

C. R. ENGLAND.
 MEANS FOR CONTROLLING ELECTRIC CURRENT.
 APPLICATION FILED MAY 26, 1915.

1,154,849.

Patented Sept. 28, 1915.
 2 SHEETS—SHEET 1.

Fig. 1

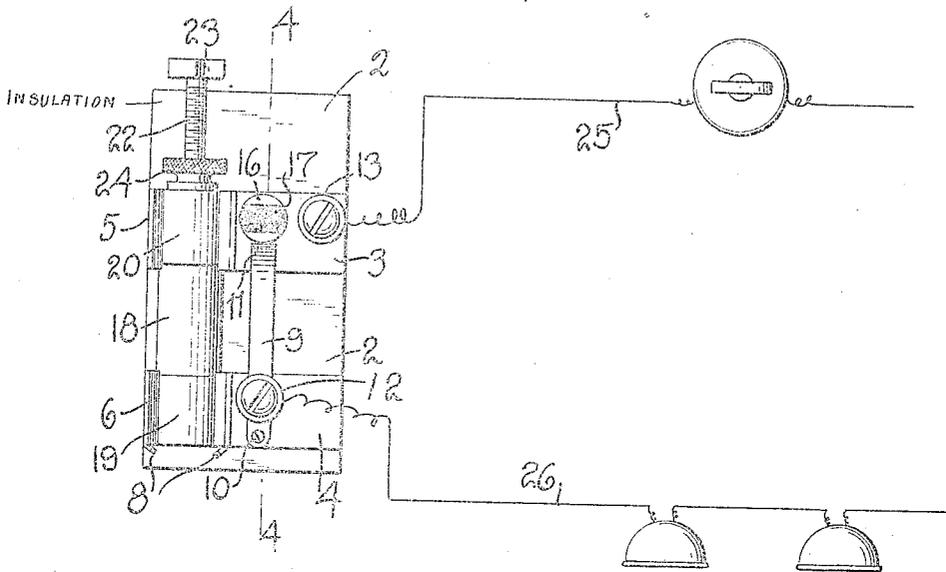


Fig. 2

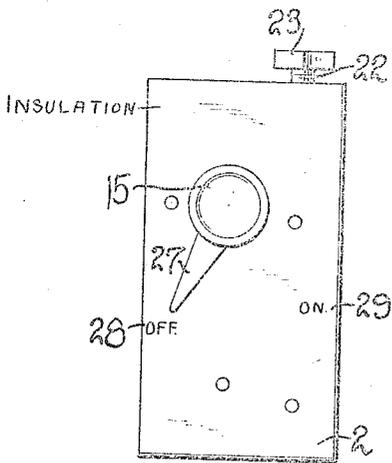
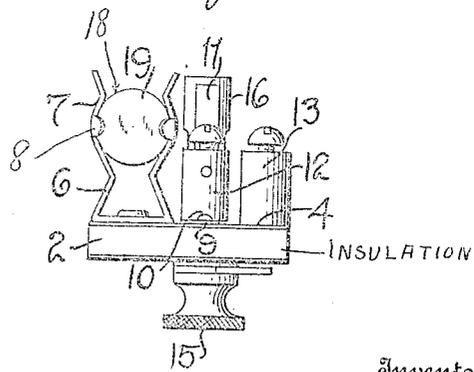


Fig. 3



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Fig. 7

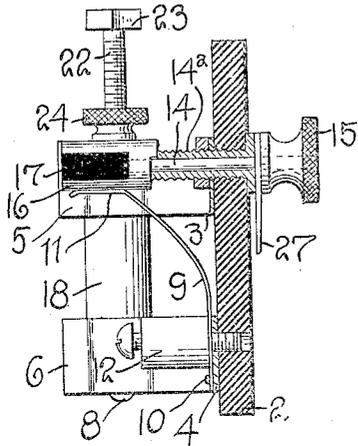


Fig. 6

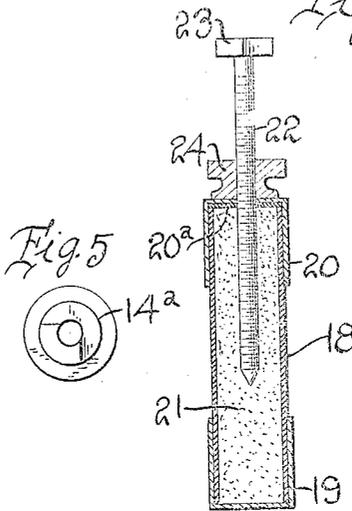


Fig. 5

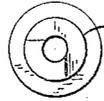


Fig. 7

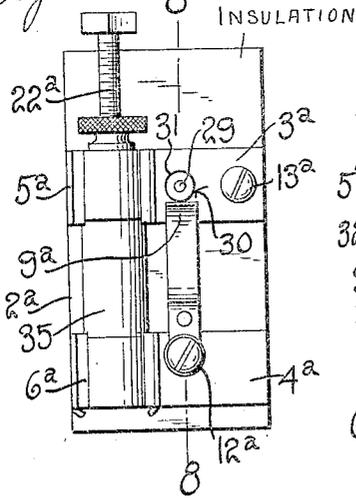
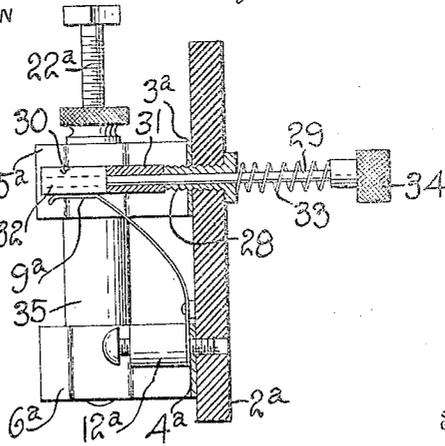


Fig. 8



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MEANS FOR CONTROLLING ELECTRIC CURRENT.

1,154,849.

Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed May 26, 1915. Serial No. 30,647.

To all whom it may concern:

Be it known that I, CLIFFORD R. ENGLAND, a citizen of the United States, residing at McKeesport, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Means for Controlling Electric Current, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to means for controlling current, and particularly to means for controlling current by means of an adjustable resistance.

The primary object of my invention is the provision of a very simple device for controlling electric current including variable resistance which is capable of being applied and used in any situation where variable resistance is desirable, but which is particularly adapted to be used for dimming automobile headlights.

A further object of the invention is the provision of a device of this character including a variable resistance element and means in the nature of a switch for causing the current to flow around or through the variable resistance, as may be desired.

A further object of the invention is the provision of a very simple form of variable resistance element in which the amount of resistance may be readily adjusted.

Still another object of the invention is the provision of a variable resistance in the form of a cartridge or plug which may be readily put in position or removed therefrom.

Still another object is the provision of a variable resistance element comprising an exterior shell, a filling of granular or pulverulent resistant material such as graphite, and a conducting member which is adjustable to various degrees into the mass of granular or non-conducting material, the degree to which the conducting element is adjusted controlling the resistance offered by the element to the passage of current.

Other objects will appear in the course of the following description,

My invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a face view of my device, the view being partly diagrammatic; Fig. 2 is a face view opposite to Fig. 1; Fig. 3 is an end view; Fig. 4 is a section on the line 4-4 of Fig. 1; Fig. 5 is an end view of the sleeve through which the adjustable terminal passes; Fig. 6 is a longitudinal section of the resistance plug; Fig. 7 is a rear face view of a modified form of my invention; Fig. 8 is a section on the line 8-8 of Fig. 7.

In these drawings I have shown two forms of my invention which vary from each other in details of construction but which operate on the same principle. One of these forms is illustrated in Figs. 1 to 6. In these figures 2 designates a non-conductive base which may be made of porcelain, hard fiber, or other suitable non-conductive material, and which, in case the device is to be used for dimming automobile headlights, is preferably disposed upon the dashboard of the vehicle. Extending transversely across the base at spaced points are the metallic plates 3 and 4. Disposed upon each of these metallic plates 3 and 4 are the metallic U-shaped spring clips 5 and 6. These clips are preferably formed each with the upstanding oppositely disposed arms, these arms being outwardly bowed, as at 7, to receive the cylindrical resistance cartridge or plug which will be later described. The clip 6 is the same as the clip 5 except that it is provided with limiting ears 8.

Mounted upon the strip 4 is a spring contact 9 which may be held upon the base and in electrical contact with the strip 4 by means of a screw 10. This spring is upwardly curved and then extends upward to provide a straight contact portion 11. Mounted upon the strip 4 in contact with the attached end of the contact 9 is a binding post 12 of any suitable or usual construction. Mounted upon the strip 3 is a binding post 13 of any usual or suitable form. Passing through the base 2 and between the clip 5 and the binding post 13 is a shaft 14 which is held from longitudinal

movement with relation to the base in any suitable manner but which has rotary movement in a sleeve 14^a. This shaft carries upon one end the knurled knob 15 whereby the shaft may be rotated, and at its other end the shaft is provided with the metallic head 16 which, as illustrated, is cleft to receive a block 17 of nonconducting material such as hard fiber. The upwardly extending portion 11 of the spring contact finger 9 has electrical engagement with the head 16, or with the block 17 which extends diametrically through the head.

Removably disposed within the clips 5 and 6 is a resistance element, which, as illustrated, comprises a shell 18 which may be formed of any non-conducting material such as fiber, this shell being closed at one end by means of a metallic cap 19 and at its other end by means of a metallic cap 20. The metallic cap 20 is insulated from the interior of the shell by means of insulation 20^a. Disposed within the shell and entirely filling it is a granular or powdered resistant material such as graphite, designated 21. Having screw threaded engagement with the end of the shell 20 is a screw threaded pin 22, the inner extremity of which is pointed. The outer extremity is provided with the head 23 whereby the pin may be turned, and preferably mounted upon the screw threaded shank of the pin is a binding nut 24. When this resistance element is inserted in place between the clips 5 and 6 the arms of the clip 5 have electrical engagement with the metal of the cap 20 and the arms of the clip 6 have electrical engagement with the metal of cap 19, the ears 8 holding the shell from movement in one direction.

The operation of the device as above described is as follows: Assuming that the wire 25 leading from the source of current is connected to the binding post 13 and that the wire 26 leading to the lights of an automobile for instance, is connected to the binding post 12, then if the knob 15 be rotated so that the non-conducting block 17 be brought in contact with the spring contact finger 9 current will pass to the binding post 13, thence to the strip 3, and from the strip to the clip 5, thence to the cap 20, thence to screw 22, then to the graphite filling 21, then to the cap 19, the clip 6, the strip 4, the binding post 12 and the wire 26. If, however, the knob 15 be turned so as to bring the metallic portion of the head 16 into contact with the contact member 9, the current will pass from the binding post 13 to the strip 3, thence through the pin 14, the head 16, the spring contact finger 9 directly to the binding post 12, and the current will not pass through the variable resistance element.

Where the device is used, for instance, for

controlling automobile headlights, it will be obvious that when the current passes directly from the binding post 13 to the binding post 12 without passing through the resistance, the full strength of the current will be applied to the lights. When, however, it is desired to dim the lights the knob 15 is turned as before described, so that the current will have to pass through the variable resistance, and thus the strength of the current at the lights will be very greatly reduced and the lights will be dimmed. For the purpose of indicating the position of the knob 15 and of the head 16, that is, to show when the variable resistance is on or off, I preferably provide the indicating pointer 27 which coacts with the two index points 28 and 29, one indicating "off" and the other "on."

In Figs. 7 and 8 I show another form of my invention operating upon the same principle but differing in detail. In this construction, 2^a designates the base, which is the same as the base previously described, 3^a and 4^a designate the metallic strips mounted thereon, 5^a and 6^a designate the clips which are the same as the clips 5 and 6 previously described, 12^a and 13^a designate the binding posts, and 9^a designates the contact finger. All of these parts are the same as previously described. Slidably mounted in a bushing 28 carried in the base 2, is a pin 29 which at one end carries a head 30, one-half of which is formed of nonconductive material 31 and the other half of which is formed of conducting material and is designated 32. When this pin is pushed inward to its full extent the non-conducting portion 31 contacts with the contact finger 9^a. When, however the pin is pushed outward the metallic portion 32 engages with the contact finger. This pin is shown as urged outward or to a normal position by means of a spring 33, which is disposed between the knurled knob 34 of the pin and the bushing 28. A resistance element 35 is disposed within the clips 5^a and 6^a, this resistance element being constructed in precisely the same manner as the resistance element previously described. It comprises a shell, the oppositely disposed caps and the screw threaded pin 22^a which may be adjusted into greater or less engagement with the graphite contained within the shell, as desired, so as to vary the resistance offered by the graphite. In this second form of my invention, when it is desired to dim the lights of an automobile, if the device is used for this purpose, the pin 29 is forced inward, bringing the non-conductive portion 32 into contact with the contact finger 9^a and thus causing the current to be deflected through the resistance element. Upon a re-

lease of the pin the spring 33 will force the pin outward bringing the metallic portion 31 into contact with the spring finger and thus causing the current to pass directly from the pin to the binding post 12^a and thus cutting out the resistance.

While I have shown certain details of construction which I have found very effective in practice, it will be obvious that these details may be varied without departing from the spirit of the invention. Furthermore, while I have described my invention as being particularly adapted for the purpose of dimming automobile headlights and have described my device in connection with an automobile, yet it is to be understood that it may be applied in a large variety of situations for controlling current.

It will of course be noted that the member 22 or 22^a and the oppositely disposed cap constitute terminals of the resistance plug, and that in both instances I have provided a switch, which, when shifted in one direction, permits the passage of current through the resistance plug, and when shifted in the other direction short-circuits the resistance plug and permits the current to pass directly between the spaced conductors without passing through the plug. It is to be understood that by the term "granular" as used in the claims, I intend to include any material which is in the form of powder, grains, or flakes.

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

1. Means for controlling electric current including a base, oppositely disposed metallic resilient clips mounted thereon adapted to be electrically connected in an interrupted circuit with a source of energy, a resistance element detachably mounted between the clips and adapted to electrically connect said clips, and a switch mounted upon the base which when shifted into one position will short circuit the clips and resistance element and when shifted in the other direction will permit the passage of current through the clips and resistance element.

2. Means for controlling electric current including a base, oppositely disposed metallic clips mounted thereon and adapted to be electrically connected in an interrupted circuit with a source of energy, a resistance element detachably mounted between the clips and adapted to electrically connect said clips and comprising a cartridge having metallic caps with which the clips electrically engage, a granular resistance material contained within the cartridge with which one of the caps electrically engages, a terminal longitudinally movable through and having electrical engagement with the other cap and

through the granular filling of the cartridge, and a switch mounted upon the base which when shifted into one position will short circuit the clips and resistance element and when shifted in the other direction will permit the passage of current through the clips and resistance element.

3. Means for controlling current including a resistance element, means for adjustably varying the resistance of said element, spaced conductors and means for connecting said conductors through said resistance element or directly connecting the conductors and cutting out the resistance element, said means comprising a shiftable conductive member electrically connected to one terminal of said resistance element and to one of said conductors, said member having thereon an insulating portion, and a contact member connected to the other of said conductors and having electrical engagement with the shiftable member or with said insulating portion thereof.

4. Means for controlling current including a base, binding posts mounted upon the base, oppositely disposed clips mounted upon said base and each electrically connected to one of said binding posts, a resistance element detachably mounted upon said clips and electrically connected through said clips to the binding posts, and means for short circuiting the resistance element comprising a shiftable member having a conductive and a non-conductive portion, the conductive portion of said member being disposed between one of said binding posts and the corresponding clip, and a resilient contact member connected to the other binding post and adapted to engage both the conductive and non-conductive portion of the shiftable member.

5. Means for controlling electric current including a base, oppositely disposed metallic resilient clips mounted thereon, binding screws mounted upon the base and electrically connected to said clips, said binding screws adapted to be electrically connected in an interrupted circuit with a source of energy, a resistance element detachably engaged by said clips and adapted to electrically connect them, and a switch mounted upon the base which when shifted into one position will electrically connect the binding posts and short circuit the clips and resistance element and when shifted in the other direction will cause the passage of current through the clips and resistance element.

6. Means for controlling electric current including a base, binding posts mounted upon the base, oppositely disposed metallic clips mounted upon the base and each electrically connected to one of said binding posts, a resistance element detachably sup-

ported in said clips and electrically connect-
ed through the clips to the binding posts,
and means for short circuiting the resistance
element comprising a rotatable metallic shaft
5 disposed between one of said binding posts
and the corresponding clip and electrically
engaged with both and carrying a metallic
head formed with a non-conductive casing
and a resilient contact member connected to
10 the other binding post and adapted to en-

gage said head and to contact with both the
conductive and non-conductive portion of
the head.

In testimony whereof I hereunto affix my
signature in the presence of two witnesses. 15

CLIFFORD B. ENGLAND.

Witnesses:

J. D. YEARLEY,
FREDERIC B. WRIGHT.