

H. C. EGERTON,
ELECTROMAGNETIC SWITCHING DEVICE.
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1,272,402.

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Fig. 1.

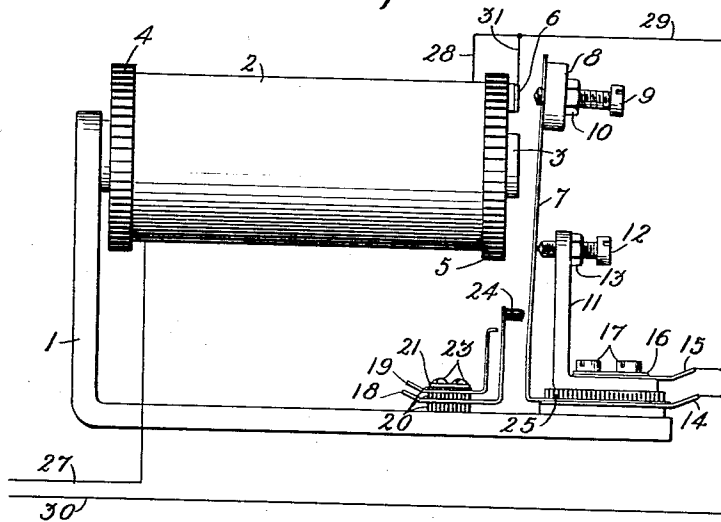
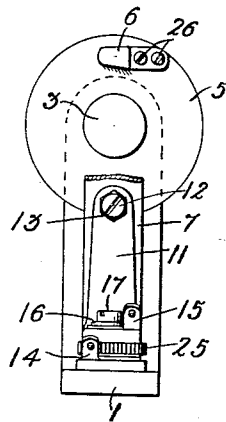


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTROMAGNETIC SWITCHING DEVICE.

1,272,402.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY C. EGERTON, a citizen of the United States, residing at Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Electromagnetic Switching Devices, of which the following is a full, clear, concise, and exact description.

10 This invention relates to electromagnetic switching devices, and more particularly to devices of such character in which the operation is retarded.

15 In electrical circuits, it is often desirable to provide an electromagnetic switching device, the operation of which may be retarded or delayed for a predetermined period following the closure of the circuit including the switching device.

20 The object of this invention is to provide a simple and inexpensive electromagnetic switching device which may be adjusted so that the operation thereof will be delayed for a predetermined period without detracting from the positiveness of its action.

25 To attain this object in accordance with one feature of this invention, an electromagnetic relay is provided with a weighted vertical reed armature, which will begin to vibrate upon the energization of the relay and will continue to vibrate until a predetermined amplitude of vibration has been attained, whereupon certain circuit contacts will be closed and the armature will be retained in an actuated position during the period of energization.

30 These and other features not specifically mentioned above will more clearly appear in the following specification and the annexed drawing, in which Figure 1 shows a side elevation of a relay embodying the invention and also shows a diagrammatic representation of the circuit connections therefor; and Fig. 2 shows an end elevation of such relay with the upper portion of the armature removed.

35 As shown in the accompanying drawing, the upturned end of a base 1 of magnetic material supports an electromagnet comprising a core 3 magnetically connected thereto, and a coil 2 having ends 4 and 5, on the latter of which a contact member 6 is suitably mounted by means of screws 26, 26. Near the end of the base 1 and operatively associated with the core 3, is placed

a vertical reed armature 7, the upper end of which carries a weight 8 and an adjustable contact set screw 9, adapted to engage the contact member 6 and provided with a lock nut 10 for retaining its adjustment. The lower end of the armature 7 terminates in a foot portion mounted upon and magnetically connected with the base 1. Mounted on the foot portion of the armature 7 but electrically insulated therefrom by insulating member 25, is a member 11, the upper portion of the up-turned end of which supports an adjustable contact set screw 12 normally in engagement with the armature 7 and provided with a lock nut 13 for retaining its adjustment. Suitable circuit terminals 14 and 15 are provided for, and electrically connected with the armature 7 and the member 11 respectively. Parts 7, 14, 25, 11 and 15, together with a top plate 16, are secured to the base 1 by means of screws 17, 17 extending through such parts and engaging threaded holes in the base 1.

Behind the armature 7, in operative relation thereto, and secured to the base 1 by means of screws 23, 23, is a bank of bent contact members comprising a flexible contact spring 18, the upper end of which carries an insulating abutment 24 adapted to be engaged by the armature 7, a rigid contact member 19, the upper end of which is adapted to be engaged by contact spring 18 when in an operated position, the top plate 21 and insulating members 20, 20.

It is thought that the invention may be more clearly understood from a description of the operation of the device.

Referring to Fig. 1, assume that a suitable source of electrical energy (not shown) and a suitable switch or other circuit controlling means (also not shown) serially connected therewith, are connected to the conductors 27 and 30. Upon the closure of said switch, a current will flow from such source over conductor 27, winding of coil 2, conductors 28 and 29, circuit terminal 15, member 11, set screw 12, armature 7, circuit terminal 14, conductor 30 and return to the source. The electromagnet will be energized thereby and the core 3 will attract the armature 7, but not sufficiently to cause the set screw 9 to engage contact 6. The normal contact between the set screw 12 and the armature 7 will be broken, thus interrupting the flow of current from the coil 2

and causing a cessation of the attraction of the armature 7 by the core 3. However the momentum of the weight 8 will be sufficient to carry the upper end of the armature 7 a short distance after the attraction has ceased, but the armature will thereafter return to its normal position in engagement with the set screw 12. The circuit through coil 2 again being closed, the cycle is repeated, but the momentum of the weight 8 is increased so that the upper end of the armature 7 is carried a somewhat greater distance after the circuit is opened. This action continues with slightly increasing excursions of the armature until the amplitude of vibration is such that set screw 9 engages contact 6 when the armature 7 is retained in its actuated position by virtue of a circuit proceeding from the source of energy, through conductor 27, coil 2, conductors 28 and 31, contact 6, set screw 9, armature 7, circuit terminal 14, conductor 30 and returning to the source.

When the armature 7 is in its actuated position, it engages the abutment 24 and causes the contact spring 18 to engage the contact member 19, which contacts may be included in such local circuits as may be desired.

It will be evident that by properly proportioning the parts of the device and by suitably adjusting the set screws 9 and 12, the time required for the armature 7 to attain the necessary amplitude of vibration, which will cause the engagement of the set screw 9 and the contact 6, may be varied over a wide range, and that due to the structure employed a given adjustment may be accurately maintained under all conditions.

What is claimed is:

1. In an electromagnetic device, an electromagnet adapted to be energized, an armature therefor adapted to vibrate with increasing excursions upon the energization of said electromagnet, means for retaining said armature in a fixed position upon attaining a certain amplitude of vibration, and adjustable means for predetermining such certain amplitude.

2. In an electromagnetic device, an electromagnet adapted to be energized, a reed armature therefor adapted to vibrate with increasing excursions upon the energization of said electromagnet, means for retaining said armature in a fixed actuated position upon attaining a certain amplitude of vibration, and adjustable means for predetermining such certain amplitude.

3. In an electromagnetic switching device, a base, an electromagnet adapted to be energized supported by said base, a vibratory armature mounted on said base adapted to vibrate with increasing excursions upon the

energization of said electromagnet, means for retaining said armature in a fixed actuated position upon attaining a certain amplitude of vibration, adjustable means for predetermining such amplitude whereby the operation of said device may be delayed for a certain period, and circuit contacts controlled by the actuation of said armature.

4. In an electromagnetic switching device, a base, an electromagnet adapted to be energized, supported by said base, a weighted reed armature adapted to vibrate with increasing excursions upon the energization of said electromagnet, means for retaining said armature in an actuated position upon the attainment of a certain amplitude of vibration, adjustable means for predetermining such amplitude, and contact springs adapted to be actuated by said armature upon the attainment of such amplitude.

5. In an electromagnetic device, a base, an electromagnet adapted to be energized mounted on said base, a weighted reed armature adapted to vibrate with increasing excursions upon the energization of said electromagnet, adjustable means adapted to retain said armature in an actuated position when said armature attains a predetermined amplitude of vibration.

6. In an electromagnetic device, an electromagnet adapted to be energized, means for delaying the actuation of said device, said means comprising an armature adapted to vibrate with increasing excursions upon the energization of said electromagnet, and means for retaining said armature in a fixed actuated position upon attaining a certain amplitude of vibration.

7. In an electromagnetic device, an electromagnet adapted to be energized, an armature therefor adapted to vibrate with increasing excursions upon the energization of said electromagnet, means for magnetically maintaining said armature in a fixed actuated position upon the attainment of a certain amplitude, and adjustable means for predetermining such amplitude.

8. In an electromagnetic device, an electromagnet adapted to be energized, an armature adapted to vibrate with increasing excursions upon the energization of said electromagnet and to intermittently interrupt such energization of said electromagnet, means for retaining said armature in a fixed actuated position upon attaining a certain amplitude of vibration, and adjustable means for predetermining such certain amplitude.

In witness whereof, I hereunto subscribe my name this 4th day of October, A. D. 1917.

HENRY C. EGERTON.