May 25, 1926. 1,585,988

G. HESSE

ELECTRIC CURRENT CONTROLLER

Filed May 9, 1924 2 Sheets-Sheet 1

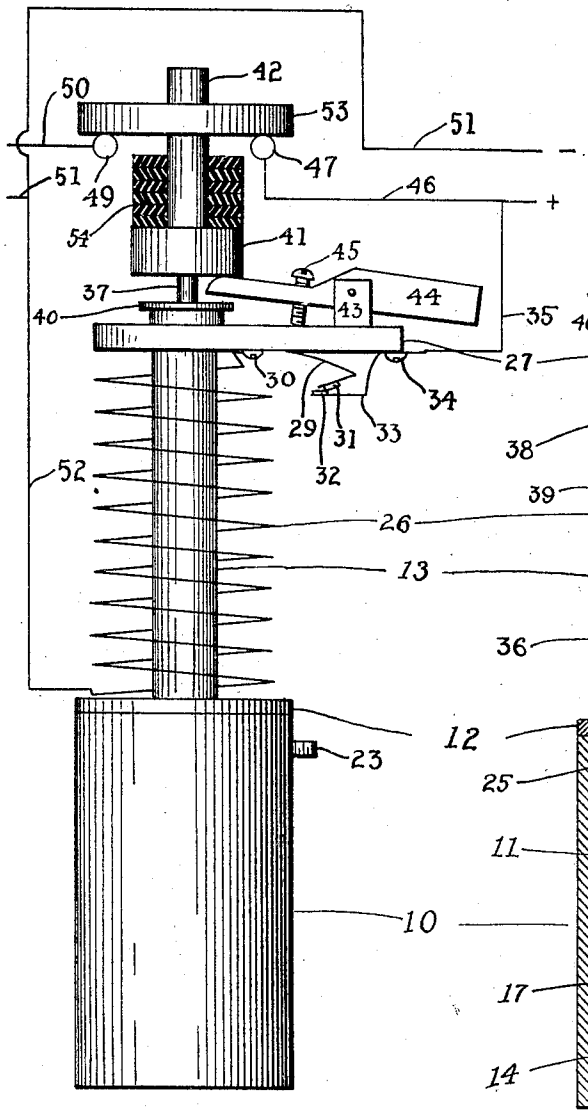


Fig 1.

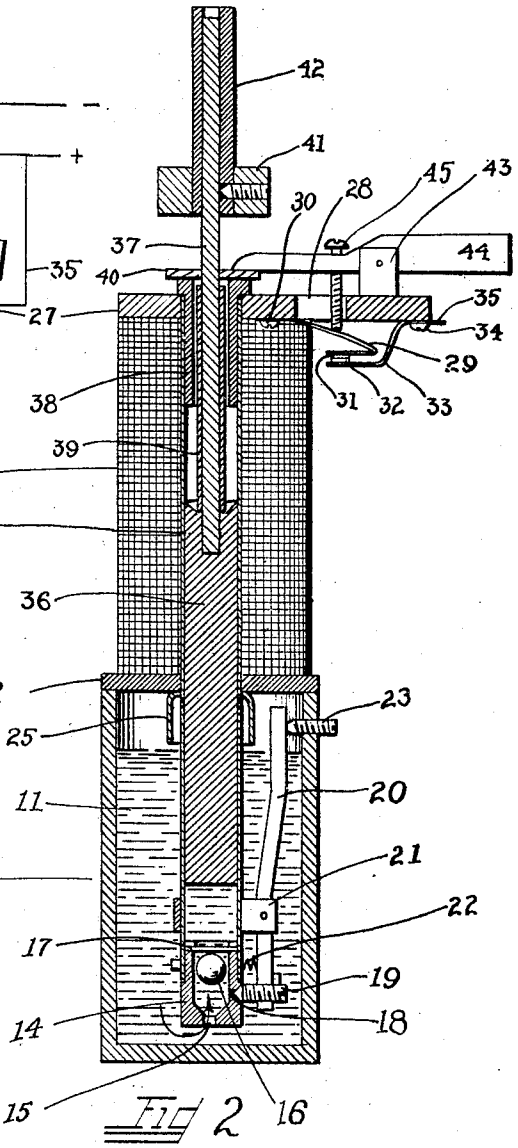


Fig 2.

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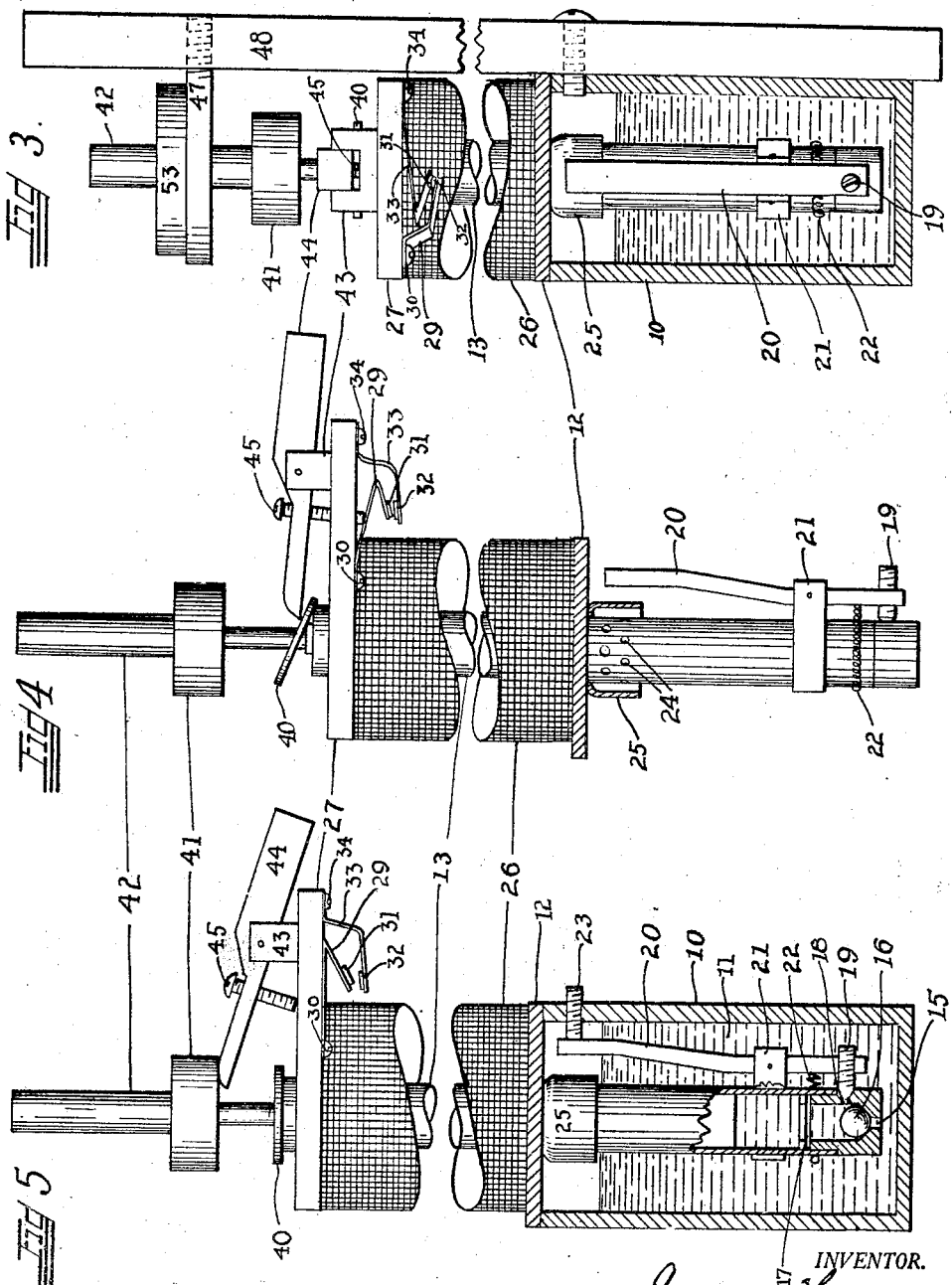


Fig 3.

Fig 4

Fig 5

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UNITED STATES PATENT OFFICE.

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ELECTRIC-CURRENT CONTROLLER.

Application filed May 9, 1924. Serial No. 712,110.

My invention relates, primarily, to means for controlling the current of electric flash signs; and the object thereof is to produce a device by means of which the time in which an electric flash sign will be active or inactive will be automatically controlled. A further object is to produce a device in which such times of activity and inactivity can be easily changed. While my device is primarily designed for electric flash signs, I do not restrict myself to that use as it is adapted for any use where it is desired to regularly make and break an electric circuit.

In the drawings forming a part of this application:

Figure 1 is a front elevation of my controller applied to a flasher sign circuit at the initial closure of the solenoid circuit;

Fig. 2 is a central longitudinal section, with some of the parts in elevation, of the controller after the solenoid circuit is fully in operation, the circuits being omitted;

Fig. 3 is a side elevation with parts in section and partly broken away of the controller, the circuits being active but omitted;

Fig. 4 is a front elevation, with parts broken away and parts omitted, showing the device as the solenoid circuit is about to be opened;

Fig. 5 is a front elevation with parts broken away and parts omitted after the solenoid circuit is opened.

My device consists of a vessel 10 of suitable material, and preferably circular in cross section in which is a suitable liquid, preferably oil, 11. To the top of vessel 10 is secured a pierced cover 12 of insulating material through which projects a non-magnetic cylinder 13 which extends to near the bottom of 10. In the bottom of 13 is secured a valve casing 14 having an inlet port 15 in the bottom thereof, which when the device is inactive is closed by ball valve 16. Pin 17 prevents 16 from rising out of 14 when the device is operating. Any other form of valve may be used to control port 15 but I prefer the ball as it is simplest. Above port 15 is an outlet port 18 which is controlled by valve 19 which is screwed through the lower end of lever 20. Lever 20 is rockably mounted in bearing 21 secured upon the lower end of 13. A spring 22 is secured to 20 and passes around 13 and holds 19 to close port 18. In the side of 10 is a screw 23 which engages the upper end of 20 so as to regulate 19 to open port 18 to permit a flow of oil therethrough as hereafter explained. Near cover 12, cylinder 13 is provided with a number of perforations 24 best shown in Fig. 4, which permit oil to escape therefrom when the device is being operated. These ports may be protected by a tubular deflector 25 to deflect downwardly the oil passing out of the ports. A coil of insulated wire is wound around cylinder 13 between cover 12 and end plate 27 of insulating material and forms a solenoid coil 26. Plate 27 is secured to 13 and projects at one side thereof and has an aperture 28 (see Fig. 2) therethrough. One end of a flat spring 29 passes across 28 and is secured to 27 by screw 30, which screw also secures one end of coil 26 to 27, thereby electrically connecting the coil to the spring. Spring 29 has its free end angularly bent back toward the coil and has secured thereto a contact point 31 which is adapted to engage contact 32 secured to a flat spring 33 fastened to plate 27 by screw 34, which screw also fastens wire 35 to 27, thereby electrically connecting wire 35 to spring 33.

Within cylinder 13 is the solenoid core 36 which projects downwardly to about the center of vessel 10 at the time contacts 31 and 32 are engaged. The upper end of core 36 projects upwardly at such time to about the center of coil 26 and may be cupped as shown in Fig. 2, and has secured therein the non-magnetic rod 37 which extends to the top of the controller. In the top of cylinder 13 is tubular magnetic member 38, which extends a short distance into coil 26. Within member 38 and loosely surrounding rod 37 is a non-magnetic tube 39, the lower end of which rests on core 36 and the upper end extends to nearly the top of member 38. Surrounding rod 37 and normally resting on the top of member, which for distinction will be

called magnet 38, is a thin washer 40 of non-magnetic material. Adjustably secured by screw to the upper end of rod 37 is a breaker disk of non-magnetic material 41 having a neck 42. A bearing 43 is secured upon the projecting part of plate 27 and has rockably mounted therein switch lever 44. The outer end is heavier than the inner end and when the solenoid circuit is inert lever 44 assumes positions as shown in Figs. 1 and 5.

The inner end of lever 44 carries a screw 45 which passes therethrough in threaded contact therewith and through aperture 28 in plate 27 when the inner end of the lever is engaged and brought down by breaker disk 41, which disk is brought down by gravity acting on the disk and parts connected thereto after the solenoid circuit is opened. Wire 35 is connected to wire 46 which is connected to a source of electrical energy (not shown) and also to a contact bar 47 secured to the base block 48, to which block vessel 10 is secured. Block 48 is adapted to be fastened in any place of use. A second contact bar 49 spaced from bar 47 is secured to block 48. Bar 49 is connected by wire 50 with the place of use, the flasher signs, not shown.

Wire 51 is the return or ground wire. Wire 52 connects coil 26 with wire 51. When the flasher signs are active, bars 47 and 49 are connected by a washer 53 of magnetic material which rests thereon and loosely surrounds neck 42 of the breaker disk 41. On neck 42 are placed as many rubber washers 54 as may be desired to raise washer 53 the distance above bars 47 and 49 to render the flasher sign circuit inactive the required time. By using more or less washers, the relative time of activity and inactivity of the flasher signs is varied.

In the position of parts shown in Fig. 1, the flasher sign circuit is in full activity and the solenoid circuit is just closed. The closure of the solenoid circuit causes core 36 to be drawn upward and magnet 38 to become magnetic which draws the inner end of lever 44 down upon washer 40 and holds it there until it is pried off by the upward movement of tube 39, thereby overcoming the magnetic power of magnet 38 and permitting the inner end of lever 44 to rise and thereby disengage contacts 31 and 32 which opens the solenoid circuit. The upward movement of core 36 carries washer 53 off bars 47 and 49 thereby opening the flasher sign circuit and rendering the signs inert. As core 36 was carried upward, oil entered tube 13 and followed up the core. As soon as the upward movement ceased, ball 16 dropped and closed port 15 and the time of the descent of core 36 is regulated by the amount of oil that is permitted to flow from port 18. As the core descends disk 41 contacts with the inner end of lever 44 and carries it downward, screw 45 again causes contacts 31 and 32 to engage at which time the solenoid circuit is established, the coil energized and the core again rises until the solenoid circuit is broken as before explained. It will be observed that the upward movement of the core is rapid and the descent slow and that the upward movement of the core breaks both circuits, the flasher sign circuit being broken in advance of the solenoid circuit and that in the descent of the core the flasher sign circuit is closed and active before the solenoid circuit is closed and active.

The times of activity and inactivity of the flasher sign circuit can be varied by adjusting 41 on 37 or by putting washers on or taking washers off 42.

The flasher sign circuit will be called the work circuit and the solenoid circuit the operating circuit.

Having described my invention, I claim:

1. In a circuit opening and closing device for electric circuits the combination with a stationary terminal; of a pivoted lever carrying a co-operating movable terminal, said lever having one end heavier than the other, the heavier end being adapted to cause the separation of the terminals when free to act; a solenoid connected to said stationary terminal; a core for said solenoid; a nonmagnetizable stem for said core; a tube on said stem; a magnetizable washer surrounding said stem and projecting within the solenoid winding and resting thereon; a nonmagnetizable washer on the other washer; and adjustable means carried by the stem to cause the engagement of said terminals when the solenoid is de-energized.

2. In a circuit opening and closing device for electric circuits the combination with a stationary terminal; of a pivoted lever carrying a co-operating movable terminal, said lever having an end adapted to cause the separation of the terminals when free to act; a solenoid connected to said stationary terminal; a core for said solenoid; a nonmagnetizable stem for said core; a tube on said stem; a magnetizable washer on said stem and projecting within the solenoid windings and having a head resting thereon; a nonmagnetizable washer upon the other washer; adjustable means carried by the stem to cause the engagement of the terminals when the solenoid is de-energized; and regulatable means for retarding the downward movement of the solenoid core.

3. In a circuit opening and closing device for electric circuits the combination with a stationary terminal; of a pivoted lever carrying a co-operating movable terminal, said lever having an end adapted to cause the separation of the terminals when free to act; a solenoid connected to said stationary terminal; a core for said solenoid; a

nonmagnetizable stem for said core; a tube on said stem; a magnetizable washer on said stem and projecting within the solenoid windings and having a head resting thereon; a nonmagnetizable washer on the other washer; adjustable means carried by the stem to cause the engagement of the terminals when the solenoid is deenergized; regulatable means for retarding the downward movement of the solenoid core.

In witness that I claim the foregoing I have hereunto subscribed my name this 22nd day of April 1924.

GEORGE HESSE.