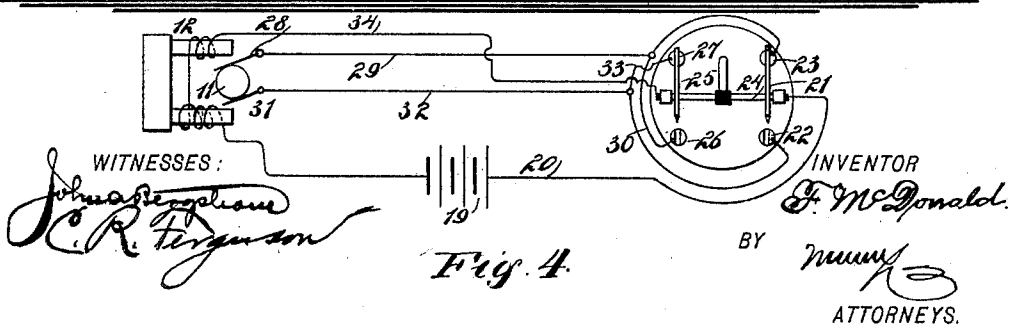
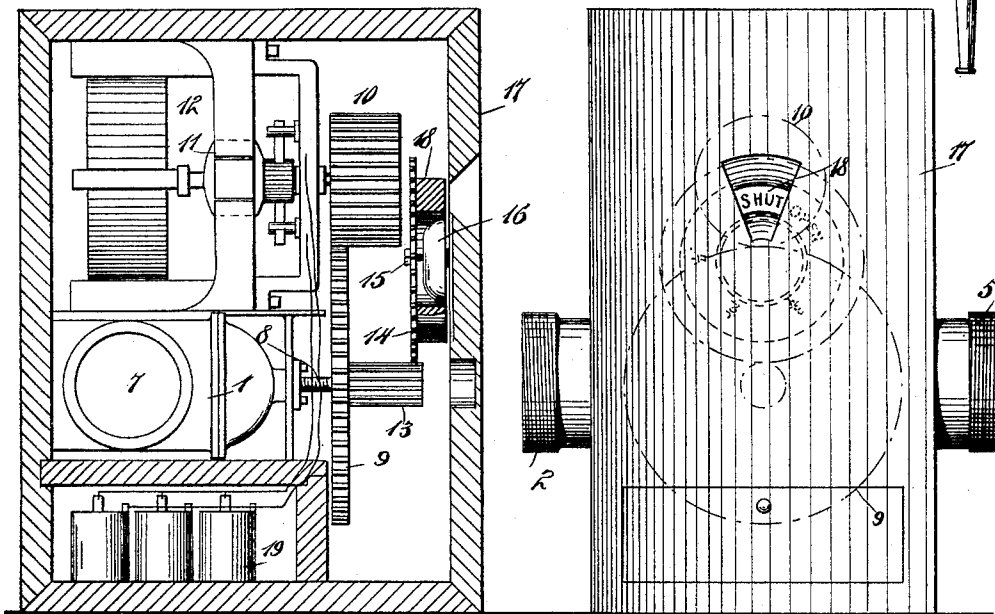
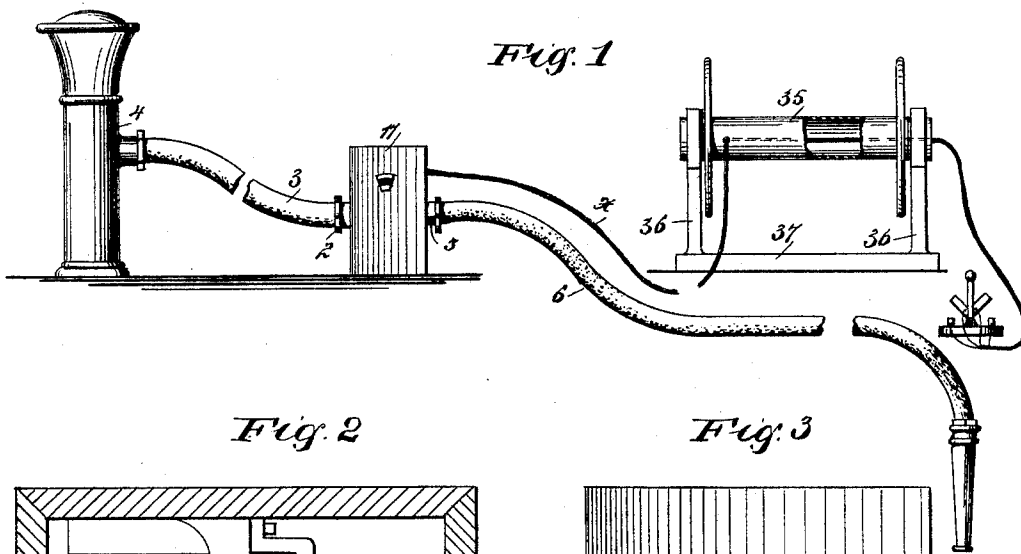


(No Model.)

F. McDONALD.
ELECTRICALLY OPERATED VALVE.

No. 586,861.

Patented July 20, 1897.



UNITED STATES PATENT OFFICE.

FRANK McDONALD, OF PORTLAND, MAINE.

ELECTRICALLY-OPERATED VALVE.

SPECIFICATION forming part of Letters Patent No. 586,861, dated July 20, 1897.

Application filed April 22, 1897. Serial No. 633,364. (No model.)

To all whom it may concern:

Be it known that I, FRANK McDONALD, of Portland, in the county of Cumberland and State of Maine, have invented a new and Improved Electrically-Operated Valve, of which the following is a full, clear, and exact description.

This invention relates more particularly to means for electrically operating a valve for controlling the flow of water through a fire-extinguishing apparatus; and the object is to provide a simple means of this character whereby the flow of water through an apparatus or hose will be under the complete control of a man holding and directing the nozzle, thus avoiding the necessity of shouting orders, as is ordinarily done, to the engineer or other man in charge at the hydrant end of the hose, which takes considerable time and often proves disastrous by flooding a building after the fire is extinguished and before the order to shut off can be heard and executed.

I will describe my invention and then point out the novel features in the appended claims.

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

Figure 1 is a side elevation of a valve-operating means embodying my invention and showing the same in connection with a hydrant and a fire-hose. Fig. 2 is an elevation showing the valve and a motor for operating the same, the said parts being placed in a casing shown in section. Fig. 3 is a side elevation of the casing, and Fig. 4 is a diagrammatic view of the electric circuits.

Referring to the drawings, 1 designates a valve-casing having an inlet 2, adapted for connection by means of a short pipe 3 with a hydrant 4 and also having an outlet 5, adapted for connection with a fire-hose 6. Arranged within the valve-casing is a gate-valve 7, having a screw-threaded stem 8 extended through a tapped hole in the pocket of the valve-casing. This stem 8 of course will have a rotary connection with the gate-valve 7.

Mounted on the stem 8 is a gear-wheel 9, meshing with a gear-wheel 10 on the shaft of the armature 11 of an electric motor 12.

It will be noted that the gear-wheel 10 is of smaller diameter than the gear-wheel 9 and

that said gear-wheel 10 is considerably wider than the gear-wheel 9, so that the gear-wheel 9 may move across the gear 10 during the longitudinal movement of the stem 8 without disengaging said gears. Also secured to the stem 8 is a broad pinion 13, meshing with a gear-wheel 14, rigidly mounted on a shaft 15, mounted to rotate in a bearing through a bell or gong 16, secured to the inner side of the casing 17, which contains all the parts heretofore described. The shaft 15 will operate a striker within the bell in the ordinary manner as the gear-wheel 14 is rotated.

Mounted on the gear-wheel 14 is a ring 18, which of course surrounds the bell 16, and on the face of this ring 18 are marks to indicate when the valve is wholly closed or wholly open or at any degree of opening between the same—that is, the face of the ring 18 has marked upon it the word "Shut," the word "Open," and the fractional indications " $\frac{1}{4}$," " $\frac{1}{2}$," and " $\frac{3}{4}$." The pinion 13 will of course be sufficiently broad to allow it to move along the gear 14 as the stem 8 moves longitudinally. The indicating-marks upon the ring 18 can be seen through a sight-opening in a wall of the casing.

I will now describe the electrical connections for operating or controlling the motor from a distance—say, for instance, by a fireman holding and directing the nozzle of the hose 6.

Arranged within the casing 17 is a source of electricity, here shown as a battery 19, comprising a number of cells. From one pole of this battery a wire 20 leads to a connection with a double-knife-edged switch-arm 21, adapted to make engagement with the contact-fingers 22 or the contact-fingers 23. This double-knife-edged switch-arm 21 is mounted on a rocking shaft 24, to the other end of which is attached a similar double-knife-edged switch 25, adapted to make connection with either one of the contact-fingers 26 or 27. From the brush 28 of the motor 12 a wire 29 extends to the contact-fingers 23, and a shunt 30 from said wire 29 extends to the contact-fingers 26. From the other brush 31 of the motor a wire 32 extends to a connection with the contact-fingers 22, and a shunt 33 from said wire 32 leads to the contact-fingers 27. From the switch-arm 25 a

wire 34 leads through the field of the motor 12 to the opposite pole of the battery 19. These several wires will preferably be arranged in cable form and one insulated from the other. This cable (indicated at *x* in Fig. 1) is designed when not in use to be wound upon a reel 35, having a hollow shaft, and the said shaft has bearings in uprights 36, extended from a base-plate 37.

As before stated, the cable when not in use will be wound upon the reel 35, so that the same, with the valve and valve-operating motor, may be carried upon a hose-carriage or other vehicle. The cable will extend through a hole in the wall of the reel-shaft, and may, if desired, to provide for a greater length be coiled or packed within the tubular shaft of the reel. The base of the switch will preferably be so formed as to fit into the end of the tubular shaft of the reel for convenience in transportation.

In operation the reel and valve with its controlling parts will be removed from the hose-carriage or other vehicle and placed in a suitable position near a hydrant. The valve-casing will be connected with the hydrant by means of the short pipe 3, and the valve will also be connected with the hose 6. Then by unwinding the cable the switch may be carried to a point accessible to the fireman operating the nozzle of the hose.

The valve in Fig. 2 is shown in its closed position. Assuming that it is desired to turn on the water, the man operating the switch will shift the switch-arms 21 and 25 into engagement with the contact-fingers 23 and 27. Then the current will be from the battery through the wire 20, the switch-arm 21 to the contact-fingers 23, the wire 29, the brushes 28 and 31, thence through the wire 32 and the shunt 33 to the contact-fingers 27, the switch 25, the wire 34, and through the field of the motor back to the battery. The degree of the opening of the valve will of course depend upon the length of time that the switches are held in engagement with the contact-fingers. Upon releasing the switch the switch-arms will be moved out of contact with the contact-fingers by a suitable spring.

When it is desired to more or less or entirely close the valve, the knife-edged switches will be shifted into engagement with the contact-fingers 22 and 26. Then the current will be from the battery through the wire 20, the switch 21, the contact-fingers 22, the wire 32, the brushes 31 and 28, thence through the wire 29 to the contact-fingers 26, the switch 25, the wire 34, and through the field of the motor to the other pole of the battery. This of course will reverse the rotation of the motor and cause the gate-valve 7 to be moved in its closing direction.

When the device is used in connection with a pumping-engine, the indicator 18 will advise the engineer as to the situation of the

valve, whether it be wholly closed, wholly open, or at any intermediate point, and therefore he can govern his pumping power accordingly by lessening or increasing the speed, and these changes will be audibly given to the engineer by means of the striker on the shaft 15 striking against the bell or gong 16. Of course where several hose are used in connection with one engine a governing means must be employed for each hose.

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

1. A mechanism for controlling the flow of water through a fire-hose, comprising a valve, a source of electricity, a motor in said source of electricity, a reversing-switch in said source of electricity, a broad gear-wheel on the armature-shaft of the motor, and a gear-wheel on a longitudinally-movable screw-threaded stem of the valve and engaging with the broad gear-wheel, substantially as specified.

2. A mechanism for controlling the flow of water through a fire-hose, comprising a valve, a source of electricity, a motor operated from said source of electricity, a reversing-switch for the motor, a broad gear-wheel on the armature-shaft of the motor, a gear-wheel on the longitudinally-movable screw-threaded stem of the valve, a broad pinion on the screw-threaded stem of the valve, a gong, a shaft having a bearing in said gong for operating a striker, and a gear-wheel on said shaft engaging with the pinion, substantially as specified.

3. A mechanism for controlling the flow of water through a fire-hose, comprising a valve, a source of electricity, a motor operated from said source of electricity, a reversing-switch for the motor, a broad gear-wheel on the armature-shaft of the motor, a gear-wheel on the longitudinally-movable screw-threaded stem of the valve, a broad pinion on the screw-threaded stem of the valve, a gong, a shaft having a bearing in said gong for operating a striker, a gear-wheel on said shaft engaging with the pinion, and an indicator-ring on the gear-wheel mounted on the shaft having a bearing in the bell, substantially as specified.

4. A mechanism for controlling the flow of water through a fire-hose, comprising a casing, a valve in said casing, a source of electricity, a motor in the casing for operating the valve, electric wires formed in a cable, a reel having a hollow shaft through which said cable passes, and a reversing-switch having connection with certain of the wires, the said reversing-switch being adapted to be inserted in the hollow shaft of the reel, substantially as specified.

FRANK McDONALD.

Witnesses:

FRANKLIN SKILLINGS,
EDWARD D. MCCLEARN.