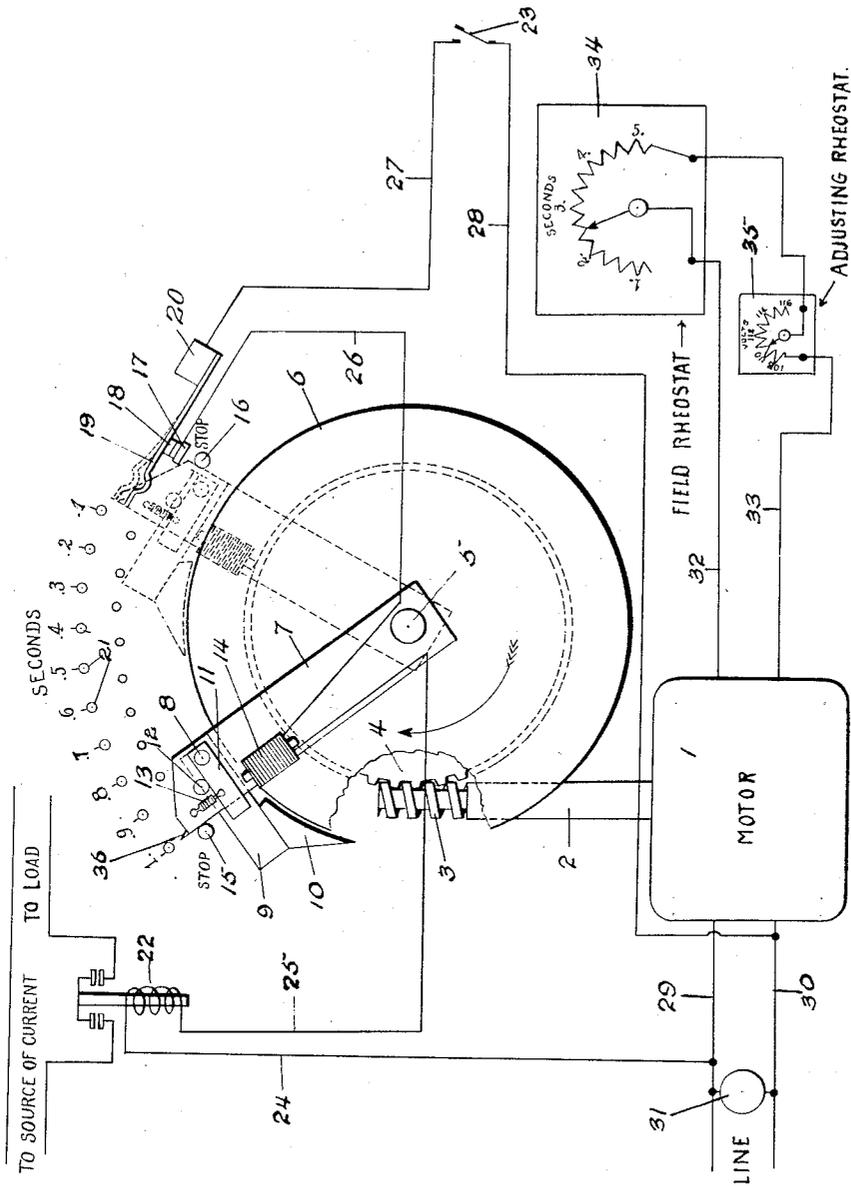


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L. S. UPHOFF.
AUTOMATIC TIME SWITCH.
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AUTOMATIC TIME SWITCH.

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To all whom it may concern:

Be it known that I, LESLIE S. UPHOFF, a citizen of the United States, and a resident of Schenectady, county of Schenectady, State of New York, have invented an Improvement in Automatic Time Switches, of which the following is a specification.

The invention described herein may be used by the Government, or any of its officers or employees in prosecution of work for the Government, or by any other person in the United States, without payment to me of any royalty thereon.

This invention relates to time switches and has for its object to provide novel automatic means for closing an electric circuit for a predetermined period.

A further object is to provide a mechanism capable of adjustment whereby the period of time the circuit is closed may be greatly varied, thereby adapting the device to a variety of uses.

A further object is to provide a simple, durable and inexpensive construction having simple adjustment means and positively operating parts.

The drawing shows an elevation of the improved time switch.

Referring to the drawing by numerals, 1 indicates an electric motor having a shaft 2 provided with worm 3 adapted to operate the worm wheel 4 rigidly mounted on shaft 5.

A rotatable body, in this instance a drum 6, is rigidly mounted on shaft 5 and is rotated thereby at predetermined speeds controlled through the motor.

An arm 7 is mounted to oscillate on shaft 5, and has independent movement thereon.

The arm 7 extends beyond the periphery of drum 6 and has mounted for oscillation in its outer end a shaft 8 on which is rigidly secured arm 9 carrying a shoe 10, in line with the face of drum 6.

An armature 11 is rigidly mounted on shaft 8 and is normally held in contact with stop 12 by spring 13, thus maintaining the shoe 10 out of engagement with the drum.

A magnet or solenoid 14 is mounted on arm 7 beneath the armature 11, which magnet, when energized, operates the armature to bring the shoe 10 into contact with the face of the drum, thereby causing arm 7 to swing on shaft 5 with the drum, which rotates in the direction of the arrow.

Stops 15 and 16 are provided to limit the movement of the arm 7, and located near stop 16 is a contact member 17. A contact member 18 is mounted on spring arm 19 secured on terminal block 20.

The spring arm 19 is adapted to be sprung outwardly by the end of arm 7 to break contact of members 17 and 18, thereby releasing shoe 10 from drum 6 as will appear later.

In order to provide for the closing of the circuit for fractional parts of the time that would be consumed in the operation of the arm from stop 15 to stop 16 the distance therebetween is divided into such fractional parts as may be desired, said points of division being indicated at 21 and numbered from 1 to 10, constituting a scale, thus providing for any fraction of the time ordinarily consumed in the full swing of the arm. By setting the arm at the desired distance from stop 16, the arm will be required to travel only a portion of its entire swing in reaching stop 16. For the purpose of setting the arm, the stop 15 may be adjustably disposed, so that it may be positioned beneath any one of the points of division of said scale.

Relay 22 is in the circuit controlled by means of the time switch and its coil is connected in series with magnet 14 and button 23 through conductors 24, 25, 26, 27 and 28.

The motor 1 is connected through line wires 29 and 30 to a suitable source of electrical energy, its voltage being indicated by volt meter 31.

The field windings of the motor are connected through conductors 32 and 33 with rheostat 34 and a second rheostat 35 the former being graduated in seconds, the latter in volts.

Rheostat 34 is adapted to vary the speed of the motor and therefore the speed of the drum 6 and arm 7 when connected therewith. When arm 7 by means of the frictional contact between shoe 10 and drum 6, is caused to operate, the time required for the arm to travel from stop 15 or one of the divisional points indicated at 21, to stop 16, will be determined by the speed of the drum. Rheostat 34 is therefore graduated in suitable units of time such as seconds which indicate the time required for the arm 7 to travel from stop 15 to stop 16.

In order to compensate for line voltage variation, the adjusting rheostat 35 is pro-

vided. Said rheostat 35 is so graduated that the speed of motor 1 will be constant within practical limits when rheostat 34 is set at a desired speed and rheostat 35 is set according to the indication of volt meter 31.

The operation is as follows: Suppose it is desired to close the circuit running to the load for a period of three seconds. The rheostat 34 is set at a point marked 3 seconds, and rheostat 35 is set at the voltage indicated by volt meter 31. Button 23 is then depressed thus closing the circuit through the coil to the relay 22, magnet 14 draws the armature 11 into contact therewith, and the shoe 10 into frictional contact with drum 6. Drum 6, revolving at a speed determined by the setting of rheostats 34 and 35, carries with it arm 7. When arm 7 reaches stop 16, its free end engages spring arm 19, which separates contact members 17 and 18 and breaks the circuit which holds shoe 10 in contact with the drum through magnet 14. The breaking of the circuit through magnet 14 also causes the relay 22 to break the circuit running to the load, and the particular object in view in closing the circuit running to the load for a given length of time has been accomplished.

When it is desired to close the circuit running to the load for a fractional part of a second, the rheostat 34 is set at one second and arm 7 is set with its pointer 36 at the fractional part of a second desired, as indicated at 21, therefore when the arm 7 takes up the movement of the drum it only moves from its set position to stop 16 when the circuit will be broken.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, comprising a rotatable body, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to move therewith, and normally closed contacts in the path of movement of said member to be opened thereby.

2. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, comprising a rotatable body, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to move therewith, and means controlled by the movement of said member for breaking said circuit.

3. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, com-

prising a rotatable body, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to move therewith, and means in the path of movement of said member and engageable thereby for breaking said circuit.

4. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, comprising an electric motor driven rotatable body, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to revolve therewith, means in the path of movement of said member and engageable thereby to break the circuit, and means for varying the speed of the motor.

5. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, comprising a rotatable body, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to move therewith, means in the path of movement of said member engageable thereby to break said circuit, and means for varying the degree of oscillation of said member.

6. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, comprising a rotatable body, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to move therewith, means in the path of movement of said member engageable thereby to break the circuit, and stops in the path of movement of said member for determining the degree of oscillation thereof.

7. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, comprising a rotatable body, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to move therewith, means in the path of movement of said member engageable thereby to break the circuit, and stops in the path of movement of said member for determining the degree of oscillation thereof, one of said stops being adjustably positioned to vary the degree of oscillation of said member.

8. The combination with a working cir-

5 cuit, of mechanism for governing the closing of the same for a predetermined period comprising a rotatable body, an electric motor with its shaft, co-acting means carried by the motor shaft and said body for rotating the latter, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to revolve therewith, and means in the path of movement of said member to be contacted thereby to open the circuit.

15 9. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, comprising a rotatable body, an electric motor with its motor shaft, a worm carried by said shaft, a worm wheel carried by said body and meshing with said worm, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to move therewith, and means in the path of movement of said member to be contacted thereby to open the circuit.

30 10. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, comprising a rotatable body, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, a frictional clutch normally out of contact with said body for coupling said member to said body so as to move there-

with, means actuated by the energizing of said magnet for throwing said clutch into contact with said body, and means in the path of movement of said member to be contacted thereby to open the circuit.

40 11. The combination with a working circuit, of mechanism for governing the closing of the same for a predetermined period, comprising a rotatable body, a circuit breaking member oscillatory on the axis of rotation of said body, a magnet carried by said member, means actuated by the energizing of said magnet for coupling said member to said body so as to move therewith, stops in the path of movement of said member for determining the degree of oscillation thereof, one of said stops being adjustably positioned to vary the degree of oscillation of said member, a scale arranged along the path of travel of said member, a pointer carried by said member and co-operating with said scale and means in the path of movement of said member to be contacted thereby to open the circuit.

50 12. An automatic time switch including a rotatable body, a circuit breaking arm, oscillatory on the axis of rotation of said body, means carried by the arm for coupling the arm to the body to move therewith and means for actuating said coupling means.

60 13. An automatic time switch including a rotatable body, a circuit breaking arm, oscillatory with said body, means carried by the arm for coupling the arm to the body to move therewith, and electromagnetic means for actuating said coupling means.

70 LESLIE S. UPHOFF.