

G. H. ROWE.
PLUNGER DEVICE.
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1,015,084.

Patented Jan. 16, 1912.

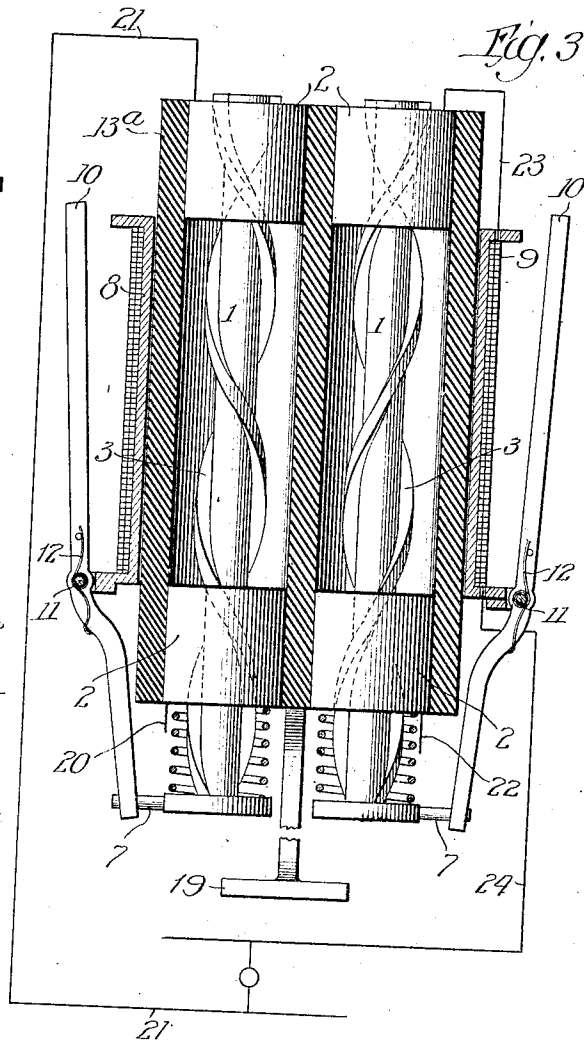
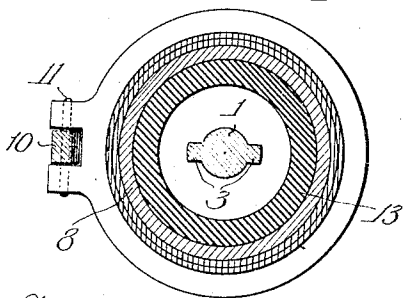
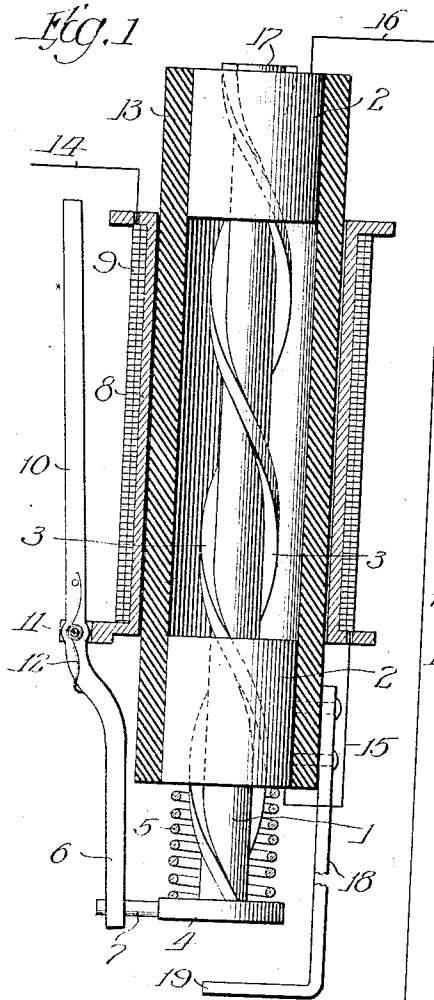


Fig. 2

Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE H. ROWE, OF BERWYN, ILLINOIS.

PLUNGER DEVICE.

1,015,084.

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Patented Jan. 16, 1912.

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To all whom it may concern:

Be it known that I, GEORGE H. ROWE, citizen of the United States, residing at Berwyn, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Plunger Devices, of which the following is a full, clear, concise, and exact description.

My invention relates to a plunger mechanism and its object is to provide a device in which the plunger though subjected, when set, to a strong thrust tending to operate the same, is nevertheless readily released.

A further object is to provide a device of the character described in which the catch for holding the plunger set is electrically actuated, the plunger being controlled by variations in the current flow in an electric circuit.

The essential feature of my invention consists in a plunger having both a rotary and a longitudinal motion, whereby by locking the plunger against rotary motion it is likewise held against longitudinal motion.

My invention may be put to various uses, and I do not wish to be understood as limiting my invention to any particular use. However, for purposes of illustration, I have shown my invention as embodied in a switch or circuit breaker.

The invention itself and certain novel features of this particular embodiment thereof may be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a central, longitudinal section of a single pole switch or circuit breaker embodying my invention; Fig. 2 is a section on the line 2—2 of Fig. 1; and Fig. 3 is a modification showing my invention as embodied in a double pole switch or circuit breaker.

Similar letters of reference refer to similar parts throughout the several views.

The plunger 1 and its mounting or bearings 2, 2 are provided with cooperating means for causing the longitudinal motion of said plunger to be dependent upon a simultaneous rotary movement thereof. For example, the plunger 1 may be provided with ordinary spiral threads 3, 3 and the bearings 2, 2 are provided with spiral grooves to receive said threads. Arranged between the head 4 of the plunger and one of its bearings 2 is a coiled compression spring 5 which, in the set position of the plunger, is compressed and tends to impart

a longitudinal motion to the plunger. Owing to the spiral threads 3, 3 the plunger in order to move longitudinally must also rotate. The plunger is held in its set position against rotation by a catch 6 which engages a pin 7 or other like device projecting radially from the plunger head 4. By this arrangement the plunger is released and allowed to operate by removing the catch 6 out of the path of rotary motion of the pin 7.

The plunger 1 preferably is inclosed within a soft iron shell or spool 8 upon which are wound coils 9 forming part of an electric circuit. The shell or spool 8 and the coils 9 thus constitute an electromagnet, of which the spool is the core, provided with an armature 10 pivoted at 11 upon one of the end flanges of the spool 8. The catch 6 is integral with and forms an extension of the armature 10, and said armature when attracted releases said catch from engagement with the pin 7. A spring 12 normally holds said armature in its unattracted position. The bearings 2, 2 are preferably inserted in the ends of a tube 13 of fiber or other insulating material about which the shell 8 fits.

Referring to Fig. 1 the circuit can be traced from the terminal 14 through the winding 9, conductor 15, the bearing 2, plunger 1 the other bearing 2 to the terminal 16. The structure can be so adjusted that the normal flow of current in the circuit does not cause the attraction of the armature 10. However, when an abnormal flow causes the armature 10 to be attracted, and thus to release the plunger, the coil spring 5 thereupon is free to impart motion to the plunger 1 and said plunger is moved outwardly and the circuit is broken between the end 17 of the plunger and the bearing 2.

In the drawings I have shown a bracket 18 provided at its end with a stop 19 adapted to form a stop for the head 4. It is obvious that quite a considerable blow may be given by the head 4 and an important object of my invention is to utilize this for accomplishing various useful results. For example, the impact of the head 4, when the plunger is released, may be utilized for tripping an ordinary circuit breaker.

In Fig. 3 my invention is shown as embodied in a double pole switch in which both of the plungers or bridging elements 1 are surrounded by a common tubular core 8. Arranged within the core 8 is a fiber block 13^a provided with two longitudinal bores in

the opposite ends of which the bearings 2 are supported. The structure is otherwise substantially identical with that already described.

5 The circuit in Fig. 3 can be traced over one leg from the terminal 20 to bushing 2, plunger 1, bushing 2, to the line 21. The circuit over the other leg may be traced from the terminal 22, bushing 2, plunger 1,
10 bushing 2, conductor lead 23, winding 9, to the line 24. Each leg of the circuit has thus included therein a switch adapted to open the circuit in case of abnormal current flow. The plunger 1 and its bearings 2, 2 may be
15 made of any suitable material. In case the plunger 1 and the bearings 2, 2 are to form part of an electric circuit, as in the embodiment of my invention described hereinbefore, the material may be selected which
20 is best suited for the purpose needed, as for example, they may be made of copper, carbon or other suitable conducting material. Since the air gap between the end of the armature 10 and the corresponding pole of
25 the magnet is very small the device will operate on either alternating or direct current, and application of my invention is not limited in this respect.

What I claim is:

- 30 1. The combination with a plunger and means for imparting a rotary-longitudinal motion thereto, of a catch for holding said plunger in set position, and automatically operated means for releasing said catch.
- 35 2. The combination with a plunger and means for imparting a rotary-longitudinal motion thereto, of a catch for holding said plunger in set position, and electrically actuated means for releasing said catch.
- 40 3. The combination with a plunger and means for imparting a rotary-longitudinal motion thereto, of a catch interposed in the path of rotary-motion of said plunger for holding the same in set position, and means
45 for operating said catch to release said plunger.
- 50 4. The combination with a plunger and its mounting provided with cooperating means for causing the longitudinal motion of said plunger to be dependent upon a simultaneous rotary motion thereof, of means tending to impart longitudinal motion to said plunger, a catch for holding said plunger in

set position against rotary motion, and automatically operated means for releasing 55 said catch.

5. The combination with a spring actuated plunger and its mounting, said plunger and mounting being provided with cooperating means for causing the longitudinal 60 motion of the plunger to be dependent upon a simultaneous rotary motion thereof, a catch for holding said plunger in set position against rotary motion, and electrically actuated means for operating said catch to 65 release said plunger.

6. The combination with a plunger, of means for imparting a rotary-longitudinal motion to said plunger, and means for holding said plunger in said position by inter- 70 posing a stop in the path of the rotary motion of said plunger.

7. The combination with a plunger and means for imparting a rotary-longitudinal motion thereto, of an electromagnet and its 75 armature, said armature being provided with a catch arranged in one of the alternate positions of said armature to be interposed in the path of rotary motion of said plunger. 80

8. The combination with a plunger and its mounting, said plunger and mounting having a spiral engagement with each other to provide a rotary-longitudinal motion of said plunger, a coiled compression 85 spring tending to impart longitudinal motion to said plunger, and a catch arranged to be interposed in the path of rotary motion of said plunger and thereby to hold the same in set position. 90

9. The combination with a plunger and its mounting, said plunger and its mounting having a spirally threaded engagement with each other, a coiled compression spring surrounding said plunger and arranged to be 95 compressed in the set position of said plunger, a catch for holding said plunger against rotary motion, and electrically actuated means for releasing said catch.

In witness whereof, I, hereunto subscribe 100 my name this 26th day of September, A. D., 1911.

GEORGE H. ROWE.

Witnesses:

A. H. MOORE,

McCLELLAND YOUNG.