

926,312.

Patented June 29, 1909.

Fig. 1.

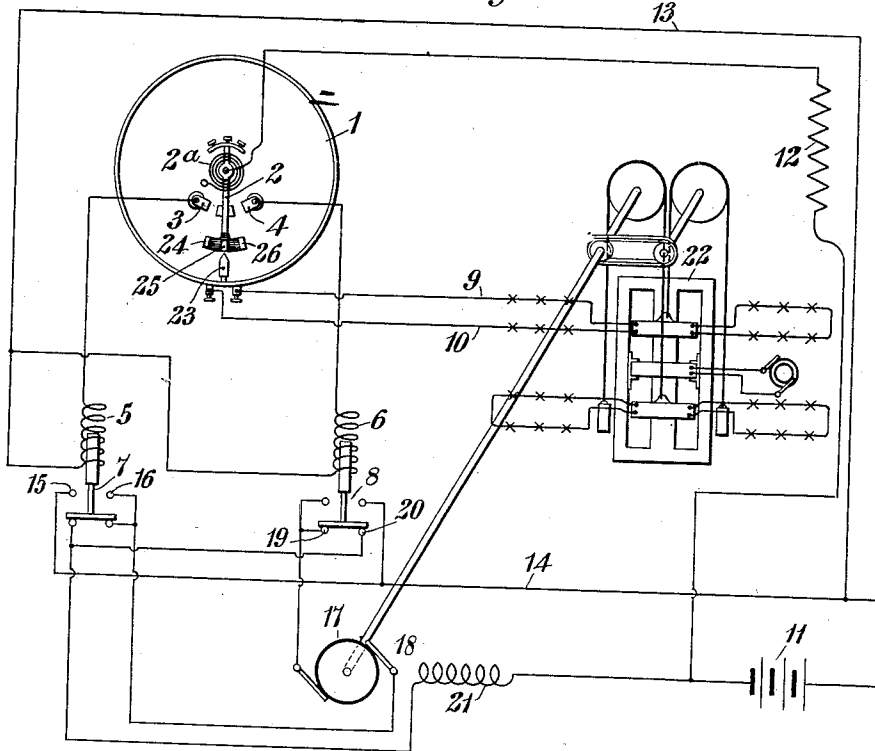
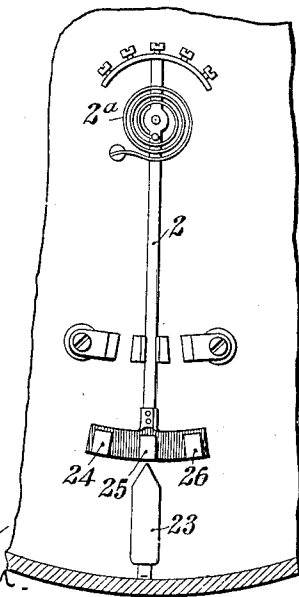


Fig. 2.



WITNESSES:

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Fig. 3.

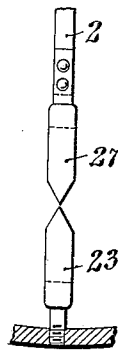
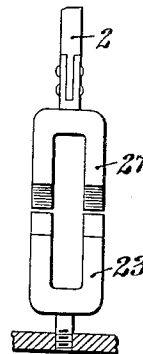


Fig. 4.



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METER-RELAY.

No. 926,312.

Specification of Letters Patent.

Patented June 29, 1909.

Application filed April 4, 1906. Serial No. 309,923.

To all whom it may concern:

Be it known that I, HENRY S. BAKER, a subject of the King of Great Britain, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Meter-Relays, of which the following is a specification.

My invention relates to meter relays and particularly to such devices of this class as are provided with oscillating contact arms which are adapted to engage pairs of similar stationary contact members at the limits of their movement.

The object of my invention is to provide, in a device of the class above indicated, magnetic means for accentuating one or more of the positions which the movable contact member is adapted to occupy.

In automatic regulators for various purposes, such as the maintenance of constant fluid-pressure in a tank or the maintenance of a constant potential or constant current in an electric circuit, meter or indicating mechanisms having a movable arm which swings in one direction when the fluid-pressure, the voltage or current, as the case may be, exceeds a predetermined value and which swings in the opposite direction when the intensity of these elements falls below the predetermined value have generally been employed. It is usually essential to make the movable member relatively light so that it may be operated by a small force, consequently the circuits completed through the contact member must be traversed by small current values which, in turn, operate relay switches capable of carrying the main operating currents. Even if the values of the current traversing the contact members are small, it is desirable to accentuate the various positions occupied by the movable contact arm in order to prevent the chattering or rapid oscillation of the arm into and out of engagement with the stationary contact members. According to my present invention, I provide a magnetic means for effecting this objective result that comprises a stationary magnet which is mounted near the end of the movable contact arm and which produces a small magnetic field through which other magnets or magnetizable blocks oscillate as the contact arm moves from one extreme position to the other.

Figure 1 of the accompanying drawings, is a diagrammatic view of a constant current

system of regulation embodying the meter relay of my invention. Fig. 2 is an elevation of the relay accentuating device shown in Fig. 1, and Figs. 3 and 4 are, respectively, a front and a side elevation of a modified form of a magnetic accentuating device which is included in my invention.

Referring to Figs. 1 and 2, a meter relay 1 comprises a movable contact arm 2, a centering spring 2^a and a pair of similar stationary contact members 3 and 4 from which energy may be supplied, respectively, to actuating coils 5 and 6 of relay switches 7 and 8. The movable contact arm 2 is oscillated in the one direction or the other from its mid-position when the current traversing a distributing circuit 9—10 rises above or falls below a predetermined amount. Energy at a relatively low voltage is supplied from any convenient source, such as a battery 11 through a resistance 12 to the movable contact arm 2 from which point circuit is completed through either the stationary contact member 3 and the coil 5 of the switch 7 or the stationary contact member 4 and the coil 6 of the switch 8 to a conductor 13 which is connected to the opposite terminal of the battery 11. When the relay switch 7 is closed, energy is supplied from the battery 11 through conductor 14, contact-members 15 and 16 of the switch 7 to the armature 17 of a motor 18, from which point, circuit is completed through contact members 19 and 20 of the switch 8, which is in its open position, and field magnet winding 21 of the motor to the opposite battery terminal. If the switch 8 is closed instead of the switch 7, energy is similarly applied to the motor except that the current passes through the armature 17 in the opposite direction, so that the rotation of the motor is reversed. The motor 18 is employed in a well known manner to change the position of the movable coils of a current regulator 22 which tends to keep the value of current traversing the distributing circuits constant. A description of a regulator of this type is embodied in Patent No. 792,120, granted June 13, 1905 to the Westinghouse Electric & Manufacturing Company, as assignee of Frank Conrad. In order that the contact arm 2 may be moved positively into engagement with either the stationary member 3 or the stationary member 4, a stationary magnet 23 is located near the end of the

arm upon which three magnetizable blocks 24, 25 and 26 are located. The end of the magnet 23 may preferably be pointed or beveled so that its flux may be concentrated upon one of the magnetizable blocks and these blocks are so arranged that the attraction between the blocks and the magnet serves to accentuate the mid-position of the contact arm and the two extreme positions of its motion in which it engages the movable contact members. The strength of the magnet 23 and the size and arrangement of the blocks 24, 25 and 26 are such that any tendency for the arm to chatter in the vicinity of the stationary contact members is obviated, while the force of attraction between the magnet and any one of the blocks is not sufficient to permit any considerable variation from the constant value of current which is maintained in the circuit 9-10.

Figs. 3 and 4 illustrate a modified arrangement of parts in which a magnet 27 is attached to the end of the movable contact arm 2 and replaces the magnetizable blocks 24, 25 and 26. The magnet 27 may be either a straight bar or in the form of a horse shoe and will be arranged to be attracted by the stationary magnet 23 and its ends may also preferably be pointed so that the field of influence between the two magnets is narrow. With this arrangement the mid-position of the movable arm only is accentuated but if the arm is held in this position until the turning forces are sufficient to overcome the magnetic attraction, chattering at the contacts may be avoided.

Although I have illustrated a magnetic accentuating device of my invention in connection with an ammeter relay, it may advantageously be employed for various other purposes, and I desire that only such limitations be imposed as are indicated in the appended claims.

I claim as my invention:

1. The combination with a pair of stationary contact members and a movable contact member provided with three magnetizable blocks and having its open circuit position between said stationary contact members, of a stationary magnet so located as to cooperate with said magnetizable blocks and thereby accentuate the positions which the movable member is adapted to occupy.

2. In a meter relay, the combination with a pair of stationary contact members, and a movable contact member having three magnetizable pieces, the open circuit position of said magnet being between said stationary

contact members, of a returning spring which normally holds the movable member in its open circuit position, and magnetic means cooperating with the magnetizable pieces to accentuate the open circuit and closed circuit positions of the movable member.

3. In a meter relay, the combination with a movable contact arm, a pair of similar stationary contact members, of a stationary magnet and a plurality of magnetizable projections on said movable arm which are in the field produced by the magnet when the movable arm occupies any one of the positions to which it is adapted.

4. In a meter relay, the combination with a pair of stationary contact members and a movable contact member the open circuit position of which is between said stationary contact members, and a spring tending to hold the movable member in open circuit position, of a stationary magnet serving to accentuate the open circuit and closed circuit positions of said movable member.

5. The combination with a movable arm, and means for returning it to a middle position when moved therefrom in either direction by external forces, of means for accentuating three positions comprising devices attached to the arm, and a stationary magnet which produces a concentrated field to act upon said devices in said positions.

6. The combination with a movable contact-carrying arm, a pair of stationary contact members which may be engaged by the contact-carrying arm and a returning spring which normally holds the arm in a position midway between the two stationary terminals, of a relatively movable magnet and magnetizable blocks therefor which parts are cooperatively located on the movable contact arm and on a relatively stationary body.

7. The combination with a movable contact-carrying arm, a pair of stationary contact members which may be engaged by the contact-carrying arm and a returning spring which normally holds the arm in a position midway between the two stationary terminals, of magnetic means for accentuating the mid-positions and the two positions of contact with the stationary members.

In testimony whereof, I have hereunto subscribed my name this 31st day of March, 1906.

HENRY S. BAKER.

Witnesses:

WESLEY G. CARR,
BIRNEY HINES.