May 28, 1929. R. E. OLLERENSHAW 1,715,172

ELECTRIC FLASHING DEVICE

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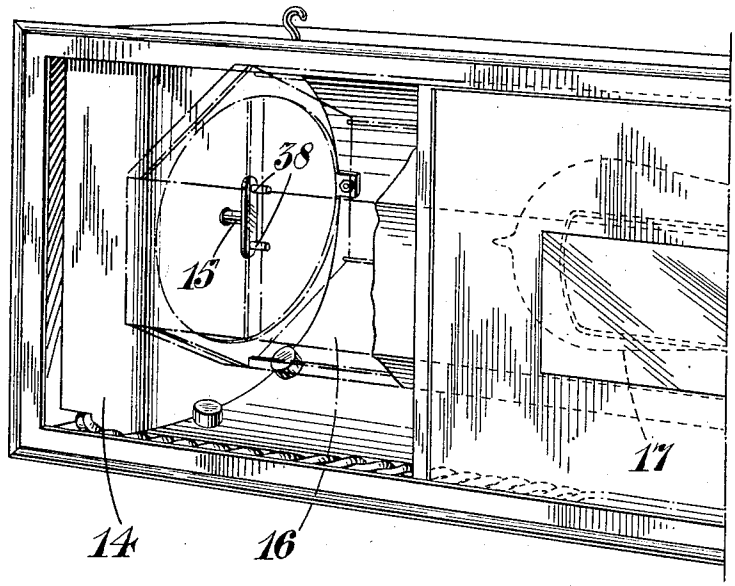


Fig. 1.

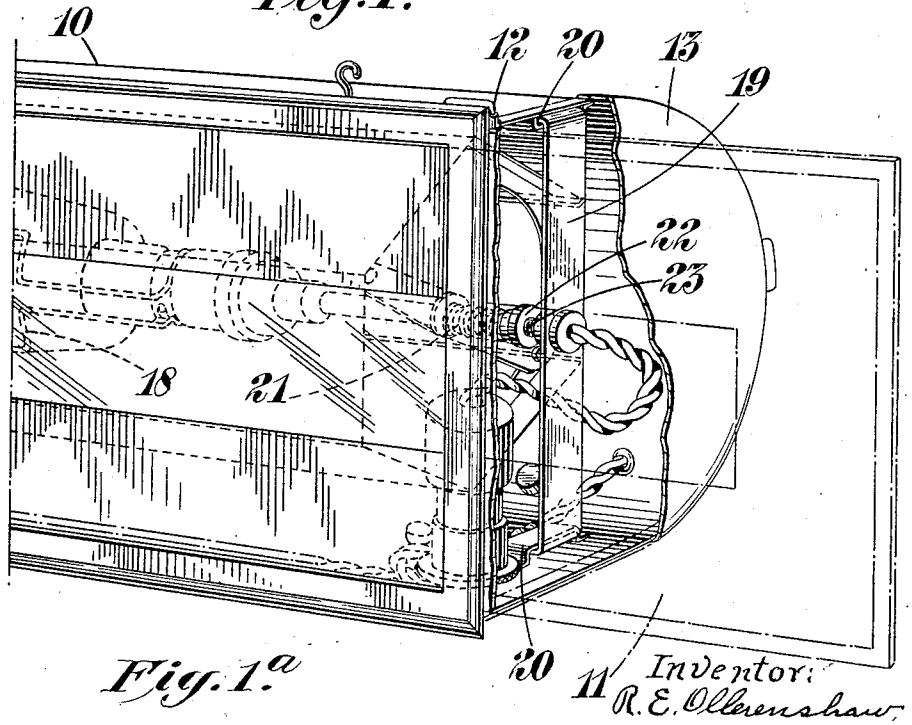


Fig. 1a

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Fig. 2.

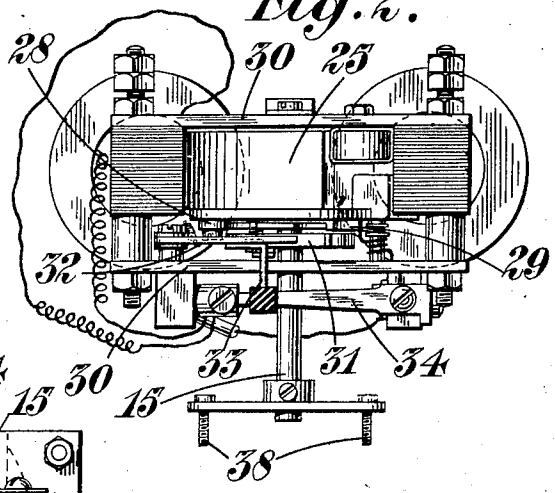


Fig. 3.

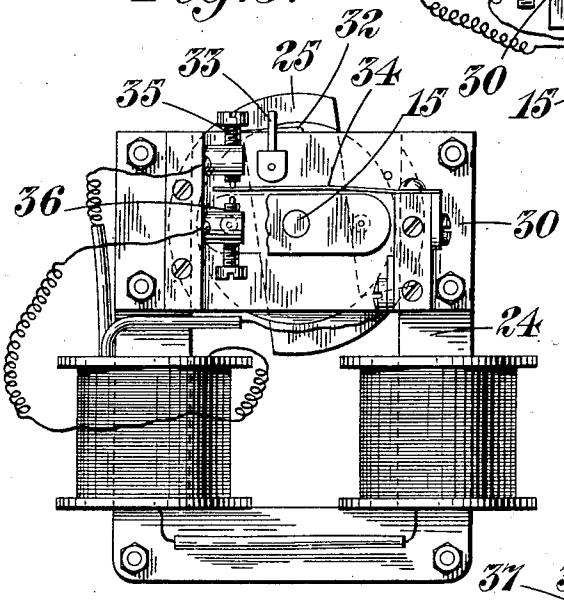
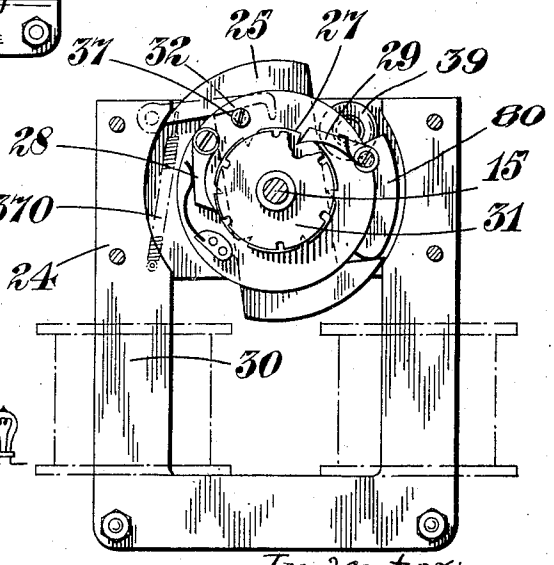


Fig. 4.



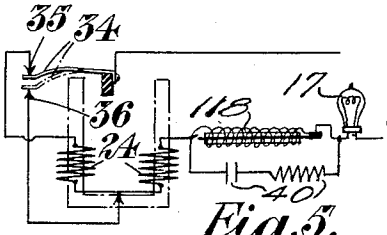


Fig. 5.

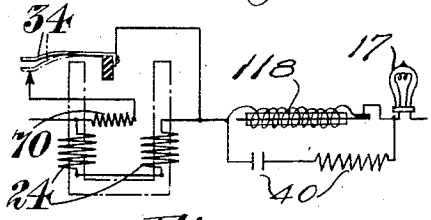


Fig. 6.

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UNITED STATES PATENT OFFICE.

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ELECTRIC FLASHING DEVICE.

Application filed January 5, 1925, Serial No. 728, and in Great Britain January 16, 1924.

This invention consists in improvements in or relating to electric flashing devices. One of such devices, all of which will be hereinafter referred to by the term "flasher", is a thermal or heat-operated device and is sometimes assembled in a socket for an electric lamp, or in an adapter which is formed to fit a lamp-socket and has in it means to accommodate an electric lamp. There are also other means in which these or other forms of flasher are associated with an electric circuit, such means being in themselves well-known.

The object of a flasher is to afford means by which current in an electric circuit is automatically switched on and off alternately at intervals or in which the current is automatically reduced and increased alternately.

The present invention relates to apparatus of the type comprising a flasher and an electric-motor device which is electrically connected with the flasher in such manner that intermittent movement of the motor-device is automatically obtained.

The invention provides in apparatus of the above type the combination of a rotatable display device, an electric-motor for driving said device, a one-way clutch between the motor and the display device, an automatic thermo-electric switch arranged to control the current supply to the motor so as to cause intermittent operation thereof, a rotatable member carried by the display device for rotation therewith, a pivoted locking member automatically operable at the termination of each intermittent movement of the motor to make a locking engagement with the rotatable member aforesaid, and means actuated by the pivoted locking member as the latter is brought into engagement with the co-operating rotatable member, to decrease the magneto-motive force of the motor.

The provision of means for decreasing the magneto-motive force of the motor has the following advantages:

The armature of an electro-magnetically operated motor device is generally arranged to have an appreciable distance of travel in order to produce the movement required and by provision of the aforesaid magneto-motive force decreasing means the armature is prevented from completing its movement with unnecessary force. Moreover, where the flasher is of the type in which the current passing through it is never entirely cut off but is only reduced, the reduced current flowing through the windings of the electro-magnet is sufficient to affect adversely the return movement of the armature under the action of a return spring for example, unless the magneto-motive force decreasing means is employed.

In the preferred form of the invention, there is combined with the flasher-controlled motor device an electrically energized illuminating means controlled by the same flasher. In such a combination, the magneto-motive force decreasing means operates to prevent dimming of the light when the flasher operates. This is particularly noticeable when the motor device is in the form of an electro-magnet having a movable armature serving to operate a changing sign advertising device for example. It is to the latter type of device that the present invention particularly applies and it is essential that for the good operation of an advertising device, the light should not be temporarily dimmed during the period of time over which the device is intended to be illuminated. The aforesaid magneto-motive force decreasing means is particularly advantageous (in eliminating "hum") where the flashing device is operated from alternating current supply.

In order that the invention may be more clearly understood some preferred embodiments thereof will now be described by way of example only with the aid of the accompanying drawings, in which—

Figure 1 is a perspective view showing one half of an advertising device according to the present invention;

Figure 1[a] is a similar view of the other half of the device;

Figure 2 is a plan;

Figure 3 is an elevation of one form of motor device;

Figure 4 is an elevation of the device shown in Figure 2 with the front plate removed to show the mechanism lying behind that plate; and

Figures 5 and 6 are diagrams of electrical connections of the motor device and flasher.

Like reference numerals indicate like parts in the figures of the drawings.

As shown in Figures 1 and 1ª the advertising device comprises a casing 10 having an endwise slidable transparent or translucent front 11 (shown in chain lines). The front may be decorated if preferred and in one form may have a marginal decoration with a clear central portion. A clip to retain the front in its closed position is indicated at 12 and an end wall 13 of the casing 10 is hinged or otherwise moved to give access to the interior of the device.

The motor device is concealed or contained within a shield 14 through which the spindle 15 of the motor extends. The motor, which is illustrated in detail in Figures 2, 3 and 4, will be described more fully hereinafter. The spindle of the motor has means by which it can be engaged with a prismatic advertising structure which is rotated intermittently by the motor device behind the front 11, and within the structure 16 is an illuminating means indicated by a lamp 17 provided with a light-diffusing screen 18.

The illuminating means is carried on a bracket 19 engaged with clips 20 secured to the inside of the casing 10. A coiled compression spring 21 is employed between a fixed part and the end of the structure 16 so as to apply the requisite braking effect to the latter as it is moved and the force of the spring 20 is adjustable by means of a compression adjusting nut 22 screw-threaded on to a spindle 23.

Each surface of the structure 16 is preferably formed with an advertising or other device which it is desired to exhibit through the front 11.

Referring to Figures 2 to 4 the motor device has a U-shaped electro-magnet 24 between the free ends of the limbs of which there is disposed an oscillating armature 25 carried on the spindle 15. Mounted to rotate with the spindle of the armature is a toothed wheel 27, the teeth of which are engaged by a spring-pressed pawl 28 carried on the armature and by a back-stop pawl 29 carried in one of the two plates 30 in which the spindle 15 is journalled. The armature is free to rotate on that spindle. Mounted to rotate also with the spindle 15 is a notched disc 31 wherein there is a notch corresponding to each of the teeth on the wheel 27.

As the armature oscillates from one extreme position to the other the pawl 28 engages behind one of the teeth of the wheel 27 and rocks it through an angular distance equal to one tooth space. At the end of its operative position one of the notches in the disc 31 is brought underneath a spring-pressed arm 32, the free end of which enters the notch and in so doing a projection 33 (Figures 2 and 3) extending from the arm 32 engages with a spring strip 34 comprising part of a switch device. The movement of the projection 33, as the arm 32 falls into a notch, causes the strip 34 to be disengaged from a contact 35 and to be engaged with another contact 36. During the return movement of the armature a stop or roller 37 thereon raises the pivoted arm 32 (see Figure 4) so as to remove its outer end from the notch in the disc 31 against the action of a control spring 370. At the same time the contact strip 34 is allowed to move again into engagement with the contact 35 and to be disengaged from the contact 36.

The toothed wheel 27 and the disc 31 are fast on a spindle 15 which is operatively connected with the changing advertisement sign by means of two projections 38 extending from it and shown also in Figure 1. These projections 38 engage in orifices provided, for example, in the structure 16.

The armature 25 is preferably so formed, for example of Z shape as shown, and is provided with a counterweight 80, that when the current ceases to flow through the windings of the electro-magnet 24 or is sufficiently reduced the armature will return by gravity to its initial position; and to reduce the shock or noise of the return of the armature an elastic or other buffer 39 may be provided. The counterweight may be made of lead or any other suitable substance. It may be connected to the armature by screws or pins. The counterweight may be replaced by a spring or other suitable means, if desired.

The wiring diagram for the device so far described is shown in Figure 5 from which it will be seen that when the strip 34 is in engagement with the contact 35, current from the mains will flow through the illuminating device 17 and flasher 118 and through the full winding of the electro-magnet. When the strip 34 moves into engagement with the contact 36 part of the windings of the electro-magnet is cut out of the circuit thus reducing the magneto-motive force of the motor device. This occurs when and almost immediately after the flasher device is operated to energize the circuit and before or at the moment when the armature of the motor has completed its full stroke.

Alternatively instead of entirely cutting out the circuit through part of the electro-magnet windings the connections may be such that part of the windings is short-circuited by movement of the switch. In such a case the switch arm is connected to one end of the motor windings and is normally out of engagement with a single contact connected to a tapped point of the windings. When the switch is moved it serves to short-circuit the tapped portion of the windings.

It will be seen that by cutting out or short-circuiting a portion of the armature windings the impedance of the circuit is reduced and undue dimming of the light is prevented.

Moreover by reducing the magneto-motive force the pull of the armature may be decreased as it is nearing the end of its stroke so that it completes its movement with less force than otherwise it would do and the residual pull of the magnet, in the case in which the flasher is of the type that does not entirely break the circuit, is reduced sufficiently to prevent the tendency of the armature to stick up against its normal return.

As a further alternative, see Figure 6, the switch may serve to complete a shunt circuit through a resistance 70, which is so proportioned relatively to the resistance of the windings of the electro-magnet 24 that only a small portion of such current as there may be flowing in the circuit will pass through the windings.

In order to reduce the spark which may occur at the contacts of the flasher due to the self-induction of the magnet windings it is found preferable to shunt the flasher contacts by a condenser and resistance in series shown at 40 in Figure 5.

The provision of the means exemplified by the series condenser and resistance 40 may be found to be advantageous when comparatively heavy currents, such as would produce undesirable sparking at the flasher contacts are to be accommodated.

It will be seen from the foregoing that each time the armature is oscillated the prismatic member 16 is partially rotated to present a fresh face towards the front 11 of the enclosing casing, and thus to present a fresh advertisement to view. Moreover it will be appreciated that the current consumption of a device when the electrical connections are those diagrammatically illustrated in Figure 5, is very small inasmuch as the current passing through the energizing circuit of the motor cannot be greater than that flowing through the lamp 17. Thus a very efficient and economical device is provided by the arrangement, in series, of the lamp, flasher device and the energizing circuit for the motor.

The invention is not limited in its application to advertising devices as it may be employed for any purpose for which it is necessary to obtain intermittent and comparatively regularly intermittent movements.

Any preferred current-decreasing means or means to reduce the magneto-motive force or impedance of the circuit, other than that described hereinbefore, actuated by the movement of the motor device or otherwise, may be utilized while still obtaining the advantages of the invention.

I claim:

1. In apparatus of the type described the combination of a rotatable display device, an electric motor for driving said device, a one-way clutch between the motor and the display device, an automatic thermo-electric switch arranged to control the current supply to the motor so as to cause intermittent operation thereof, a rotatable member carried by the display device for rotation therewith, a pivoted locking member automatically operable at the termination of each intermittent movement of the motor to make a locking engagement with the rotatable member aforesaid, and means actuated by the pivoted locking member as the latter is brought into engagement with the co-operating rotatable member, to decrease the magneto-motive force of the motor.

2. In apparatus of the type described the combination of a rotatable display device, an electric motor for driving said device, a one-way clutch between the motor and the display device, an automatic thermo-electric switch arranged to control the current supply to the motor so as to cause intermittent operation thereof, a rotatable member carried by the display device for rotation therewith, a pivoted locking member automatically operable at the termination of each intermittent movement of the motor to make a locking engagement with the rotatable member aforesaid, a shunt circuit connected across at least a portion of the energizing circuit of the motor, a switch for opening and closing said shunt circuit, and means actuated by the pivoted locking member as the latter is brought into engagement with the co-operating rotatable member, to close the switch controlling the aforesaid shunt circuit.

3. In apparatus of the type described, the combination of a rotatable display device, electrically-energized means for illuminating said device, an electric motor for driving said device, a one-way clutch between the motor and the display device, an automatic thermo-electric switch arranged to control the current supply to the motor and to the illuminating means so as to cause intermittent operation of said motor and illuminating means, a rotatable member carried by the display device for rotation therewith, a pivoted locking member automatically operable at the termination of each intermittent movement of the motor to make a locking engagement with the rotatable member aforesaid, and means actuated by the pivoted locking member as the latter is brought into engagement with the co-operating rotatable member, to decrease the magneto-motive force of the motor.

4. In apparatus of the type described, the combination of a rotatable display device, electrically-energized means for illuminating said device, an electric motor for driving said device, a one-way clutch between the motor and the display device, an automatic thermo-electric switch arranged to control the current supply to the motor and to the illuminating means so as to cause intermittent operation of said motor and illuminating means, a rotatable member carried by the display device for rotation therewith, a pivoted locking

member automatically operable at the termination of each intermittent movement of the motor to make a locking engagement with the rotatable member aforesaid, a shunt circuit connected across at least a portion of the energizing circuit of the motor, a switch for opening and closing said shunt circuit, and means actuated by the pivoted locking member as the latter is brought into engagement with the co-operating rotatable member, to close the switch controlling the aforesaid shunt circuit.

In testimony whereof I affix my signature.

REGINALD ERIC OLLERENSHAW.