

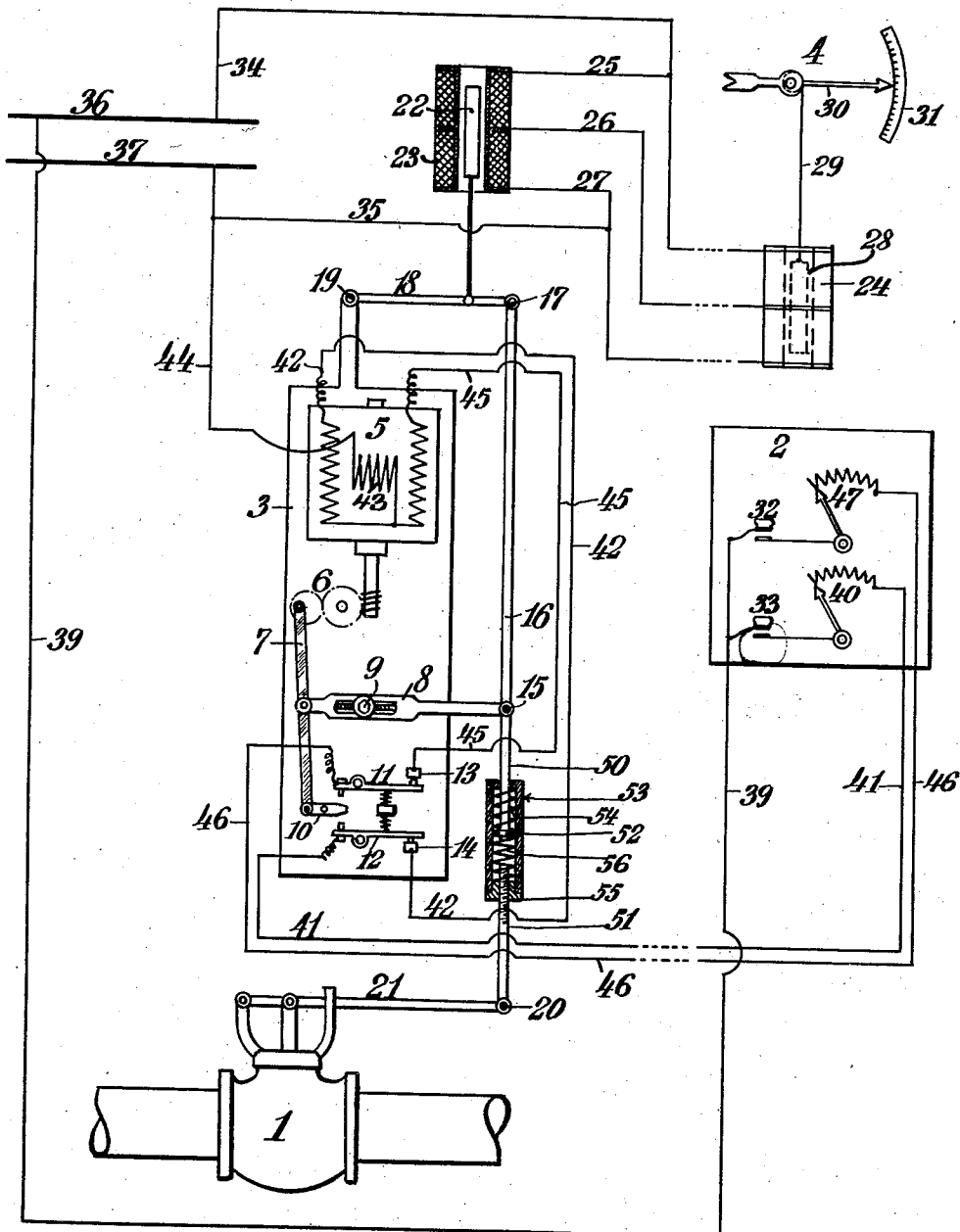
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REMOTE VALVE OPERATING MECHANISM

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REMOTE VALVE-OPERATING MECHANISM.

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This invention relates to improvements in valve operating mechanisms. More particularly the invention relates to that type of valve operating mechanisms which are located at points remote from the valves and in which it is desirable to provide means for indicating the position of a valve.

The objects of the invention are to provide a simple practical apparatus for operating valves from a distance including means for indicating the position of the valve and means preventing jamming of the valve. The invention has also as one of its objects the provision of simple means for regulating the speed of valve operation.

The accompanying drawing illustrates the invention by a diagram with parts in section and parts broken away.

In the drawing the reference numeral 1 denotes a valve which is to be operated from a remote point or control station indicated by an operating panel 2. The valve operating mechanism is mounted on another suitable panel 3 and at 4 is located the indicating means.

The operating mechanism comprises a standard reversible electric motor 5 which through suitable reducing gearing at 6 and a crank link 7 actuates an arm 8 pivoted on a floating adjustable pivot 9. The extreme free end of link 7 is connected to a limit switch lever 10. The limit switch includes two pivoted contact members 11 and 12 adapted to make contacts with two fixed terminal points 13 and 14.

The arm 8 is pivoted at 15 to a valve operating cushion link 16 which at its one end 17 is pivoted to an arm 18, which in turn is pivoted at a fixed point 19. The other end of the cushion link 16 is pivoted at 20 to the valve operating arm 21.

The position indicating means are operated from the operating mechanism by an inductance bridge comprising an iron armature 22 connected to the arm 18 and thereby movably supported within a divided inductance coil or solenoid 23. The latter is connected in parallel to a second similar coil 24 by means of wires 25, 26 and 27. In the second coil 24 there is an iron armature 28 connected by a thin wire 29 to a balanced indicating pointer 30 moving over a scale 31. The system of coils constitutes an inductance bridge, the operations of which are known to the art. In the present instance if the armature 22 is moved upwards, the

armature 28 will move upward also and the extent of the movement be shown by pointer 30 on scale 31, and vice versa.

The control station 2 is provided with a push button 32 for closing the valve and a push button 33 for opening the valve. The electrical connections are as follows. The inductance bridge is connected by wires 34 and 35 to the main line wires 36 and 37. From the line 36 a wire 39 leads to push button 33 which is connected to a variable resistance 40. A wire 41 leads from 40 to limit switch contact member 12. The terminal point 14 is connected by wire 42 with the motor, the connection thence being to the armature 43 and back to the line via wire 44.

The other side of the motor is connected by wire 45 to terminal point 13, thence through contact member 11 and wire 46 to another variable resistance 47 connected to push button 32. The aforesaid wire 39 connects the two push buttons to the line.

The link 16 is termed a cushion link because it includes a mechanism for cushioning movements in either direction to prevent jamming the valve while at the same time insuring that the valve is properly operated. The link 16 is in two parts 50 and 51. Part 50 carries a head 52 within a casing 53 and a spring 54 is interposed between the head and the casing. Part 51 is threaded into a nut 55 which is screwed into the other end of the casing 53. Another spring 56 is interposed between the nut 55 and the head 52.

If the link 16 is moved in a downward direction on the drawing, the head 52 on part 50 will transmit the movement by compressing spring 56 against the nut 55 and casing 53 and to part 51, which will therefore also be moved downward to operate the valve. Because of the spring 56 the movement will be cushioned and smooth, easy and not sudden. If the movement downward continues after the valve has been fully operated, the spring will simply be compressed still further.

If the link 16 is moved upwardly on the drawing, the head 52 will compress the spring 54 against the casing and thereby move part 51 upwards also. Should the movement continue after the valve has been fully operated, the spring 54 will simply be still further compressed.

The operation is as follows: Assuming that the valve is open (the drawing shows the parts in neutral positions), the open po-

sition will be indicated to the operator at the control station 2 by the position of the pointer 30 on scale 31.

If now for any reasons conditions change so that the valve should be closed the operator will be notified. He then presses push button 32 and thereby closes a circuit from line 36 through wire 39, push button 32, variable resistance 47, wire 46, contact member 11, terminal 13, wire 45 to the motor, through armature 43 and back to the line 37 via wire 44.

The motor then starts to operate and moves the crank link 7 downward to actuate arm 8 to move link 16 upward, for instance, to close the valve. However, limit switch 10 has also been operated and will after a given time be turned anticlockwise, strike contact member 11 and break the operating circuit at 13. The motor then stops and the valve has been closed which is again indicated by the pointer 30. The operator can therefore observe whether the valve has been properly operated.

If now conditions change, the operator is notified, or may observe, that the valve is to be opened. He then presses button 33 and establishes a circuit through the motor as follows. From line 36 to wire 39, button 33, variable resistance 40, wire 41, contact member 12, terminal point 14, wire 42 to the other side of the motor, the armature 43 and out to line 37 via wire 44. The motor then starts running in the opposite direction and through the instrumentalities above described the link 16 is moved downward to operate arm 21 and open the valve 1 after which the circuit is broken automatically at 14. The new position is again indicated by the pointer 30.

The cushion link 16 prevents jamming of the valve at the end of its movements in either direction. The variable resistances 40 and 47 serve as a means of retarding the operations by introducing these resistances in the circuit to a variable degree.

The apparatus as herein disclosed is simple, practical and direct in its operations. The control station and the indicating means may be located any distance from the valve itself.

I claim:—

1. The combination with a valve, a mechanism for opening or closing the same, an open electric circuit for actuating said mechanism, two remotely located push buttons in said circuit for closing the same to actuate the mechanism, an operating member in said mechanism for yieldingly operating the valve in either direction, means in said mechanism for automatically opening the circuit after the valve has been operated and means for regulating the operating speed of the valve.

2. The combination with a valve, a mechanism for opening and closing the same, an open electric circuit for actuating said mechanism, two remotely located push buttons in said circuit for closing the same to actuate the mechanism, an operating member in said mechanism for yieldingly operating the valve in either direction, means in said mechanism for automatically opening the circuit after the valve has been operated, remote means for indicating the operation of the valve and an inductance bridge actuated from said mechanism for operating the said remote indicating means.

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