

(No Model)

W. CRAIG.
MEANS FOR OPERATING VALVES.

No. 585,377.

Patented June 29, 1897.

Fig. 1.

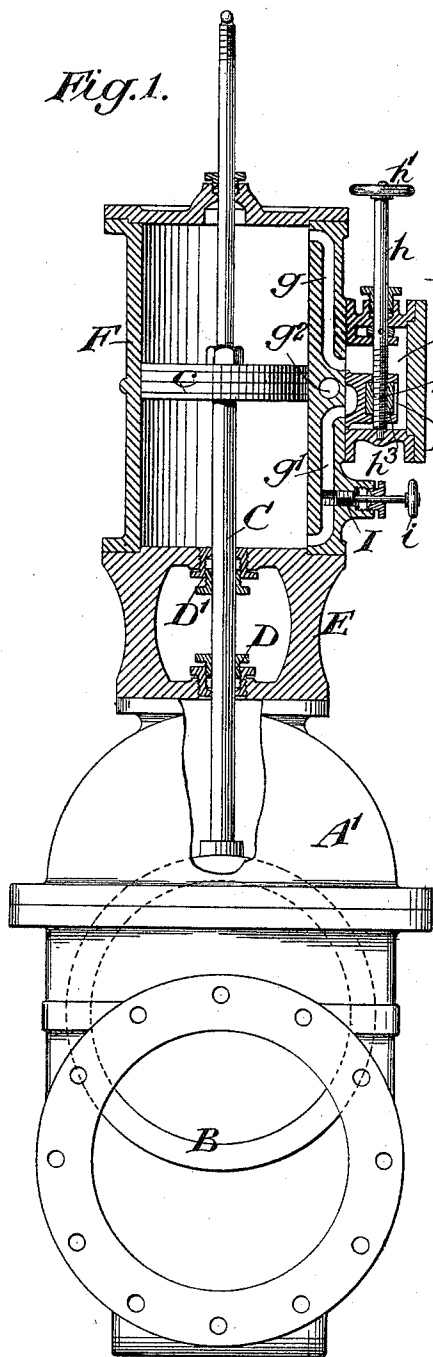
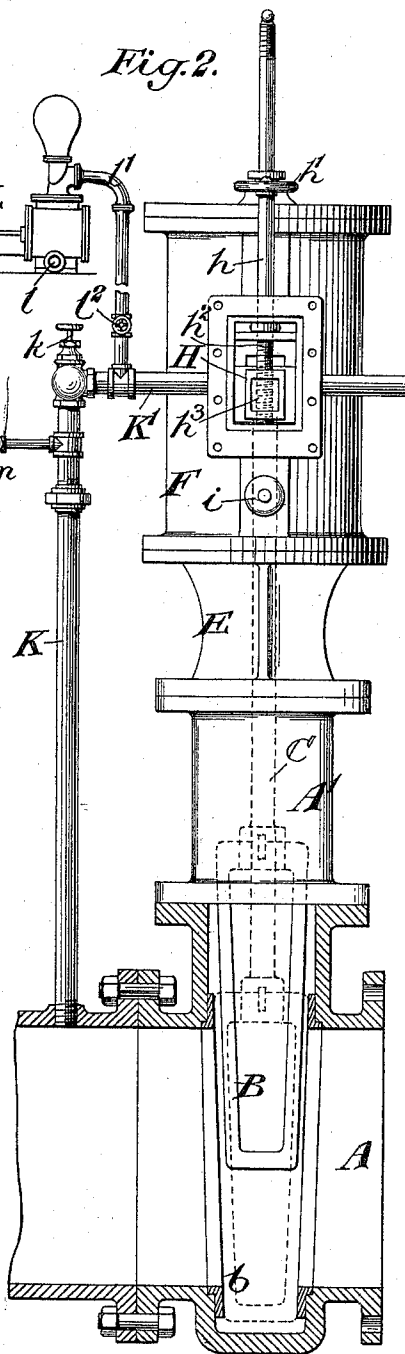


Fig. 2.



Witnesses:-

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MEANS FOR OPERATING VALVES.

SPECIFICATION forming part of Letters Patent No. 585,377, dated June 29, 1897.

Application filed March 10, 1896. Serial No. 582,565. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CRAIG, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Means for Operating Valves, of which the following is a specification.

My invention relates to an improvement in means for operating valves, and more particularly to means for operating the large valves or gates used in connection with waterworks and power supplies and commonly known as "gate-valves." The force required to open these large gate-valves under the high pressure upon one side has been a matter which has heretofore received attention and a relief has been provided by what was termed "by-pass" in order to save time and labor in operating them.

My present invention contemplates the utilization of the fluid under head or pressure, which the large valve is intended to cut off or release, as an operating force in opening the valve.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view in end elevation of the coupling-piece in which the valve is seated, showing the cylinder in which the valve-operating piston works and the piston-operating valve-chamber in longitudinal section; and Fig. 2 is a view in longitudinal section of the coupling in which the valve to be operated is located, showing the cylinder and the piston-operating valve-chamber in elevation with the top of the valve-chamber removed, and also showing, in connection with the pipe for conducting the fluid from the high-pressure side of the valve to be operated to the piston-operating valve-chamber, a pump.

The coupling in which the gate-valve is located is denoted by A, the gate-valve by B, and the valve-seat by b. On the coupling A there is located a cap-piece A' for the reception of the valve B when it is lifted from the coupling A to open the interior of the latter for the passage of the fluid, and from within the cap-piece A' a valve-operating rod C extends upwardly through suitable stuffing-boxes D D' in a pedestal E, which at the same time may form, as in the present instance, the

lower cylinder-head of a cylinder F, in which a piston c, connected to the rod C, is fitted to reciprocate. The cylinder F has in connection therewith a valve-chamber G, which communicates, by ports g g', with the interior of the cylinder F at its opposite ends and with an exhaust-port g².

A slide-valve H is fitted to reciprocate within the valve-chamber G and to alternately open the ports g g', the one to the interior of the valve-chamber G and the other to the exhaust-port g². The valve H is operated by means of a rotary shaft h, which extends through the end of the valve-chamber G, and is provided with a hand-wheel h' for turning it, and within the valve-chamber is provided with a screw-threaded portion h², which engages a nut h³, carried by the valve, so that the valve H will be slid toward one or the other end of the chamber G, according as the hand-wheel h' is turned in the one or the other direction.

I further provide means for closing the port g' at pleasure—in the present instance by means of a screw-plug I, provided with a hand-valve i for operating it and adapted to be screwed from the outer wall of the port g' across the port to completely obstruct it.

As thus far described the operation is as follows: When it is desired to open the valve-gate, the operator, by turning the hand-wheel h' in the proper direction, may slide the valve H into position to close the port g to the interior of the valve-chamber G and open it to the exhaust g² and at the same time open the port g' to the interior of the valve-chamber G. The fluid from the high-pressure side of the valve B will then be permitted to flow through the pipe K, the cock k in said pipe being open, into the valve-chamber G, with which the pipe K communicates by a branch K', and thence through the port g' beneath the piston c, tending to lift it, and hence the gate B. After the valve B is lifted the desired distance the further inflow of the fluid from the conduit on the high-pressure side of the valve B may be cut off either by closing the cock k or by closing the port g' by the plug I. The closing of the port g' by the plug I will hold the fluid, if it be a liquid—such, for example, as water—within the cylinder F beneath the piston c to retain the gate B open,

and when it is desired to close the gate, if its own weight is not sufficient to close it, the valve H may be turned in the position shown in Fig. 1, permitting the fluid through the pipes K K', the cock *k* being open, to exert its pressure above the piston *c*, and in order that the valve may not close with a sharp injurious impact its closing movement may be regulated with the greatest precision by gradually opening the port *g'* by the turning of the plug I, permitting the liquid from beneath the piston *c* to escape as gradually as necessary.

I find it generally preferable to utilize a liquid for the operation of the piston *c* in the cylinder F whether the conduit, which is opened and closed by the valve B, is for conducting a liquid or a gas, and to this end I find it advantageous to have connected with the transmitting-pipes K K' a pump, (denoted conventionally at L,) which when the gated conduit contains steam or gas under pressure may be operated by the said steam or gas by closing the cock *k* and opening the cock *m* in the branch pipe M, leading from the pipe K to the pump, the pump being arranged to draw water or other liquid from a suitable source into the pipe *l* and discharge it through the pipe *l'* into the pipe K' by opening the cock *l'*.

Thus whether the conduit in which the gate-valve B is located is employed to transmit a liquid or a gas the piston *c* may be in either event operated by a liquid, in the one instance by transmitting the liquid through the pipes K K' directly to the cylinder F and in the other case by utilizing the pressure of the fluid to operate a pump and force the liquid into the cylinder F.

It may in some instances be found satisfactory to use the gas direct from the gated conduit to the cylinder F to operate the piston *c* in the same manner as that described with respect to conducting the liquid directly to the cylinder, and when so desired the mech-

anism which I have described is fitted for the purpose.

By the above construction and arrangement of parts the heaviest gate-valve may be manipulated with perfect ease by the outlay of just strength enough to turn the hand-wheel *h'*, an operation which requires an inconsiderable amount of strength, and the closing of the gate may be regulated with perfect ease by manipulating the turn-plug I.

What I claim is—

1. The combination with a conduit for the transmission of a fluid under head or pressure, and a valve for opening and closing said conduit, of a cylinder, a piston within the cylinder and connected with the said valve, a valve-chamber and ports for transmitting a fluid to the opposite sides of the piston, a valve within the said chamber, a valve-operating rod extending without the chamber and provided with a screw-thread within the chamber, a traveling nut connecting the screw-threaded portion of said rod with the valve and means for transmitting liquid from the said conduit to the said valve-chamber, substantially as set forth.

2. The combination with the conduit for transmitting a fluid under head or pressure and a valve for opening and closing said conduit, of a cylinder, a piston within the cylinder and connected with said valve, a pipe for transmitting fluid from the conduit to the cylinder containing the piston, a pump having its feed and discharge pipes connected with said fluid-transmitting pipe and means for closing the said fluid-transmitting pipe intermediate of its connections with the pump for utilizing the pressure of the fluid in the conduit indirectly to operate the piston in the cylinder, substantially as set forth.

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Witnesses:

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