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M. H. SHOENBERG ET AL

1,789,640

CIRCUIT CONTROLLING DEVICE

Filed Feb. 5, 1927

FIG. 1.

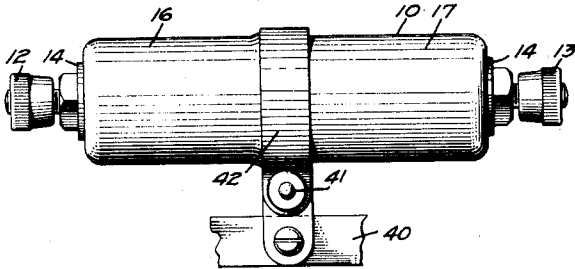


FIG. 2.

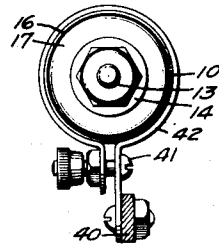


FIG. 3.

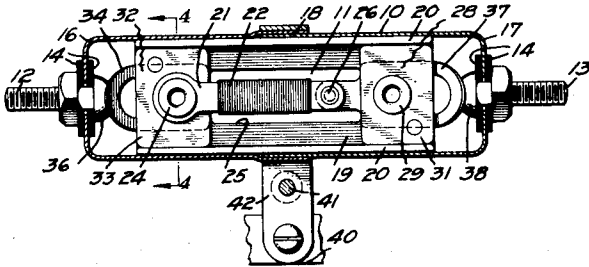


FIG. 4.

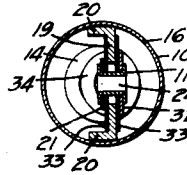


FIG. 5.

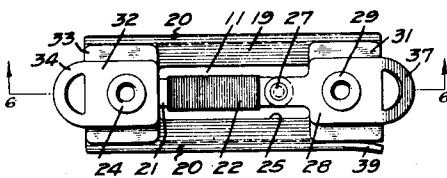


FIG. 6.

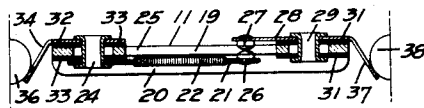


FIG. 7.

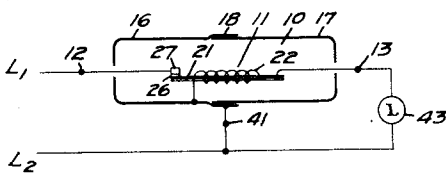


FIG. 8.

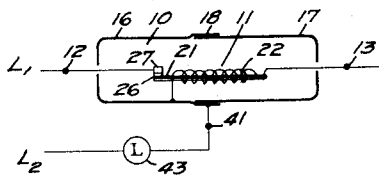
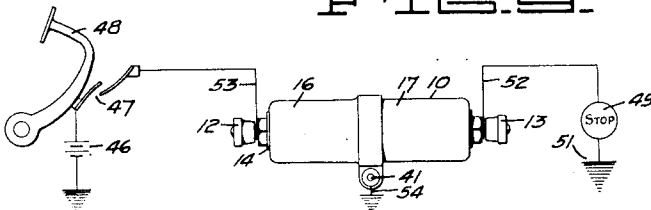


FIG. 9.



INVENTORS
Milton H. Shoenberg
Lester Schon
BY
White, Post & Fayer
ATTORNEYS

UNITED STATES PATENT OFFICE

MILTON H. SHOENBERG AND LESTER SCHON, OF SAN FRANCISCO, CALIFORNIA; SAID
SCHON ASSIGNOR TO SAID SHOENBERG

CIRCUIT-CONTROLLING DEVICE

Application filed February 5, 1927. Serial No. 166,143.

This invention relates generally to devices for producing timed variations in an electrical current, and has special application for light circuits used in electric signs, advertising or display devices and signalling circuits. The invention includes both the device as an article of manufacture and a system or circuit arrangement which may incorporate this device.

10 It is an object of this invention to devise a novel circuit interrupting system suitable for use with electric lamps, the operation of which will always be initiated by a period of illumination upon closing of the circuit.

15 It is a further object of this invention to devise a novel circuit interrupting system the operation of which will be practically independent of the resistance or wattage of the electric lamps or other load which is included in the circuit.

20 It is the further object of this invention to devise a cartridge like structure which will include a circuit interrupting element and which may be readily incorporated with any electrical circuit.

25 It is the further object of this invention to devise a novel mounting for a circuit interrupter element whereby this element may be readily assembled within an enclosing casing.

30 It is the further object of this invention to devise a novel form of automobile signalling system incorporating a flashing lamp.

35 It is another object of this invention to devise a novel form of circuit interrupting device which may be readily incorporated with an automobile signalling system.

40 Further objects of this invention will appear from the following description in which we have set forth the preferred embodiment of our invention. It is to be understood that the appended claims are to be accorded a range of equivalents consistent with the state of the prior art.

45 Referring to the drawing:

Fig. 1 is a side elevational view of a circuit interrupting device constructed in accordance with this invention.

50 Fig. 2 is an end view of the device as shown in Fig. 1.

Fig. 3 is a cross sectional view of the device as shown in Fig. 1.

Fig. 4 is a cross sectional view taken along the line 4—4 of Fig. 3.

Fig. 5 is a detail illustrating the mounting 55 for the circuit interrupter element.

Fig. 6 is a cross sectional view taken along the line 6—6 of Fig. 5.

Fig. 7 is a circuit diagram illustrating the preferred system with which this device is to 60 be incorporated.

Fig. 8 is another circuit diagram illustrating the modified system with which the device may also be used.

Fig. 9 is a circuit diagram illustrating a 65 novel form of automobile signalling system capable of utilizing the device.

While the device of this invention is capable of being constructed in a number of forms, it is preferably constructed as a cartridge like device which may be readily connected in any electrical circuit. Thus referring to the drawing there is shown a relatively small elongated casing 10 which is cartridge like in shape. While this casing 70 may be made of insulating material such as a phenolic condensate product, it is preferably constructed of metal for a reason which will be presently apparent. Within the casing there is disposed a circuit interrupter element 11 which is electrically connected with the connection terminals or binding posts 12 and 13. These binding posts are preferably 75 mounted upon the ends of the casing and are insulated from the metal thereof as by means of insulating washers 14.

To facilitate assembly of the device in manufacture the casing is preferably made of two cup-shaped sections 16 and 17 which have interfitting or telescoping portions 18. The mounting for the interrupter element 11 is preferably constructed so that the element with the mounting may be inserted into the casing as a unit without the necessity of connecting wires to the binding posts 12 and 13. 85 The form of mounting shown is in the form of a relatively flat member 19 which is preferably constructed of a metal plate, the plate being substantially rectangular in shape. The edges of this plate are bent to form 90 95 100

flanges 20 which act as a reinforcement and aid in seating the plate within the casing. The width of the plate is slightly smaller than the internal diameter of the casing so that when the mounting is inserted within the casing it will extend substantially diametrically across the interior of the same, forming in effect a partition wall.

The interrupter or circuit controlling element is preferably of the bimetallic type and includes a bi-metallic strip 21 in close thermal contact with a heating resistance, such as the insulated resistance wire 22 which is wound upon the strip. One end of strip 21 is secured to one face of member 19 as by means of eyelet 24, and the member 19 is cut away or recessed as at 25 to provide space within which the bi-metallic element is adapted to operate. The free end of strip 21 carries a movable contact 26 which is adapted to cooperate with a relatively stationary contact 27. Contact 27 is mounted upon a conductor strip 28 which is secured to the other end of member 19 as by means of eyelet 29. Conductor strip 28 is insulated from the member 19 as by means of sheets or washers 31 of insulating material. Eyelet 23 also serves to secure conductor strip 32 to the member 19, and this strip 32 and bi-metallic strip 21 are insulated from member 19 as by means of washers 33 of insulating material. Extending from conductor strip 32 there is a laterally bent resilient contact 34 which is adapted to resiliently press against and make electrical contact with the head 36 of binding post 12. Conductor strip 28 is provided with a similar contact 37 adapted to make electrical contact with the end 38 of binding post 13. One end of the resistance wire 22 is grounded upon the bi-metallic strip 21 and therefore when the device is assembled, it is connected with binding post 12, while the other terminal of this resistance is grounded upon the metallic member 19 and therefore to the casing 10. To provide for more positive connection between member 19 and the casing, one of the flanges 20 may be provided with an outwardly bent or struck out portion 39 which is adapted to resiliently engage the casing interior. External connections to the casing 10 are made by means of a binding post or connection terminal 41 which for example may be incorporated with a metal clamp 42 extending about the periphery of the casing. This clamp preferably serves as a means for mounting the device upon a suitable support 40, which may be a part of an automobile. When placed about the interfitting portions 18 as shown in Figs. 1 and 3, it also serves to retain the two parts of the casing together.

One system for incorporating the device as explained above is shown in Fig. 7. In this instance the current supply line L_1 is connected to binding post 12 while supply line L_2 is connected to binding post 41 and to one

side of the lamp 43 or other load, the other side of the lamp being connected to binding post 13. This connection places contacts 26 and 27 in series with the load and the heating resistance 22 in shunt with the load. Contacts 26 and 27 are adapted to be normally closed so that when the circuit is closed light 43 is immediately illuminated and the full potential drop across the line is imposed across heating resistance 22. The current flowing in this resistance will heat the bi-metallic strip 21 until this strip is flexed to separate contacts 26 and 27 thus interrupting current flowing through the lamp 43. Current flow through resistance 22 is also interrupted to permit strip 21 to cool and again close contacts 26 and 27. The resultant effect of the system is therefore to repeatedly or recurrently interrupt flow of current to the lamp 43. One particular advantage of a system of this kind is that when the circuit is initially closed, the lamp is immediately illuminated since contacts 26 and 27 are normally closed. This initial period of illumination may be made much longer than the period of the subsequent flashes by mounting or bending the strip 21 so that contact 26 normally presses against contact 27 with considerable force. The amount of this force will of course determine the length of the initial period of illumination. The arrangement of the heating resistance 22 in shunt with the lamp 43, rather than in series with contacts 26 and 27, is of importance since it makes the period and operation of the interrupter element entirely independent of the size or wattage of the lamp 43. In other words the potential drop across the resistance 22 will always be substantially the voltage across lines L_1 and L_2 , which is independent of the current consumed by lamp 43. In Fig. 8 the manner in which the device may be utilized as a series type of interrupter is shown. In this case one of the lines say line L_1 is connected to binding post 12 while the other line is connected to binding post 41 in series with lamp 43. In this case no connection need be made to binding post 13. The heating resistance 22 is then connected in series with contacts 26 and 27 and is energized when the circuit is closed to heat the bi-metallic strip 21 and open the contact.

In Fig. 9 we have shown the device incorporated in an automobile stop signalling system. In this case the circuit is energized from the usual storage battery 46, one side of which is grounded to the frame of the automobile. The circuit is closed by means of a switch 47 controlled by operation of the brake pedal 48. The lamp is disposed within suitable stop signal 49 and is connected to the battery by means of ground conductor 51 and to switch 47 in series with the interrupting device. For example binding post 13 is connected to the lamp by

conductor 52 while binding post 12 is connected to switch 47 through another single conductor 53. Binding post 41 is grounded upon the automobile frame as by means of conductor 54. Instead of inserting the device between the switch and signal, it may be inserted between the switch and battery 46. When the pedal 48 is depressed to close switch 47, the stop signal 49 will be immediately illuminated for a considerable period of say about 20 seconds. After this period of illumination the lamp or signal will be repeatedly flashed at a relatively rapid rate to attract attention. The present day automobile signalling systems may be readily converted to this system merely by inserting the device in the conductor connecting the switch 47 with the signal, the only other connection necessary being the conductor 54 to the ground. The circuit interrupting device is universal in its application to automobile signalling systems since the resistance 22 is connected in shunt with the lamp and is therefore independent in its operation of the candle power or wattage of the lamp. It may be noted here that a circuit interrupter having a heating resistance connected in series with the circuit is unsatisfactory for the voltages employed in automobile signalling systems, as the current flowing through the lamp is insufficient to heat the resistance. Furthermore the operation of a series interrupter is only suited for lamps of a certain wattage.

It will be obvious from the above that we have provided a small structural unit having wide application in electrical circuits for continuously varying the electrical current. In addition to the uses explained above, the device is applicable to road signal signs in which it is essential to have a circuit interrupter which will continue to burn the lamp when the interrupter element becomes inoperable from some reason or other. With the system shown in Fig. 7 if the resistance coil becomes burned out the contacts remain closed so that the light will continue to burn. This system may also be used to advantage for the small electric lamps used on telephone switchboards. In this instance the interrupter element is connected to each lamp as shown in Fig. 7 and when a call is received, the lamp indicating the call first burns steadily for a considerable period after which if the operator does not immediately answer the call, the lamp is flashed rapidly to attract the operator's attention. It is characteristic of the system of Fig. 7 that the lamp will be varied between maximum illumination and absolute minimum, that making it especially useful for signalling purposes. While the series type of interrupter element in which the resistance is in series with the contacts, has an absolute minimum, its maximum is

not the full candle power of the lamp as the current must flow thru the resistance. Likewise in the shunt type of interrupter elements in which the resistance is in shunt with the contacts, the maximum period gives full illumination but the minimum is not absolute, and the current flowing thru the resistance may be sufficient to partly illuminate the filament.

We claim:

An automobile signalling system, comprising in combination, a stop signal circuit including a driver operated switch and a bi-metallic flasher switch having their contacts in series, a heating resistance for said bi-metallic switch and a stop signal lamp connected in parallel and both in series with the contacts of said switches, the contacts of said bi-metallic switch being normally closed and the contacts of said driver operated switch being normally open whereby when the driver operated switch is closed during stopping of the automobile the stop signal lamp will be immediately lighted and recurrently extinguished and lighted by operation of said bi-metallic switch so long as the driver operated switch remains closed.

In testimony whereof, we have hereunto set our hands.

MILTON H. SHOENBERG.
LESTER SCHON.