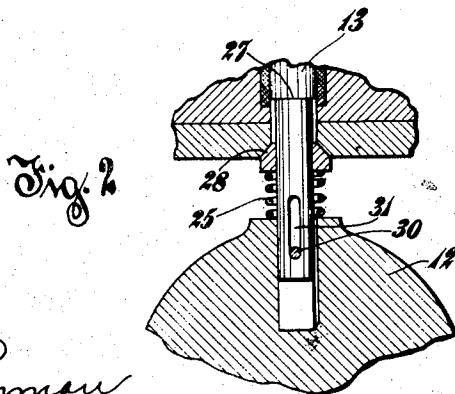
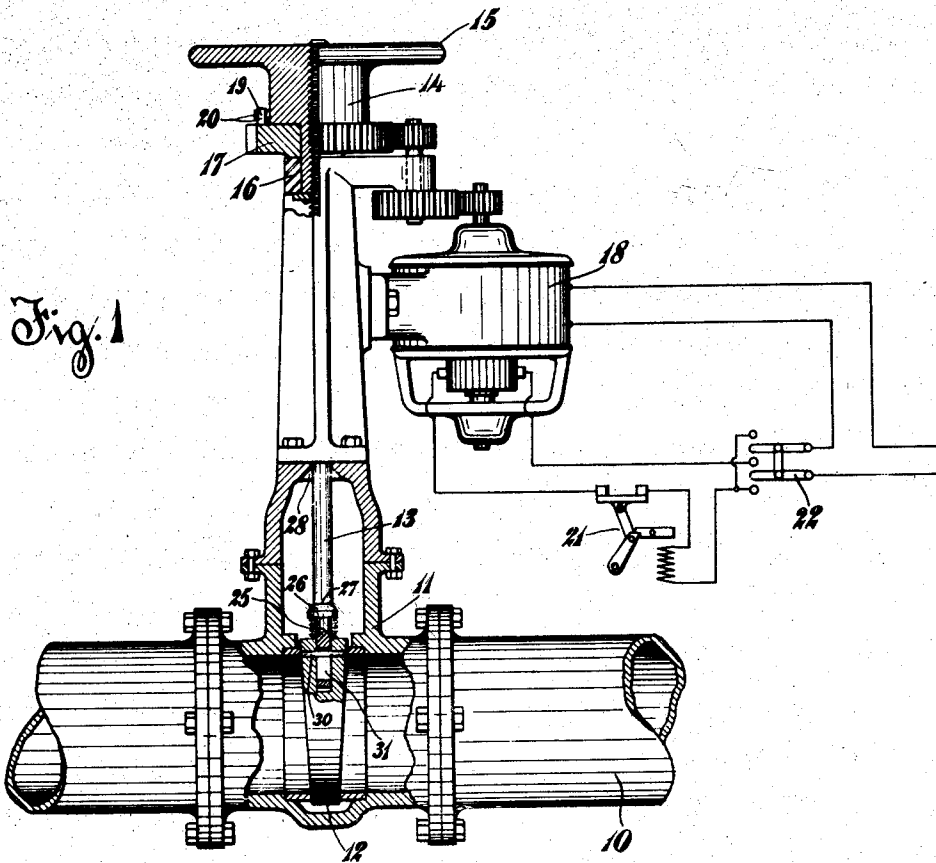


J. J. BETTINGER.
VALVE.

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916,831.



Witnesses

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VALVE.

No. 916,831.

Specification of Letters Patent.

Patented March 30, 1909.

Application filed April 20, 1907. Serial No. 369,208.

To all whom it may concern:

Be it known that I, JOHN J. BETTINGER, citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Valves, of which the following is a full, clear, and exact specification.

My invention relates to motor operated valves.

In operating valves by means of electric motors, it has been found most simple and convenient to limit the movement of the motor by means of an overload circuit-breaker in its circuit. With this arrangement, when the valve reaches either limit of its movement the load on the motor is suddenly increased and the circuit-breaker is tripped to stop the motor. However, the momentum of the moving parts often causes the valve to jam so that it cannot be moved in the other direction when the motor is reversed and started, and this even when there is a lost motion device between the motor and the movable part of the valve. It is found that most of this jamming takes place when the gate is opened to its limit, although there may also be some when the valve is closed. The jamming at the closing of the valve is generally found to be comparatively slight because of the relatively gradual increase of resistance to the movement of the parts at this point.

It is the object of my invention to prevent such jamming of valves.

With this object in view my invention comprises a motor operated valve provided with a resilient buffer device so constructed and arranged that same is placed under strain when the valve is moved into its open position. The device may also be arranged to be placed under strain when the valve is moved into its closed position.

Other features of my invention will appear hereinafter.

Figure 1 shows a partly sectional elevation of a gate valve constructed according to my invention; and Fig. 2 is an enlarged view of the buffer spring and its adjacent parts.

In the pipe 10 is a gate valve 11 which in general construction may be of any desired type. A pin 30 in the gate 12 of this valve passes through a slot 31 in a rod or stem 13 threaded at its upper end to engage an in-

ternal screw on a nut or sleeve 14 operable by a hand wheel 15. The sleeve 14 extends through a bearing 16 in the framework attached to the gate valve and itself serves as a bearing for a gear 17. The latter is operated by a motor 18 through any suitable train of gearing, and is provided with a finger 19 which coöperates with a similar finger 20 on the sleeve 14 to form a lost motion connection between said gear and sleeve. In the circuit of the motor 18 is an overload circuit-breaker 21 which operates in the usual manner. The motor 18 may be supplied from any suitable source through the reversing switch 22.

Surrounding the stem 13 and resting on the gate 12 is a coil spring 25 which presses a loose collar 26 upward. A shoulder 27 on the stem 13 limits the upward movement of the collar 26 along the stem 13. The upper surface of the collar 26 is cone-shaped as shown and is arranged to engage a seat 28 in the upper part of the fluid chamber of the gate valve.

The gate 12 may be operated by the hand wheel 15 when desired or necessary. In this manual operation the hand wheel 15 and sleeve 14 move the stem 13 directly. Generally, however, the gate will be operated by the motor 18. When it is being so operated and is nearing the upper limit of its movement, the collar 26 engages the seat 28, and further movement compresses the spring 25 to increase the load on the motor gradually until it is sufficient to trip the circuit-breaker 21. Instead of there being any jamming, the spring 25 is compressed, as shown in Fig. 2.

When it is now desired to close the valve the circuit-breaker 21 is set and the switch 22 closed in the proper direction. This causes the motor 18 and gear 17 to rotate in directions opposite to their previous rotation. When the gear 17 has made almost a complete rotation the fingers 19 and 20 engage, and because of the momentum the motor has acquired, a hammer blow is struck upon the sleeve 14 sufficient to start it and to overcome the effect of any possible previous jamming. The spring 25 expands until the collar 26 and shoulder 27 are in engagement, thus assisting somewhat in starting the sleeve 14. When the gate 12 is seated in its closed position the spring 25 is compressed by the continued movement of

the rod 13 until because of the increased load on the motor, the circuit-breaker 21 is tripped. Any tendency to jam is taken up by the compression of the spring 25. By resetting the circuit-breaker 21 and closing the switch 22 in the proper direction, the motor may be started in the other direction to open the valve. When the gear 17 has made almost a complete rotation the fingers 19 and 20 engage, and because of the momentum the motor has acquired, a hammer blow is struck upon the sleeve 14 sufficient to start it, overcoming the effect of any possible jamming which may have taken place when the valve was closed. The expanding of the spring 25 assists in this somewhat. The rotation of the sleeve 14 raises the rod 13 and after having brought the bottom of the slot 31 against the pin 30 begins to open the valve. This continues until either the switch 22 is opened, or the collar 26 engages the seat 28 and the spring 25 is compressed to cause tripping of the circuit-breaker.

In some cases the lost motion connection between the motor 18 and the sleeve 14 may well be omitted and in others it may be found necessary to provide the loose connection between the gate 12 and the rod 13.

Many other modifications may be made in the precise arrangements here shown and described, and all such which do not involve a departure from the spirit and scope of my invention I aim to cover in the following claims.

What I claim as new is:—

1. In combination, a valve, a motor for operating said valve, and a buffer spring which is compressed when the valve reaches either limit of its movement.
2. In combination, a gate valve, a reversible motor for operating said valve, an overload circuit-breaker in the motor circuit, and a buffer spring which is put under strain as the valve nears either extreme position.
3. In combination, a gate valve, a screw-threaded stem therefor, a rotatable nut engaging the thread on said stem, and a spring surrounding the stem and arranged to be compressed when the valve reaches either extreme position.
4. In combination, a gate valve provided

with a screw-threaded valve stem, a rotary member engaging the thread on said stem, a reversible motor, a lost motion connection between said motor and said rotary member, and a buffer spring arranged to be compressed when the valve reaches either extreme position.

5. In combination, a gate valve, a reversible motor, a lost motion connection through which said motor operates said valve, and a buffer spring arranged to be compressed when the valve approaches either limit of its movement.

6. In combination, a gate valve, a reversible motor, a lost motion connection through which said motor operates said valve, a buffer spring arranged to be put under strain as the valve approaches either extreme position, and an overload circuit-breaker in the motor circuit.

7. In combination, a gate valve, an electric motor for operating said valve, a buffer spring which is compressed when the valve reaches either limiting position, and an overload circuit-breaker in the circuit of said motor.

8. In combination, a valve, a motor for operating said valve, and means whereby the load on the motor is gradually increased as the valve approaches either limiting position.

9. In combination, a gate valve, a reversible motor for operating said valve, resilient means arranged to be put under strain when the valve is moved into either limiting position, and an overload circuit-breaker in the circuit of said motor.

10. In combination, a valve, a motor for operating said valve, means whereby the load on the motor is gradually increased as the valve approaches either limiting position, and means for shutting off the supply of energy to the motor when the load on the latter attains a predetermined value.

In testimony whereof I affix my signature, in the presence of two witnesses.

JOHN J. BETTINGER.

Witnesses:

GEO. B. SCHLEY,
FRED J. KINSEY.