No. 610.479. Patented Sept. 6, 1898.

J. EWART.

VALVE CHECK.

(Application filed Feb. 10, 1898.)

(No Model.) 2 Sheets—Sheet 1.

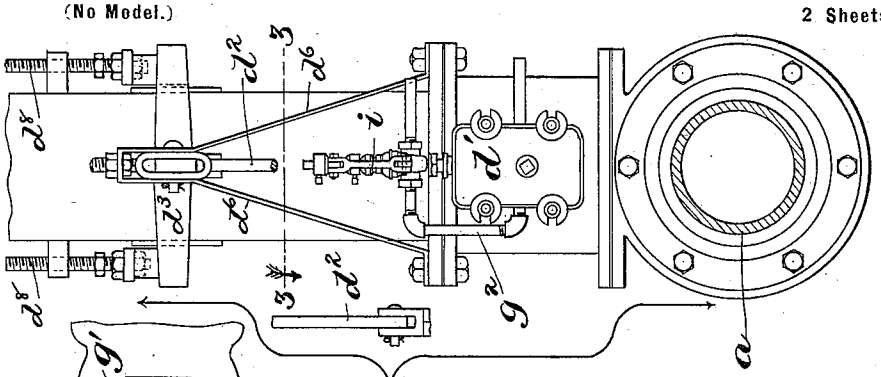

FIG. 2.

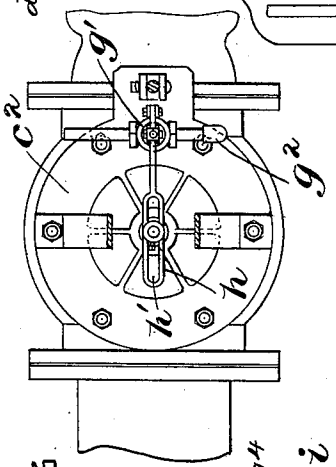

FIG. 3

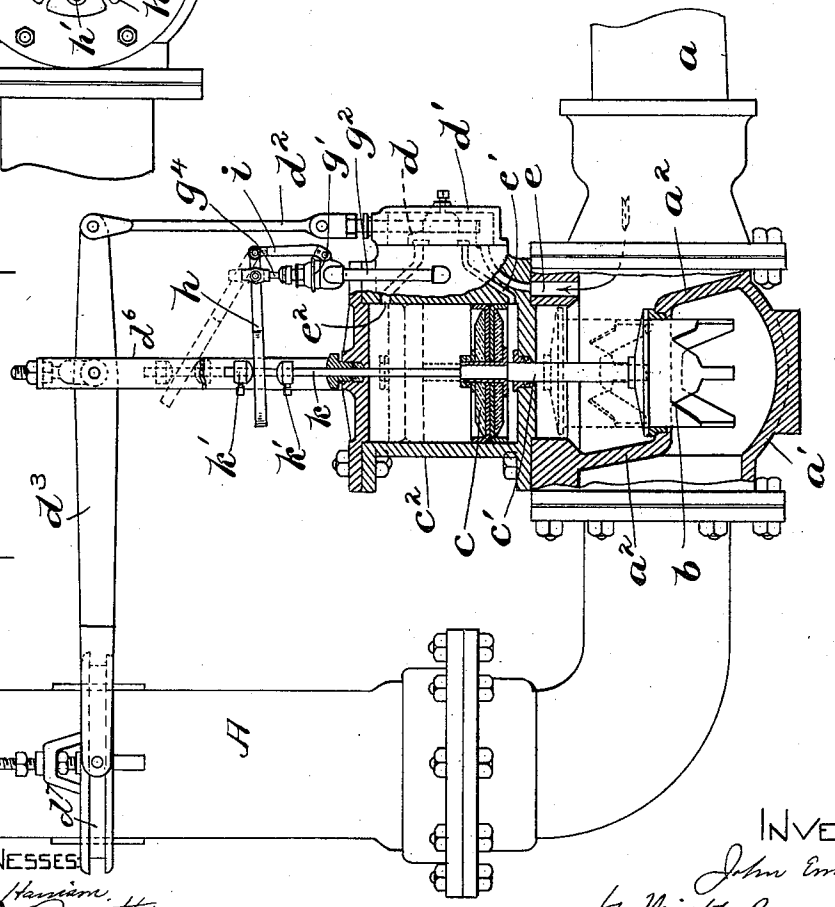

FIG. 1.

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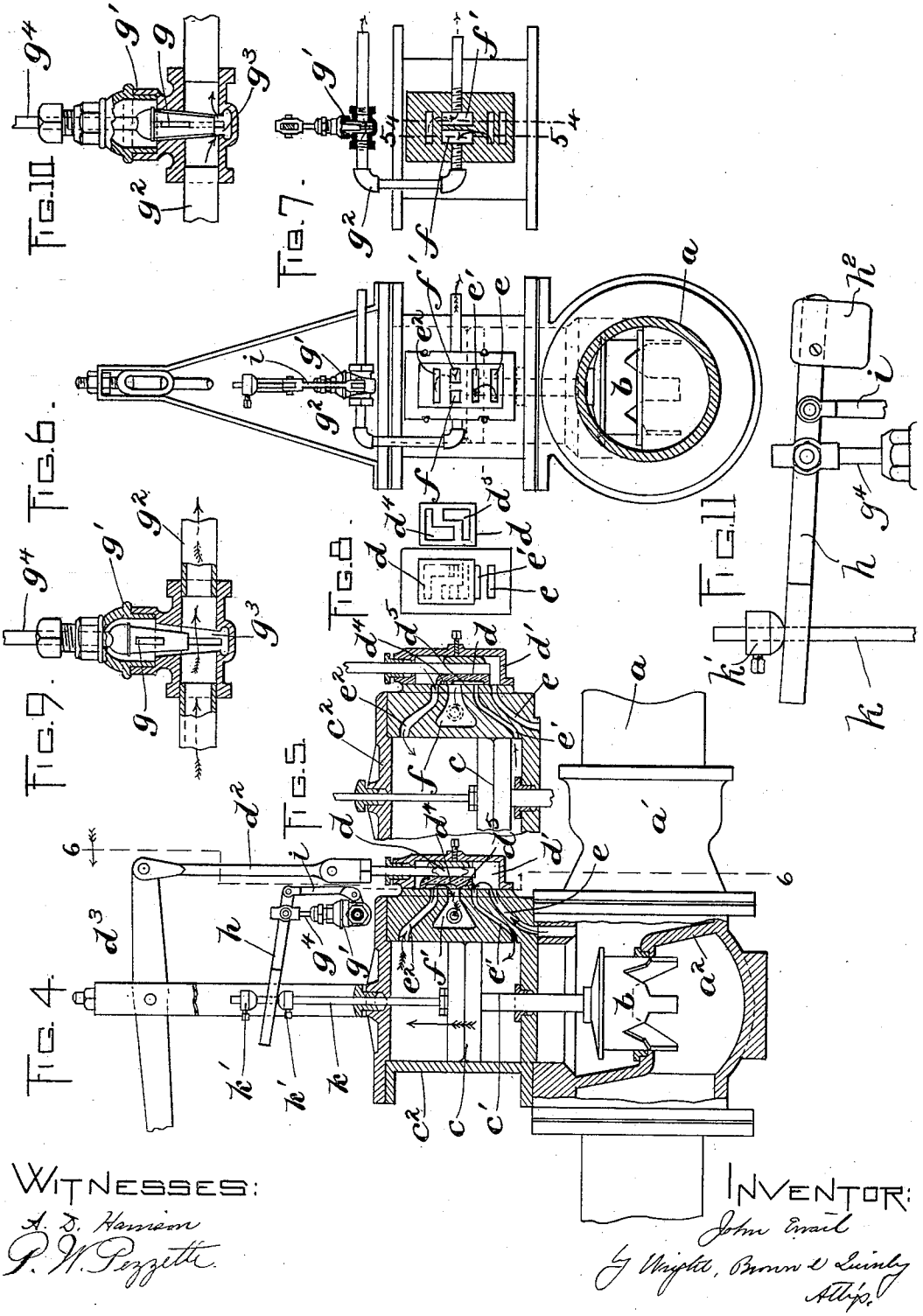

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UNITED STATES PATENT OFFICE.

JOHN EWART, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO THE SHEFFIELD CAR COMPANY, OF THREE RIVERS, MICHIGAN.

VALVE-CHECK.

SPECIFICATION forming part of Letters Patent No. 610,479, dated September 6, 1898.

Application filed February 10, 1898. Serial No. 669,752. (No model.)

To all whom it may concern:

Be it known that I, JOHN EWART, of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Valve-Checks, of which the following is a specification.

This invention relates to hydraulic and other valve mechanisms in which the liquid-pressure in a pipe or main is utilized to operate a main valve located in the pipe by combining the valve with a piston, a pressure-cylinder, and a suitable auxiliary valve mechanism for regulating the supply and exhaust of said cylinder.

The invention has for its object to furnish means for securing a gradual closing of the main valve in a mechanism of the described character; and to this end it consists in a device for crowding or retarding the exhaust from the operating-cylinder, such device being constructed and arranged in a novel manner, which I shall now proceed to describe, and then point out in the claims hereto appended.

Of the accompanying drawings, forming a part of this application and illustrating the application of my improvements to the main valve of a water-supply stand-pipe for railroad use, Figure 1 is a view, partly in section and partly in elevation, of a portion of a stand-pipe and valve provided with my improved retarding mechanism. Fig. 2 is an end view looking from the right in Fig. 1. Fig. 3 is a plan and section on the line 3 3 of Fig. 2. Fig. 4 is a section similar to Fig. 1, showing a different position of the parts. Fig. 5 is a detail section showing a position of the piston and valve of the hydraulic cylinder. Fig. 6 is a view showing the ports of the hydraulic cylinder and other parts, being a section on the line 6 6 of Fig. 4. Fig. 7 is a detail sectional view illustrating the exhaust from the hydraulic cylinder. Fig. 8 is a detail view showing a position of the hydraulic-cylinder valve on its seat and showing also a reverse view of the valve. Figs. 9 and 10 are sectional views on a larger scale than the foregoing, showing different positions of the gate-valve in the retarding mechanism. Fig. 11 is a detail view of a modification referred to hereinafter.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, a designates the supply-pipe of a stand-pipe A, a' designates the main-valve casing, and b designates the main valve for opening and closing the passage through the casing, said valve seating in a partition a^2, extending across the water-passage.

c' is a rod or spindle connecting the valve b with a piston c, located within a hydraulic cylinder c^2 and having a larger cross-sectional area than the valve b. At one side of said cylinder is a valve-chest d', containing a slide-valve d. The valve is connected by a rod d^2 to one end of a lever d^3, fulcrumed in a standard d^6. The other end of said lever is forked to pass on either side of the pipe A, engaging a grooved ring d^7, which slides up and down on said pipe and is supported by two vertical rods d^8 d^8. Longitudinal motion may be imparted to said rods by any suitable operating mechanism, so as to operate the slide-valve d. Such mechanism is familiar on railroad stand-pipes, and, forming no part of my present invention, is accordingly not illustrated in the drawings. A port e connects the interior of the valve-chest d' with the upper part of the main-valve chamber, which latter is open to the pipe a, and ports e' and e^2, opening below and above the piston c, connect the interior of the valve-chest d' with the interior of the hydraulic cylinder c^2.

f and f' are two exhaust-ports.

The valve d has three positions. In its intermediate or central position (shown in dotted lines in Fig. 1) the valve covers the openings of the two ports e' and e^2 and the exhaust-ports f f'. When the valve is in this position, no water can pass from the valve-chest d' into the hydraulic cylinder.

When the valve is in a raised position, as shown in Fig. 4, the ports e e' are uncovered and communication is established between the port e^2 and the exhaust-port f' by way of a channel d^4 in the valve-face. Water is thus admitted from the pipe a into the hydraulic cylinder c^2, below the piston c, thereby raising said piston and the main valve b. The water which has remained in the upper portion of the cylinder after a previous depres-

sion of the piston is forced out through the exhaust-port f'.

The third position of the valve d is shown in Fig. 5. In this position the ports e and e^2 are uncovered and communication is established between the pipe a and the cylinder c^2, above the piston c, the water passing around the valve d. An exhaust is also established from the lower part of the cylinder through the port e', a channel d^5 in the valve-face, and the exhaust-port f. The effect of placing the valve d in this position is to admit water from the main pressure-pipe a to the upper part of the hydraulic cylinder c^2, above the piston c, thereby depressing said piston and the main valve b and finally closing the latter against its seat. On its downward stroke the piston forces the water which has filled the lower part of the cylinder out through the exhaust-port f.

In valve-operating mechanisms of this character it is common to obstruct the exhaust from the hydraulic cylinder during the closing movement of the main valve in order to prevent the pressure of the liquid in the pressure-pipe from closing said valve with too great force against its seat. Such obstruction usually consists merely in furnishing a contracted outlet for the liquid, which outlet does not vary during the stroke as to the amount of liquid which passes in a given time. The result of this is that the piston moves just as slowly during the first part of its closing stroke as it does during the last part when the valve approaches its seat, and the valve accordingly takes a long time in closing.

By means of my invention I furnish a device whereby a free exhaust is provided for the hydraulic cylinder during the first part of the closing stroke of the main valve; but as the valve approaches its seat the exhaust-passage becomes more and more obstructed, until finally a very narrow outlet or none at all is left for the water just as the valve becomes seated. This is accomplished in the following manner: g' is a valve-casing fitted to a pipe g^2, which leads from the exhaust-port f and containing a gate or valve g, which seats in a tapered socket g^3 inside the casing. The valve g is provided with a spindle g^4, extending through the top of the casing and packed in a suitable manner. The said spindle is pivoted to a lever h, which is supported at one end by a link i, attached to the valve-casing, and is provided at the other end with an elongated slot h', Fig. 3. k is a rod forming a continuation of the piston-rod c' and passing through the top of the cylinder c^2. The upper portion of said rod passes through the slot h' in the lever h and is provided with adjustable collars or blocks k' k' on either side of the lever h. When the piston c is forced to the top of the cylinder c^2, the lever h is raised to the position shown in dotted lines in Fig. 1 and the valve g is opened wide, as shown in Fig. 9. Then when the valve d is reversed and the piston c begins to descend a free exhaust is at first provided for the water below the piston and the latter descends quite rapidly; but as it descends the lever h is pulled downwardly and the exhaust becomes more and more obstructed, as indicated by the position of the valve g in Fig. 10. The result is that the main valve b closes against its seat without any shock and there is no "hammering" of the water.

Fig. 11 shows a modification in which the lever h is provided with a weight h^2 and a single collar k' is affixed to the rod k above the lever. On the upward stroke of the piston the weight moves the lever so as to open the valve g.

Having thus explained the nature of my invention and described a way of constructing and using the same, although without having attempted to set forth all the forms in which it may be embodied or all the modes of its use, I declare that what I claim is—

1. In a valve mechanism, the combination with a main valve and a pressure-cylinder and piston for opening and closing said valve, of an exhaust-passage leading from the cylinder, and a valve in said passage controlled by the movements of the main valve and piston, and adapted to obstruct the exhaust-passage during the closing movement of the main valve.

2. In a valve mechanism, the combination with a main valve and a pressure-cylinder and piston for opening and closing said valve, of an exhaust-passage leading from the cylinder, a sliding gate-valve arranged in said passage, and connections between said valve and the operating-piston, whereby the movement of said piston in closing the main valve causes a gradual closing of the gate-valve, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 7th day of February, A. D. 1898.

JOHN EWART.

Witnesses:
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PETER W. PEZZETTI.