G. A. BURNHAM.

DASH POT.

APPLICATION FILED AUG. 2, 1918.

1,364,980. Patented Jan. 11, 1921.

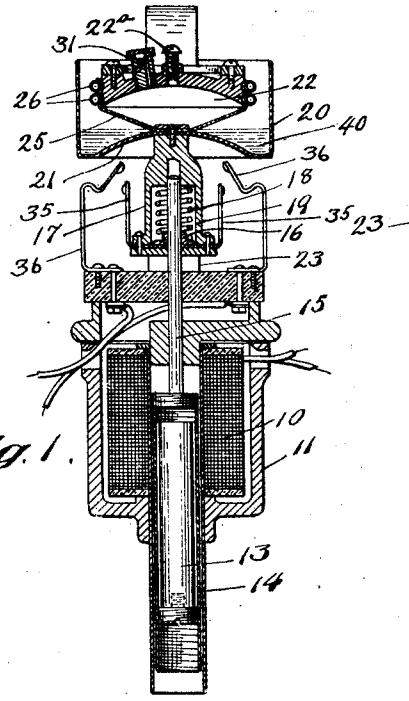


Fig. 1.

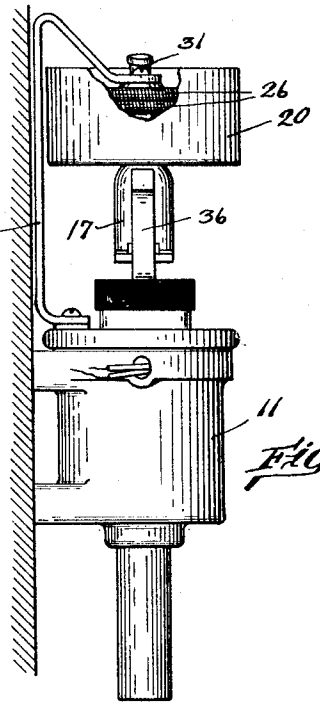


Fig. 2.

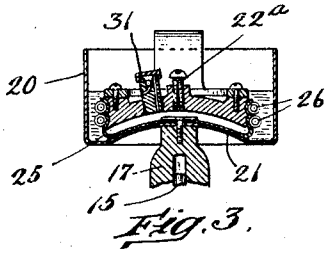


Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORGE A. BURNHAM, OF SAUGUS, MASSACHUSETTS, ASSIGNOR TO SEARS B. CONDIT, JR., OF BROOKLINE, MASSACHUSETTS.

DASH-POT.

1,364,980. Specification of Letters Patent. **Patented Jan. 11, 1921.**

Application filed August 2, 1918. Serial No. 247,978.

To all whom it may concern:

Be it known that I, GEORGE A. BURNHAM, a citizen of the United States, residing at Saugus, in the county of Essex and State of Massachusetts, have invented an Improvement in Dash-Pots, of which the following is a specification.

My invention relates to a dash pot especially adapted for time limit relays used for the protection of electric circuits of the type in which a flexible diaphragm is employed as the movable member of the time element.

One of the principal difficulties experienced in the practical operation of such relays is, that the diaphragm soon loses much of its flexibility, or at least its flexibility is so altered that the time element of the relay is considerably changed from its initial adjustment, with the result that the best protection is no longer obtained for the circuit controlled by the relay.

The partial loss of flexibility of the diaphragm is due to the drying of the oil naturally contained therein or with which it is treated, with the result that the diaphragm becomes relatively stiff, or hard in spots, both of which conditions serve to affect the operation of the relay.

In practice an attempt is made to remedy this defect by the frequent oiling or lubrication of the diaphragms by an attendant to maintain them in their condition of maximum flexibility. This treatment, however, is unsatisfactory, for the periods between oilings are uncertain and may be long, and between each oiling, the diaphragm may become partially dry and so alter the time element of the relay.

The object of my invention is in the provision of means, associated with the flexible diaphragm of a dash pot, whereby the diaphragm may be continually maintained moist with oil or other suitable lubricant and therefore in its condition of maximum flexibility and the relay maintain a constant time element.

The means whereby I accomplish the object of my invention is in the provision of a bath of lubricant in which the diaphragm is in substantially constant communication whereby it may be continually moist and flexible.

The bath or supply of lubricant may be so arranged with respect to the diaphragm that the diaphragm is in direct contact therewith, or the bath of lubricant may be at some convenient point and fluid conducting means, such as wicks, extended therefrom to the diaphragm for the lubrication thereof.

Figure 1 is a sectional elevation of a time limit relay embodying my invention.

Fig. 2 is a side elevation of the relay of Fig. 1.

Fig. 3 is a sectional detail of the dash pot in an operated position of the diaphragm.

As here shown, the relay with which my invention is associated may include the solenoid 10 inclosed in the protecting casing 11 of magnetic material and forming part of the magnetic circuit of the solenoid.

A core 13 comprising the movable element of the solenoid is adjustably arranged within the solenoid in a tube 14 of non-magnetic material whereby the current value at which the relay is effectively energized may be adjusted.

A rod 15 is secured to the upper end of said tube 14 and extends above the solenoid and its casing and bears, near its upper end, a flange 16. A stem 17 forming a part of the movable member of the time element of the relay, is slidably arranged on said rod and a spring 18 is arranged in a recess 19 in said stem and bears against the end of said recess and the flange 16 of said rod and forms a yielding connection between said rod and stem and through which a movement of said rod is communicated to said stem to cause a movement of the latter.

An oil receptacle 20, hereinafter to be more fully described, is secured to the upper end of said stem and has its bottom wall 21 dished to form a piston for the flexible diaphragm of the time element of the relay.

The time element of the relay comprises a dash pot 22 secured by means of a standard 23 above the solenoid of the relay. Said dash pot is formed with a cup-shaped lower face over which the flexible diaphragm is extended and which is secured to said dash pot by the spring rings 26. Said diaphragm is secured to the stem 17 and the piston at its middle point.

The dash pot 22 of the time element is provided with a leak valve 22^a of common construction, by which the time period of the relay may be adjusted, and it is also provided with a valve 31 which serves as a check valve to admit air between the pot and

the diaphragm upon a return movement of the diaphragm to permit the rapid recovery of the relay in readiness for a second operation.

Contact members 35 carried by the stem 17 are adapted to engage contact members 36 supported from the solenoid casing for the control of a circuit connected thereto.

The oil receptacle, as previously stated, has its bottom wall dished substantially to conform to the cupped face of the pot 22 and into which it is adapted to press the flexible diaphragm 25 when moved upward by the movable element of the solenoid. The side walls of said receptacle are adapted to extend upward to partially inclose the flexible diaphragm and the dash pot when the relay is in an inoperative position and a bath or supply of oil or other lubricant, indicated at 40, is adapted to be contained therein, the level of said bath of oil being preferably at such a height in the oil receptacle that the middle part of the diaphragm is in continual contact therewith. By such continual contact, the oil or other lubricant may spread by capillary action over the entire surface and continually maintain the diaphragm lubricated and in a condition of maximum flexibility. With such continual lubrication, the time period of the relay is also maintained constant.

As the piston is moved upward to force the diaphragm within the dash pot upon an operation of the relay, substantially the entire surface of the diaphragm is progressively brought into contact with the bath or supply of oil and therefore additionally lubricated over its normal lubrication by capillary action.

The walls of the oil receptacle are extended upwardly above the flexible diaphragm sufficiently to prevent the overflow of oil during the upward movement of the piston.

I prefer to have the diaphragm in continual communication with the oil or other lubricant although obviously it may be lubricated only at each operation of the dash pot whereby said diaphragm is always in a condition of maximum flexibility regardless of the more or less extended period of time that may elapse between succeeding operations of the relay and in which period of time the diaphragm may otherwise become dry or sufficiently partially so to change the time period of operation.

It is obvious that my invention may be modified to adapt it for various requirements without departing from the spirit thereof.

I claim:—

1. A dash-pot having a rigid end-wall, a flexible diaphragm secured thereto, and an actuating piston therefor having an oil-containing portion arranged to contain oil in contact with said diaphragm.

2. A dash-pot having a rigid end-wall, a flexible diaphragm secured thereto, and an actuating piston therefor having its peripheral portion up-turned to form an oil-container in which said flexible diaphragm extends adapted to contain oil in contact with said diaphragm.

3. A dash-pot having a rigid end-wall, a flexible diaphragm secured thereto, a movable piston secured to said diaphragm, and an oil receptacle carried by said piston into which said flexible diaphragm extends adapted to contain oil in contact with said diaphragm.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE A. BURNHAM.

Witnesses:
T. T. GREENWOOD,
H. B. DAVIS.