No. 717,015. Patented Dec. 30, 1902.

P. E. OSWALD.

AUTOMATIC ELECTROMAGNETIC FLASHER.

(Application filed Feb. 5, 1902.)

(No Model.)

FIG. 1.

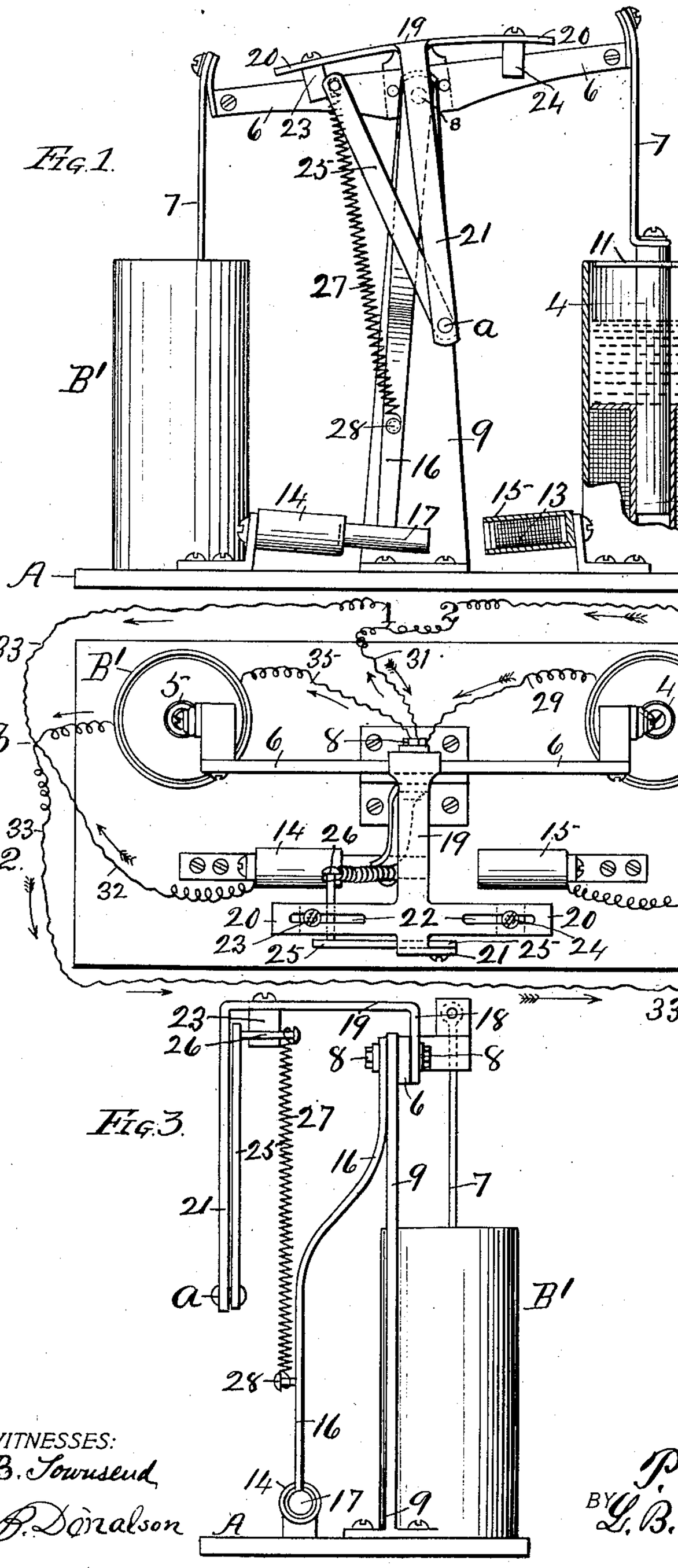

FIG. 2.

FIG. 3.

WITNESSES:
F. B. Townsend
J. P. Donalson

INVENTOR.
P. E. Oswald.
BY L. B. Coupland & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

PAUL E. OSWALD, OF CHICAGO, ILLINOIS, ASSIGNOR TO REYNOLDS ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

AUTOMATIC ELECTROMAGNETIC FLASHER.

SPECIFICATION forming part of Letters Patent No. 717,015, dated December 30, 1902.

Application filed February 5, 1902. Serial No. 92,645. (No model.)

To all whom it may concern:

Be it known that I, PAUL E. OSWALD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Electromagnetic Flashers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a combined circuit-controller and actuating mechanism that is more especially intended for use in the production of electrically-illuminated display-signs, and has for its object to provide a simple and efficient device of this character in which the direction of the current is alternately and automatically changed and the desired effect obtained without the use of an independent motor.

In the drawings, Figure 1 is a side elevation of an apparatus embodying the improvements. Fig. 2 is a plan showing the course of the circuit-wires, and Fig. 3 is an elevation looking from the center outward in the direction of the end.

A represents an insulated base, on which the different elements are properly mounted.

The companion cylinders B B′ are located some distance apart on the supporting-base and form an inclosing case for the companion solenoid-coils C, which may be of the usual construction; but one solenoid is shown, a portion of its cylinder being sectioned for that purpose in Fig. 1. It will be understood that the different elements located in each cylinder are in duplicate.

The companion plungers or cores 4 and 5 are adapted to have an alternating reciprocating movement, the upper ends being connected with the respective ends of a rocking beam 6 by connecting-rods 7. This beam is provided with a rocking bearing on a bolt 8, inserted through the upper end of a standard 9, mounted on the supporting-base. The lower part of the companion plungers extend into and have the usual metallic contact with the solenoids, as clearly shown in the sectioned part of Fig. 1. The contact of the plungers with the adjacent surfaces of the solenoids, in connection with the electric circuit, generates the magnetic current necessary to actuate the elements having a mechanical movement. The solenoid-cylinders are partly filled with a body of liquid 10, which is preferably oil or other substance of a greater density than water and also possessing some of the characteristics of a lubricant. The presence of the liquid body eases the down movement of the plungers and guards against any quick dropping action. The operation of this part of the apparatus is somewhat similar to that of a dash-pot device and might be termed a "dash-pot" solenoid. A cap or disk 11 is rigidly mounted on the plungers just below their upper ends and serves to prevent the liquid contents from splashing over. These caps are of a little less diameter than that of the cylinders and provides an annular space 12 for the admission and the escape of air when the plungers are in operation.

The magnet-coils 13 are inclosed in companion tubes 14 and 15, having their open ends pointing in the direction of each other, and are set some distance apart, as shown in Figs. 1 and 2. These tubes are suitably mounted on the supporting-base and are located a suitable distance from the solenoid-cylinders to provide the necessary space for the grouping and working of the different elements.

The upper end of a lever 16 is mounted on the pivot-bolt 8 in contact with the standard 9, the lower part being bent outward therefrom and extended downward to and terminates in line with the magnet-coil tubes 14 and 15. A contact-plug 17 is mounted on the lower end of lever 16 and is positioned in line with the open ends of the magnet-tubes and has an oscillating movement in alternately engaging the magnet-coils in the tubes. These features have the functions of a commutator and switch in alternating the direction of the electric current and that of a magnetic blow-out in preventing arcs when the current is diverted.

The inner vertical end 18 of an angle-bracket 19 is also mounted on bolt 8, as best shown in Fig. 3. From the vertical part a horizontal branch extends outward to and

ends in the integral cross-arm 20. From this cross-arm the terminal end 21 of the bracket extends downward and stops short of the supporting-base. The cross-arm member of this bracket is provided in its respective ends with elongated slots 22, Fig. 2, in which movement stops 23 and 24 are adjustably secured. The lower end of a link 25 is pivoted, as at *a*, to the corresponding lower end 21 of the bracket 19. The upper disengaged end of this link carries a pin 26, fixed therein and which extends inward past the width of the stops 23 and 24 to allow for the attachment thereto of the upper end of a spring 27. The opposite lower end of this spring is fastened to a pin 28, inserted in the lever 16. The upper disengaged end of link 25 has a vibratory movement in the space between the stops 23 and 24, and alternately contacts one stop and then the other, in accordance with the movement and position of the other mechanical elements when in active operation, as will be explained farther along. The stops 23 and 24 may be set nearer to or farther away from each other in the slotted cross-arm 20 in regulating the travel of the plunger-cores. The nearer the stops are together the quicker and shorter the stroke or travel of the plungers, and which has a corresponding effect on the lamps illuminated or other object energized.

As shown in Fig. 1, the plunger 4 has reached its highest point on the up movement. At this time the upper end of link 25 is in contact with the stop 23 and the contact-plug 17 in engagement with the magnet blow-out 14 and the lamps (indicated by the numeral 2) illuminated. The course of the current from the power plant E is now through wire 29 to and through solenoid-cylinder B to the standard 9 and through wire 30 to the lamps 2 and wire 31 to the standard 9. From standard 9 the current passes into the lever 16 and through the magnet blow-out 14 to wire 32 and returns to the power plant through wire 33 from the point of intersection *b* with wire 32, the live wires being also indicated by feathered arrows.

The down travel of the plunger imparts a corresponding movement to that end of the rocking beam and tilts the angle-bracket 19 to its opposite position from that shown in Fig. 1. When this bracket has moved far enough to bring the lower end of link 25 past a vertical line drawn through its pivotal point and that of pin 28, the upper end of the link will graduate over in contact with the stop 24 and change the pull of spring 27 in the opposite direction and impart a quick movement to lever 16 and bring the contact-plug into engagement with the magnet blow-out 15. The different parts having moved to their opposite position, the current flows through wire 29 to the intersection *d* and then follows wire 34 to the magnetic blow-out 15 and through the lever 16 and the standard 9 to wire 31 and illuminating the lamps, (indicated by numeral 1.) The current is at the same time flowing through solenoid-cylinder B′ over the wire 35 and back to the power plant through the wire 33, the course of the current for illuminating lamps 1 being also indicated by darts.

It will be understood that the alternating movements are very quick, the circuit being short-circuited instead of being broken.

The companion solenoid-cylinders are in series, as are the two sets of lamps.

It is apparent that this device may be used in a direct circuit as well as in alternating currents and also employed for other purposes besides that of controlling lamp-circuits.

Of course the magnetic blow-outs and plug constitute contacts or electrical contact-making parts. They might be varied in form without affecting their operativeness in this regard. The same is true of the electromagnetic devices B and B′, though I prefer solenoids and cores and substantially the construction shown.

The main circuit is never broken. The two branch circuits through the solenoids are cut in and out alternately, there being only one exceedingly brief interval while the plug is springing from one blow-out to the other during which the circuit is not quite complete through either solenoid.

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

1. In combination with the generator and conductors of an electric circuit, a pair of solenoids in branches of the said circuit, the endwise-movable cores of the said solenoids, a walking-beam and connections from its ends to the said cores, a lever and a movable contact-making part carried thereby, a pair of contact-making parts arranged for contact with the contact-making part first named, as it is shifted into one or the other of two positions respectively, conductors from the said two contact-making parts to the two solenoids respectively, and from the latter to the main line and the said movable contact-making part and mechanism actuated by the oscillation of the walking-beam and connected to the said lever for shifting the contact-making part carried thereby, the electric conductors being arranged to short-circuit the solenoids alternately without breaking the main circuit, as the said movable contact-making part is shifted snbstantially as set forth.

2. A walking-beam or equivalent device in combination with a pair of electric magnetic devices oscillating the same, a pair of stationary electrical contact-making parts, a movable contact-making part shifting alternately from one to the other of the said stationary parts, electric conductors from the latter to electromagnetic devices respectively, an electric generator and conductors making circuit through one or the other of the electromagnetic devices according to the position into which the said part is thus shifted, shifting devices therefor actuated by the movement of the said walking-beam, and conductors

from the said movable contact-making part to the circuit-wire substantially as set forth.

3. A generator of electricity and circuit-conductors, additional conductors making two branch circuits, a pair of electromagnets and a pair of stationary contact-making devices, each magnet and one of said contact-making parts being in each of the said branch circuits, a movable contact-making part arranged to shift from one of the said stationary parts to the other electrical connections from the said part to the main-circuit wire, completing one or the other of the said branch circuits, according to the position of contact of the said movable part, the movable cores or armatures of said electromagnets, an intermediate device oscillated thereby and mechanism connected therewith for shifting the said movable part automatically from one of the said stationary contact parts to the other, without breaking the main circuit, substantially as set forth.

4. A pair of solenoids and their movable cores, in combinatiou with an oscillating device operated thereby, a movable contact-making part, mechanism shifting said part from one to another of two positions alternately, a pair of contact-making parts connected electrically to the two solenoids respectively and arranged for contact with the said movable part as it moves from one position to the other, electric devices making a main circuit and additional conductors making branch circuits which are completed through one or the other of the two solenoids according to the position of the movable contact part as aforesaid, the main circuit remaining unbroken substantially as set forth.

5. A pair of electromagnetic devices and their movable metal parts, in combination with a walking-beam oscillating thereby, a pair of tubular electromagnetic blow-outs, an electrically-conducting plug adapted to enter and make contact with either of the said blow-outs, mechanism governed by the oscillation of the said walking-beam and operating to shift the said plug from one blow-out to the other, electric conductors constituting a main circuit which remains unbroken and additional electric conductors making two branch circuits through the two solenoids, these circuits being alternately opened and closed by the shifting of the contact-plug as aforesaid from one of the said blow-outs to the other, in order that each electromagnetic device may be short-circuited, while the other is energized, without interrupting the main circuit, substantially as set forth.

6. A pair of solenoids and their movable cores in combination with a walking-beam oscillated thereby, a pair of tubular electromagnetic blow-outs, an electrical contact-making plug adapted to enter either of the said blow-outs, means for automatically shifting the said plug from one blow-out to the other, actuated by the said oscillating walking-beam, and electrical conductors connecting to the said plug and making circuit through one solenoid or the other according to the position of the said plug substantially as set forth.

7. In combination with a walking-beam and a pair of electromagnetic devices acting on its ends alternately, a pivoted depending arm or lever, an electrical contact-making part carried thereby, two fixed contact-making parts arranged for contact alternately with the contact-making part first mentioned, electric conductors connected with these three contact-making parts and making circuit through one or other of the said electromagnetic devices, according to the position of the said contact-making part on the arm or lever, a link, a spring connecting the upper part of the said link to the lower part of the said arm or lever, an attachment of the said walking-beam to which the lower end of the said link is pivoted, devices carried by said beam and arranged to move the upper end of the said link from side to side as the said beam is oscillated, in order that the said spring, as its upper end passes the vertical line may quickly shift the movable contact-making part from one of the said contact-making parts to the other, substantially as set forth.

8. A walking-beam, in combination with a pair of electromagnetic devices for oscillating it, a bracket attached, carried by said beam and provided with two blocks 23 and 24 adjustable toward or from each other, a link pivoted to said bracket at one end and having a pin arranged to be struck by the said blocks alternately, a depending lever, a contact-making device carried thereby, a pair of contact-making devices arranged for contact with the contact-making device first mentioned at its positions of extreme lateral movement in either direction, a spring connecting the said link to the said depending lever and arranged to shift the said pin from one block to the other and the said movable contact-making part from one of the stationary parts to the other, and electric conductors connected to the said contact-making devices and making circuit through one or the other of the said electromagnetic devices, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

PAUL E. OSWALD.

Witnesses:
L. B. COUPLAND,
J. B. DONALSON.