July 27, 1937. E. M. PAULLIN, JR 2,088,174

VALVE OPERATING MECHANISM

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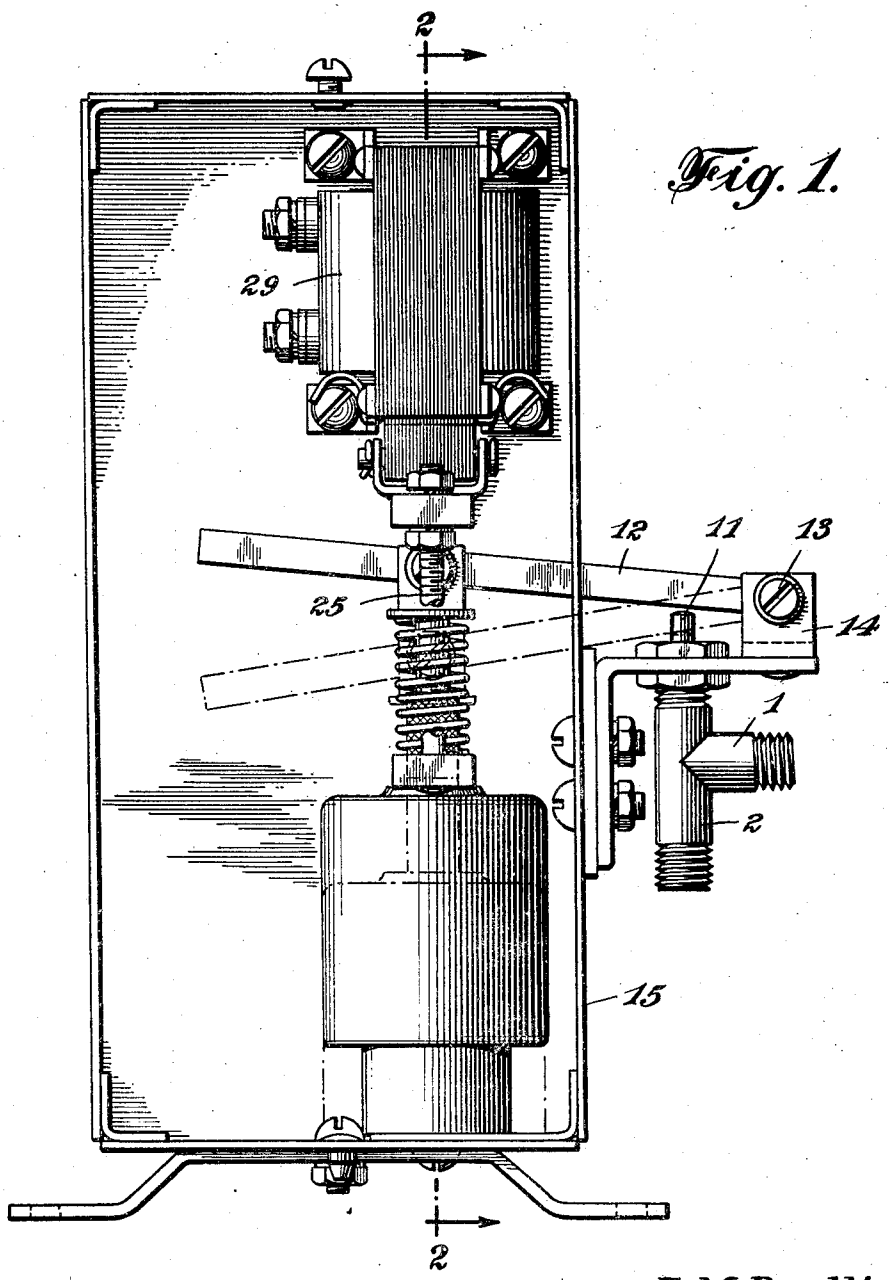


Fig. 1.

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Fig 2.

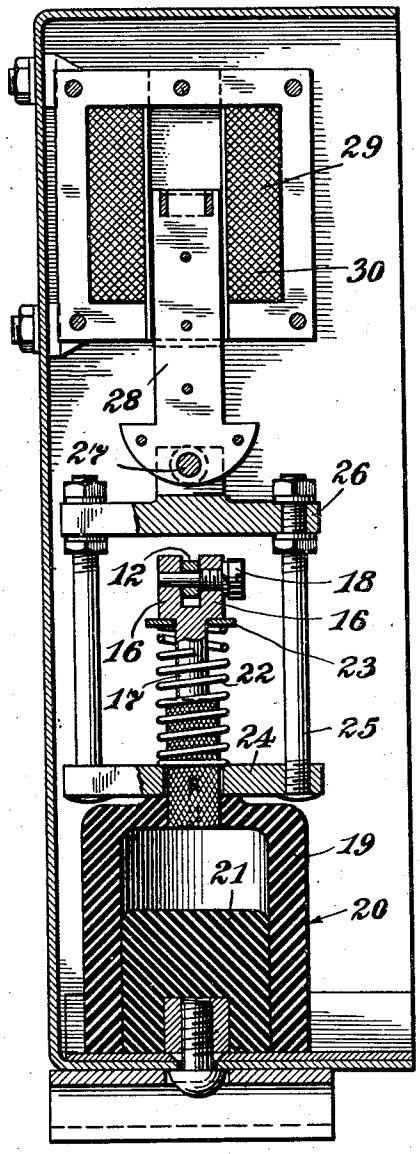
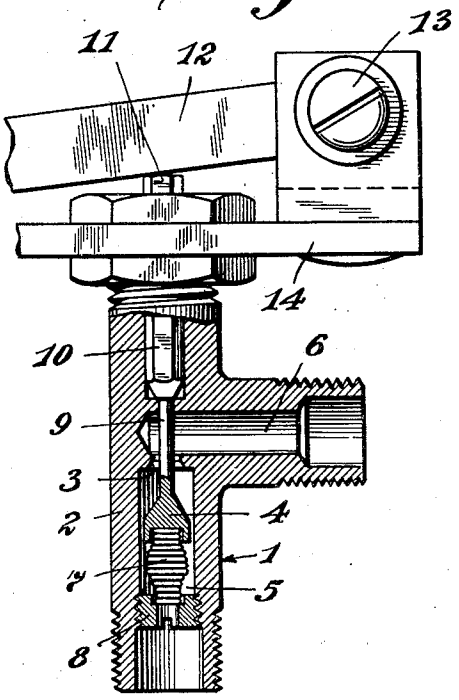


Fig. 3.



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VALVE OPERATING MECHANISM

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Application October 9, 1934, Serial No. 747,528

1 Claim. (Cl. 175—372)

This invention relates to valve operating mechanisms and an object of the present invention is to provide an electromagnet valve operating mechanism embodying means for creating a time interval between the energizing of the electromagnet and the operation of the valve.

With these and other objects in view as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawings, showing a valve operating mechanism of the preferred form, and the features forming the invention will be specifically pointed out in the claims.

In the drawings:

Fig. 1 is a side elevation of the improved valve mechanism a portion being broken away.

Fig. 2 is a vertical section through the valve operating mechanism taken on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary view showing a section taken centrally through the valve on a plane corresponding to the plane in which Fig. 1 is shown.

Referring more particularly to the drawings, the improved valve operating mechanism includes a valve structure 1. The valve structure 1 comprises a casing 2 having the valve seat 3 formed therein against which a valve cone 4 is adapted to seat to cut off communication between the passages 5 and 6 of the valve casing 2. The valve cone 4 is urged against the seat by a spring 7 which is confined between the cone 4 and the removable retaining plug 8. A stem 9 is formed on the valve cone 4 and projects upwardly through the casing 2, having its upward end engaged by the plunger 10. The plunger 10 is slidable in the valve casing 2 and projects beyond the upper end of the valve casing as clearly shown at 11 in Figs. 1 and 3 of the drawings.

An arm 12 is pivotally connected as shown at 13 to a suitable bracket 14. The bracket 14 is shown in Fig. 1 of the drawings as supported from the housing 15 which houses the valve operating mechanism, but it is to be understood that it may be mounted in any suitable place. The bracket 14 also serves as a support for the valve structure 1, in the construction shown in the drawings, but this feature also is a detail which forms no part of the present invention.

The arm 12 extends between the arms 16 of the forked rod 17 and is attached to the arms 16 by a suitable set-screw or pin 18. The rod 17 has its lower end connected to the outer slidable member 19 of the dashpot structure 20. The dashpot structure 20 includes the outer slidable member 19 which fits snugly over the core 21 in such manner as to create suction action between the member 19 and the core 21 to retard the upward movement of the rod 17 and consequently of the arm 12 under the action of the spring 22. The spring 22 is coiled about the rod 17 and has one end engaging against the forked end of the rod or against a washer 23 which in turn engages the forked end of the rod while the other end of the spring is engaged by the cross-bar 24 of the cage or frame 25. The cage or frame 25 is movable relative to the rod 17 and it has a cross-bar 26 at its upper end which is pivotally connected as shown at 27 to the core 28 of the solenoid or electromagnet 29.

When the solenoid or electromagnet 29 is deenergized, the core 28 is in its extended or lowered position, as shown in Fig. 2 of the drawings, at which time the arm 12 will be forced downwardly by the weight of the core 28, and the outer slidable cup 19 will also be moved into its lowermost position. When the valve operating arm 12 is in its lowered position it presses against the plunger 10, forcing the valve cone 4 off of the seat 3 and opening the valve.

When the electromagnet or solenoid 29 is energized, the core 28 is drawn up into the coil 30 of the solenoid or electromagnet. The movement of the core is rapid, and to provide means for preventing the rapid closing of the valve 4 and to provide a predetermined desired time interval between the energization of the solenoid and the closing of the valve, the dashpot structure 20 is provided.

As the solenoid core 28 moves upwardly it will compress the spring 22, and the expansion of the spring will move the lever 12 upwardly and also move the cup 19 upwardly. Owing to the tight suction engagement between the cup 19 and the core 21 the expanding action of the spring 22 will be materially retarded and the closing of the valve delayed.

While in the drawings and in the specification, is shown a structure which closes the valve upon the energizing of the solenoid and opens the valve upon the deenergizing of the solenoid, it is to be understood that the improved valve operating mechanism may be employed in connection with the valve operating in a reverse manner to that described, without departing from the spirit of the present invention.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown but that they may be widely modified within the invention defined by the claim.

What is claimed is:

In an operating mechanism, an electromagnet including a core, a dash pot structure comprising a slidable member and a stationary member, a rod connected to said slidable member, a cage connected to said core and engaging slidably about said rod, a spring about said rod and engaging said cage to provide a yieldable operative connection between the cage and said rod, and a pivoted valve operating arm having one end connected to said rod, said arm being moved to operating position by weight of said core upon de-energizing of said electromagnet, said dash pot structure acting to delay movement of the arm to said operating position after said cage has been moved by said spring into contact with said slidable member.

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