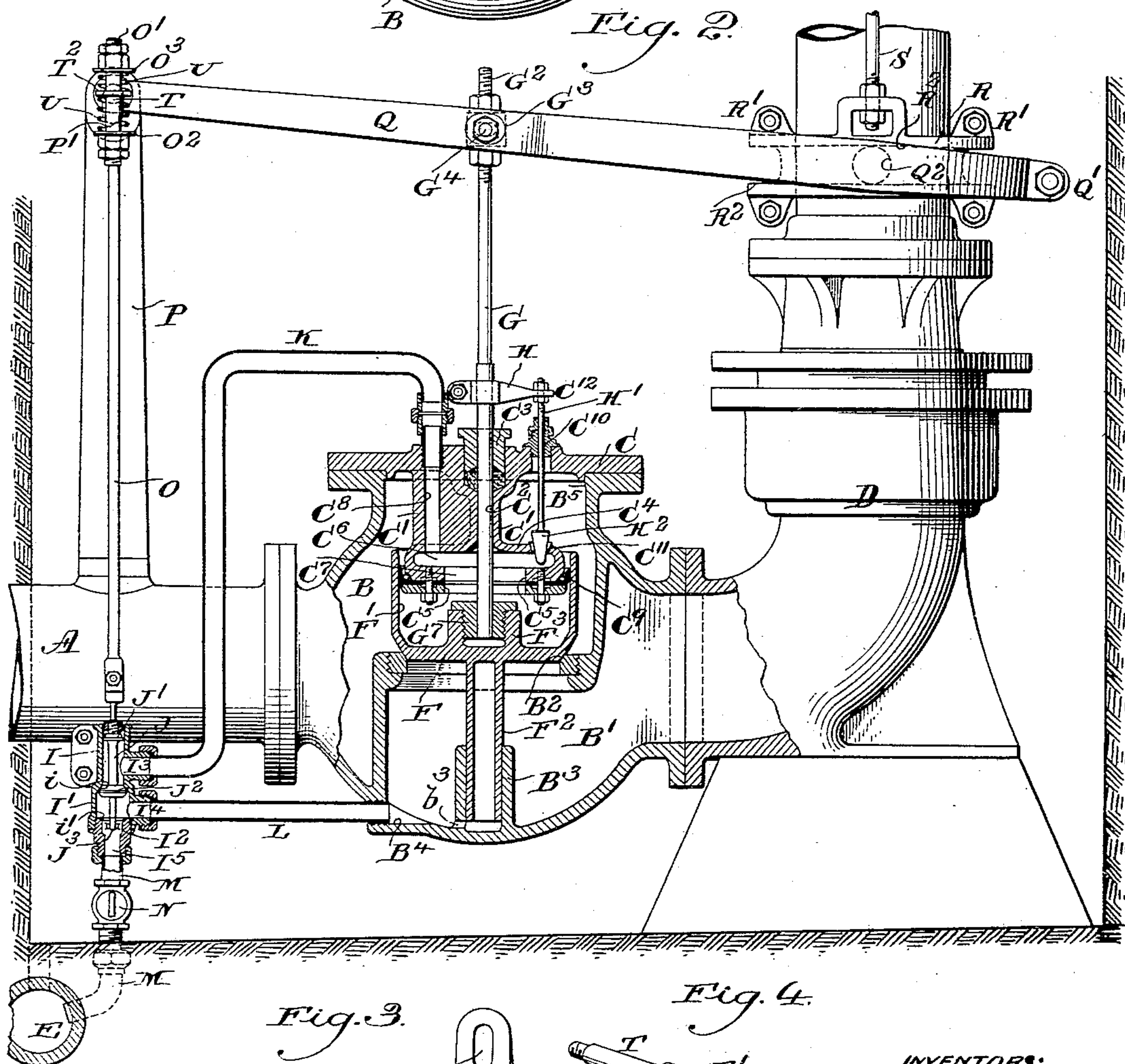


Fig. 3

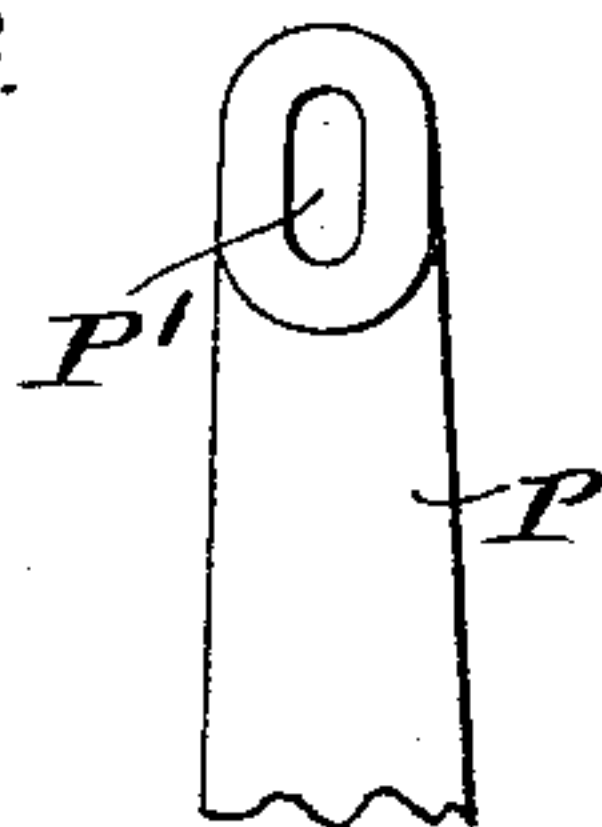
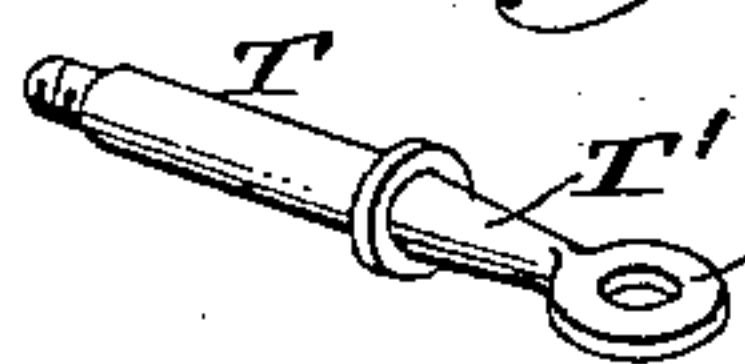


Fig. 4



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VALVE.

SPECIFICATION forming part of Letters Patent No. 616,682, dated December 27, 1898.

Application filed June 1, 1898. Serial No. 682,249. (No model.)

To all whom it may concern:

Be it known that we, JOHN L. MOHUN, residing in Altoona, in the county of Blair, and CHARLES S. CLARK, residing in Scottdale, in the county of Westmoreland, State of Pennsylvania, citizens of the United States of America, have invented a certain new and useful Improvement in Valves, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

Our invention relates to the construction of valves, and is especially, though not exclusively, adapted for use in connection with the main controlling-valve of stand-pipes such as are used for watering locomotives.

The object of our invention is to provide a valve which will be balanced so far as the water-pressure is concerned when opened and in which there will be an excess of water-pressure tending to keep it shut when closed.

Our invention further contemplates the prompt release of the excess of pressure tending to keep the valve closed when it is desired to open the valve, the provision of means adapted to check the motion of the valve in closing to a degree sufficient to prevent water-hammer, thus excluding all shock and the liability of bursting the water-mains and the drainage of the delivery side of the valve-casing when, as in case of cold weather, it is desirable that water should not stand in this portion of the apparatus or connected parts.

The nature of our improvements will be best understood as described in connection with the drawings in which they are illustrated, and in which—

Figure 1 is a plan view of a stand-pipe provided with our improved valve; and Fig. 2, a side elevation of the same, partly shown in section. Fig. 3 is a front view of the top of the standard P, and Fig. 4 a perspective view of the pin T and attached parts.

A indicates the main.

B and B' are the two divisional chambers of the main valve-casing and are connected by a valve-seat port B².

B³ indicates a guiding projection which opens at its lower part, as indicated at b³, into the delivery-chamber of the valve.

B⁴ indicates a port leading from the delivery-chamber of the valve, the purpose of which will be afterward described.

B⁵ indicates an opening in the tube of the valve-chamber by which the valve is inserted in the chamber B.

C indicates a cap-plate for closing the last-mentioned opening, and, as shown, this cap-plate is formed with a downwardly-extending web C', this web being formed with a perforation C², through which extends the valve-spindle G, C³ indicating a stuffing-box. At the lower end of the web C' is formed a stationary piston-head C⁴ which, as shown, is provided with an annular downwardly and inwardly extending flange C⁵, forming a chamber C⁶ in the piston-head, with a central opening C⁷.

C⁹ indicates a packing-ring which is secured, as shown, on the under side of the annular flange C⁵ of the piston-head.

C⁸ indicates a port leading from the chamber C⁶ in the piston-head through the web C' and the cap C, as indicated.

C¹⁰ indicates an opening formed in the cap C for the passage of a valve-spindle H', C¹² being the stuffing-box.

C¹¹ indicates a port formed through the piston-head C⁴, connecting the chamber C⁶ with the admission-chamber B of the valve-casing.

D indicates the stand-pipe, connected with the chamber B' of the valve-casing.

F indicates a valve for opening and closing the port B² of the valve-casing. As shown, it is formed with a cylindrical extension F', extending into the chamber B of the valve-casing and fitting around the piston-head C⁴, already described. The valve is formed with an internally-threaded boss F³ and a guide-rod F², which rod fits and moves in the hollow boss B³.

G is the valve-connecting rod, having at its lower end a threaded boss G⁷, which screws into the boss F³, the valve-rod being, as shown, threaded at its upper end G² and provided with a block G³, adjustable on its threaded end by means of nuts and provided with pivot-pins, as indicated by G⁴ G⁴.

H indicates an arm secured on the rod G, and from which depends a valve-rod H', working through the stuffing-box C¹², and having

at its lower end a needle-valve H^2 , which enters the port C^{11} and is so adjusted as to nearly close this port, as the valve F seats itself, the closing of the port being gradual, so that as the valve F approaches its seat the passage of fluid through the port C^{11} is gradually restricted.

On the scale of the drawings it is impracticable to illustrate the true clearance between the valve H^2 and port C^{11} , and, as shown, it is exaggerated.

I I' indicate a valve-casing, the part I , as shown, being of narrower diameter than the part I' .

i i' indicate valve-seats at the top and bottom of the portion I' of the casing.

I^2 indicates a guiding-spider, I^3 a port entering the portion I of the casing, and I^4 a port entering the portion I' of the casing.

I^5 is a port leading out of the portion I' of the casing below the valve-seat i' .

J is a rod connecting a piston J' , moving in the portion I' of the valve-casing, with the valve J^2 moving in the portion I' of the valve-casing and adapted to seat itself alternately on the seats i and i' .

J^3 indicates a guiding-spindle extending from the lower end of the valve J^2 through the spider I^2 .

K is a conduit connecting the port C^8 , leading from the cylinder F' through the piston C^4 with the port I^3 .

L is a conduit connecting the port B^4 with the port I^4 .

M is a conduit connecting the port I^5 with an outside exhaust-point, as indicated, a sewer E , N indicating a cock or valve for closing the conduit M .

O is a valve-spindle connected with the valve J^2 and provided at its upper end with threads, as indicated at O' , serving by means of nuts to hold in place spring-plates O^2 and O^3 .

P is a standard, as shown, mounted on the main A and having at its upper end a slotted fulcrum-head, (indicated at P' .)

Q is a lever which, as shown, is made up of two parts, which form a loop around the stand-pipe and are bolted together, as indicated at Q' , parts of the loop being, as shown, provided with inwardly-extending pins Q^2 Q^3 , which lie in grooves (indicated at R^2) and formed in segments R R , bolted together, as indicated at R' R' , and forming a ring around the stand-pipe, S S indicating the rods by which this ring is raised and lowered and by which the looped end of the lever is raised and lowered with the ring. The lever is, as shown, pivoted on the pins G^4 , attached to the block G^3 on the spindle G , and its other end has secured to it a pin T , which passes through the slotted fulcrum-head P' and is formed with a laterally-extending fulcrum-arm T' , having at its end a perforated disk T^2 , through which the upper end of the valve-rod O passes and against which rest springs U U , said springs being supported on the plates O^2 and O^3 .

Before going into the description of the operation of this device we desire to call attention to the obvious fact that of the operative couple consisting of the cylinder F' and piston-head C^4 it is only necessary that one member should be movable and that the valve F should be attached to the movable member. As shown, the movable member consists of the cylinder F' ; but we do not wish to be understood as limiting ourselves to this specific construction and to the exclusion of the perfectly familiar equivalent. As shown in Fig. 2, the valve F is closed and is held in a closed position by whatever head of water exists on the admission side of the valve-casing, the water finding its way through the port C^{11} into the cylinder F' , and the valve J^2 being seated on its upper seat i prevents the escape of water from the cylinder through the conduit K . It will also be seen that, assuming the plug-cock N to be opened, the delivery side of the valve-casing is in free communication through the conduit L , chamber I' , and port I^5 with a waste-pipe and sewer E . It being desired to open the valve the looped end of the lever Q is raised and the lever first turns on the pins G^4 as a fulcrum, pressing down the pin T , and, through the disk T^2 , pressing down the valve-rod O and the valve J^2 until said valve seats itself on the seat i' , and this movement of the valve connects the inside of the cylinder F' through the port C^8 , conduit K , port I^3 , chambers I and I' , port I^4 , and conduit L with the delivery side of the valve-casing. The further upward movement of the looped end of the lever Q results in shifting the fulcrum-point of the lever to the pin T , which has found a bearing in the lower portion of the slotted block P' , and consequently the lever lifting the rod G and through the valve F and cylinder F' the water in the cylinder, together with whatever water may enter through the port C^{11} , passing freely into the delivery side of the valve-casing, as already described, and the pressure on the under side of the valve when opened being obviously sufficient or slightly more than necessary to balance the pressure on its upper side. Again, when it is desired to close the valve the looped end of the lever Q is pushed downward and as before the lever first turns as a fulcrum on the pins G^4 with the result of raising the rod O and valve J^2 to the position shown in Fig. 2, cutting off all exhaust of water through the port C^8 and conduit K . The pin T of the lever Q then finding a fulcrum on the upper end of the slotted block T' , the lever depresses the rod G and the valve F , water flowing freely through the port C^{11} into the cylinder F' as the valve moves downward, until it has nearly reached its seat, at which time the needle-valve H^2 gradually contracts the port C^{11} and checks the downward motion of the valve, which for this reason seats itself gradually, thus preventing any water-hammer.

Having now described our invention, what

we claim as new, and desire to secure by Letters Patent, is—

1. In combination with a valve-casing, as B B', a cylinder and piston couple, a valve, as F, attached to the movable member of said couple and adapted to open and close the port through the valve-casing, a port, as C⁸, leading from the cylinder aforesaid and serving for an exhaust-port for the cylinder, a valve, as J², controlling said port, a port, as C¹¹, connecting the cylinder with the admission side of the valve-casing, and means for checking the inflow of fluid through port C¹¹ actuated by the movement of the valve, or a connected part, in moving to its seat.

2. In combination with a valve-casing, as B B', a cylinder and piston couple, a valve, as F, attached to the movable member of said couple and adapted to open and close the port through the valve-casing, a port, as C⁸, leading from the cylinder aforesaid and serving for an exhaust-port for the cylinder, a valve, as J², controlling said port, a port, as C¹¹, connecting the cylinder with the admission side of the valve-casing, and means for actuating valves F and J² arranged to open and close said valves successively and to act first on valve J² as described.

3. In combination with a valve-casing, as B B', a cylinder and piston couple, a valve, as F, attached to the movable member of said couple and adapted to open and close the port through the valve-casing, a port, as C⁸, leading from the cylinder aforesaid and serving for an exhaust-port for the cylinder, a valve, as J², controlling said port, a port, as C¹¹, connecting the cylinder with the admission side of the valve-casing, valve-rods G and O connected to valves F and J², and a valve-actuating lever Q pivotally connected to both of said valve-rods and arranged as described to open and close said valves successively.

4. In combination with a valve-casing, as B B', a cylinder and piston couple, a valve, as F, attached to the movable member of said couple and adapted to open and close the port through the valve-casing, a port, as C⁸, leading from the cylinder aforesaid and serv-

ing for an exhaust-port for the cylinder, a valve, as J² controlling said port, a port, as C¹¹, connecting the cylinder with the admission side of the valve-casing, and valve-rods G and O connected to valves F and J², a valve-actuating lever Q connected to both of said valve-rods and a slotted fulcrum-bearing P' for the end of the lever Q connected to rod O all substantially as and for the purpose specified.

5. In combination with a valve-casing, as B B', a cylinder and piston couple, a valve, as F, attached to the movable member of said couple and adapted to open and close the port through the valve-casing, a port, as C⁸, leading from the cylinder aforesaid and serving for an exhaust-port for the cylinder, a valve, as J², controlling said port, a port, as C¹¹, connecting the cylinder with the admission side of the valve-casing, and a needle-valve, as H², connected and moving with valve F and arranged to restrict the opening through port C¹¹ as valve F approaches its seat.

6. In combination with a valve-casing, as B B', a cylinder and piston couple, a valve, as F, attached to the movable member of said couple and adapted to open and close the port through the valve-casing, a port, as C⁸, leading from the cylinder aforesaid and serving for an exhaust-port for the cylinder, a valve-casing, as I I', connections, as K and L, leading respectively from said casing from port C⁸ and to the delivery side of the valve-casing, a connection as M, leading from the casing I I' to an exterior exhaust, a valve, as J², working in the casing I I', as specified, and so as to alternately connect the conduit L with conduit K and conduit M a port C¹¹ connecting the cylinder with the admission-seat of the valve-casing B B', means, as needle-valve H², moving with the valve F and acting to restrict the port C¹¹ as the valve approaches its seat, and means as specified for actuating the valves F and J² successively.

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Witnesses:

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M. J. DAVIS.