April 19, 1949. C. E. RECKARD 2,467,910

LIGHTING CONTROL

Filed Feb. 21, 1947

3 Sheets-Sheet 1

Fig. 1.

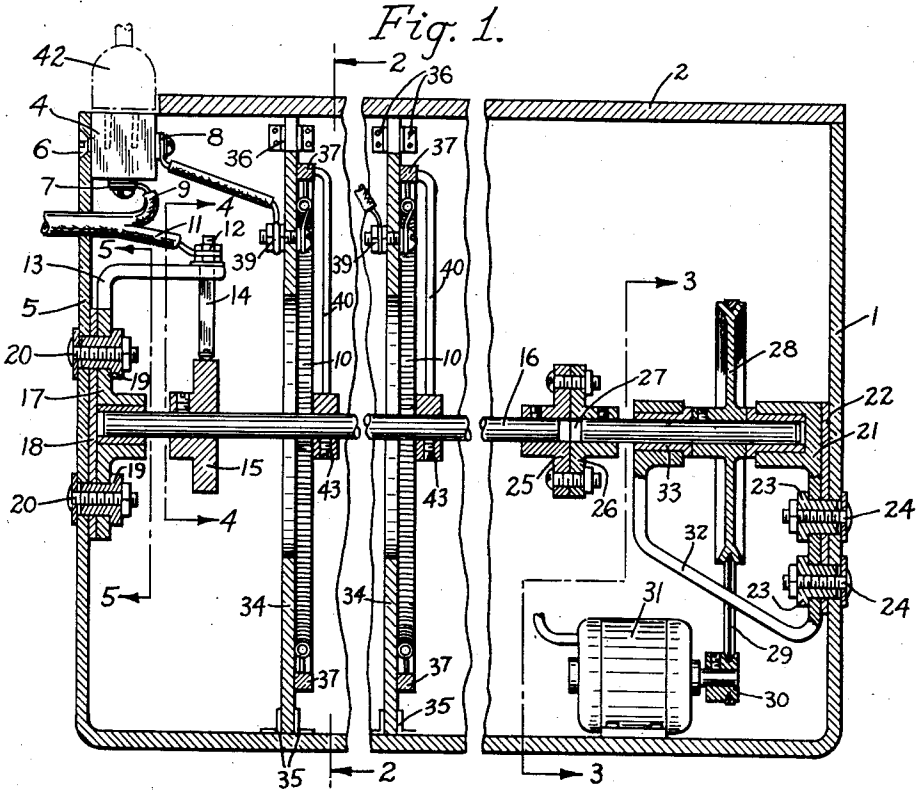


Fig. 3.

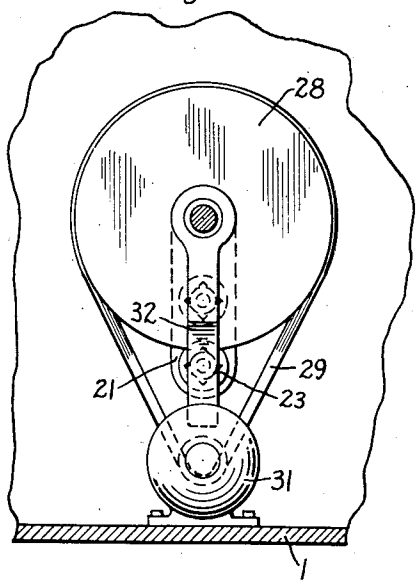
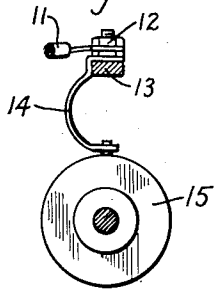


Fig. 4.



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Fig. 2.

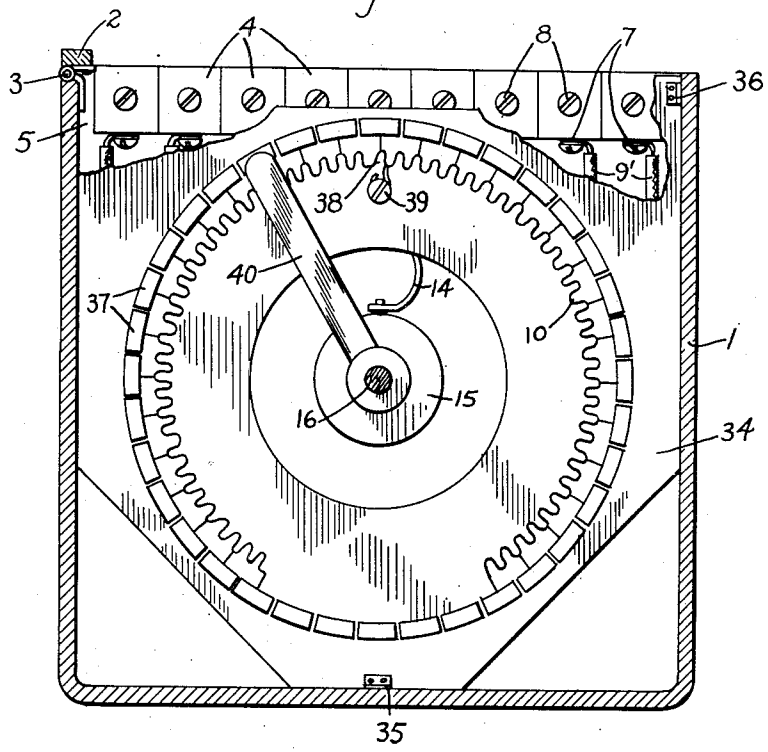


Fig. 6.

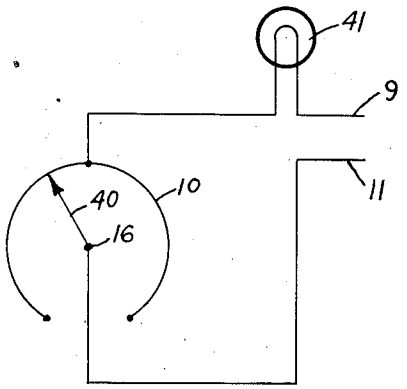
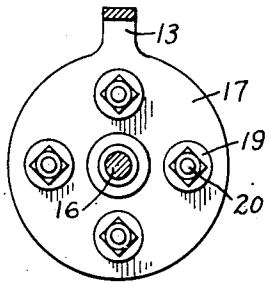


Fig. 5.



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Fig. 7.

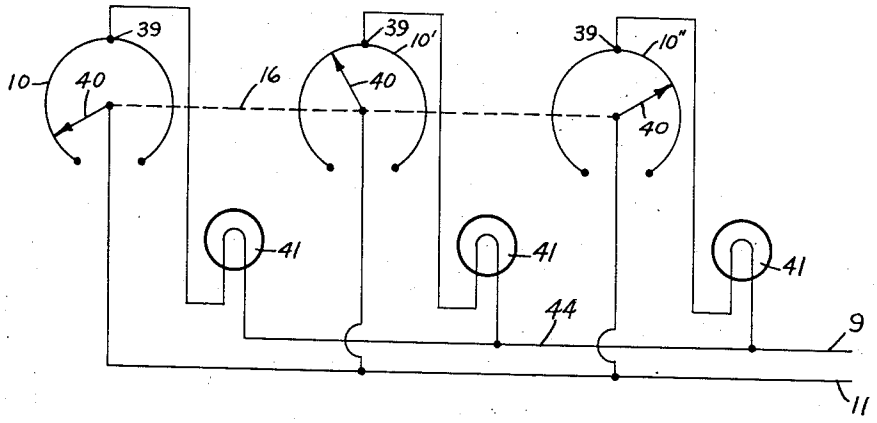


Fig. 8.

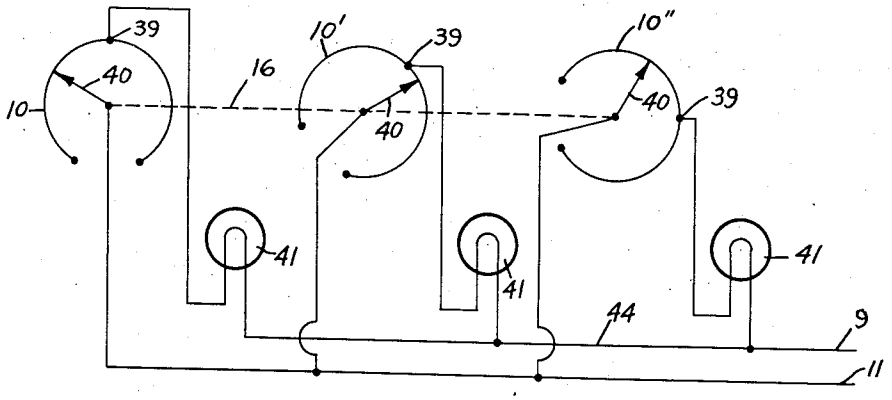
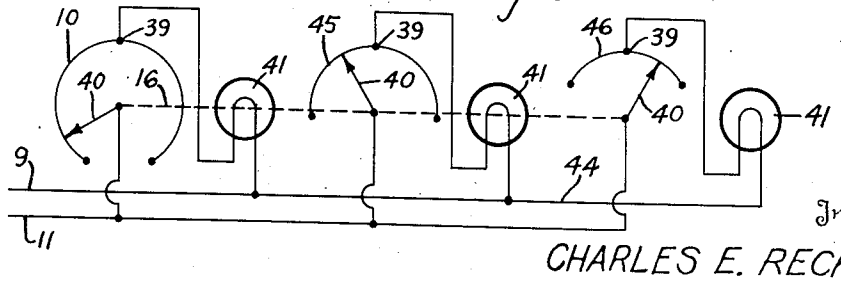


Fig. 9.



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2,467,910

UNITED STATES PATENT OFFICE

2,467,910

LIGHTING CONTROL

Charles E. Reckard, Brooklyn, N. Y.

Application February 21, 1947, Serial No. 730,164

1 Claim. (Cl. 177—346)

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This invention relates to control systems for lighted displays, wherein a combination of lights is made to vary in intensity or color in predetermined patterns and/or cycles, as may be desired; either to produce a pleasing effect, to demonstrate problems, or for any other purpose to which it may be adapted.

The object of the invention, broadly, is to provide control means for so varying the intensity of light coming from two or more light sources in relation to each other as to cause a pleasing illumination effect; in the form of either a moving light effect where single colored lights are used, or also a changing color effect where different colored light sources are used in combination.

Another more specific object is to provide a simple control means for varying the intensity of two or more electric lights of the same color on a billboard, sign or the like, wherein a rotatably adjustable rheostat is used for each light; the rotating elements of all the rheostats being mounted on a common shaft operated by a motor for continuous cyclic operation of the control means, to cause a gradual turning on and off of each light in a predetermined pattern relatively to the operation of the other lights, to produce an apparently moving wave or waves of illumination, in a predetermined manner, across the billboard, sign or the like, in accordance with the pattern.

Another object is to produce a simple control means as defined above, wherein either the rotating or the stationary elements of the rheostats are made adjustable about the common shaft, to vary the phase relation to each other, to change the pattern in any desired manner.

Another object is to produce a simple control means as defined above, wherein the stationary elements are not only adjustable but replaceable by others providing a different period of illumination or a different turning off or turning on interval to change the overall wave pattern, as may be desired.

Another object is to construct the control means above defined in a control box, having a power supply connection, and a series of outlets for selective connection to any series of light bulbs, singly or in combination to each outlet, each of the outlets being in the circuit branch of one of the rheostats, which are connected in parallel across the power supply lines.

Another object is to adapt the above control means to a series of different colored lights, particularly of the basic colors: blue, yellow and

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red; whereby to obtain color changing waves of illumination of substantially constant intensity, in accordance with the colors and the corresponding rheostats, selected for operation in the device.

Other and still more specific objects will appear in the following detailed description of some illustrious forms of devices made in accordance with the present invention, having reference to the accompanying drawings, wherein:

Figure 1 is a sectionl view of the control means, broken to show that any number of rheostat units might be included in the device,

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is an end view of the driving motor and pulley on the operating shaft taken at 3—3 of Figure 1,

Figure 4 is a view of the contact means between the power supply and the operating shaft taken at 4—4 of Figure 1,

Figure 5 is a view of the insulated contact support means taken at 5—5 of Figure 1,

Figure 6 is a wiring diagram of one rheostat circuit branch, any number of which may be connected in parallel across the power supply lines,

Figure 7 is a wiring diagram showing three of such branches connected in parallel, with the rotating elements adjusted to different phase positions relative to each other,

Figure 8 is another diagram with the stationary elements of the rheostats adjusted to different phase positions around the operating shaft, and

Figure 9 is a similar wiring diagram illustrating the use of different circumferential lengths of the several rheostat resistance units, for obtaining relatively different periods of illumination from the respective light bulbs during a cycle.

The form of device illustrated in the drawings comprises a rectangular casing 1 with a hinged lid 2 having hinges 3, the lid being cut out at one end to expose a series of outlet plugs 4 mounted on the end wall 5 of casing 1 by means of screws 6. Each plug 4 has two terminal posts 7 and 8 for connection to one of a pair of power lines 9 and to the corresponding rheostat resistance 10, respectively. The power lines may be brought in through the end wall 5 as shown.

The other of the pair of power lines 11 is connected to a binding post 12 on the arm 13 supporting a contact arm 14 in peripheral contact with a wheel 15 of conducting material fixed to the operating shaft 16. Arm 13 is formed on a bearing support 17 for one end of the shaft 16,

and the bearing support is insulatedly mounted on the end wall 5 by means of a Bakelite washer 18 and Bakelite grommets 19, through which the mounting bolts 20 are passed.

The bearing support 21 for the other end of the shaft 16 may be similarly mounted on the other end wall of the casing 1, by means of Bakelite washer 22, and grommets 23 for the mounting bolts 24. However, this insulation is not necessary if an insulated coupling comprising a pair of flanged coupling collars 25, 26 of insulating material be used across a break 27 in the shaft, as shown in Figure 1. The insulation of the shaft at this point is desirable at any rate, in order to prevent any possible grounding of the shaft circuit through the pulley 28 and drive belt 29 to the motor pulley 30, and motor 31. The bearing support 21 has an arm 32 extending to the other side of the pulley 28 to form another bearing 33 on that side of the pulley and provide a firm support for this pulley and the shaft 16.

Each of the rheostat resistances 10, 10', etc., is mounted concentrically about the shaft 16 on a bracket plate 34 removably fixed to the bottom of the casing 1 at 35 and to the sides of the casing at 36. These bracket plates may be cut away along the top to provide a space under the lid for the wire leads between the several rheostat resistances and their corresponding terminal posts 8 at one end of the casing. These bracket plates may further be cut away at the lower corners and in the center to the radius of the resistance, for weight reduction.

The rheostat resistances are connected at suitable intervals to the contact segments 37, and at their mid point 38 also to a binding post 39 for connection to the corresponding post 8 on the outlet plugs.

The parallel branches of the operating circuit are completed by contact arms 40 fixed to shaft 16 and having their ends slidably operating over the segments 37 when the shaft is turned. Each branch circuit is broken, however, during the interval when the respective arm 40 slides over the segments 37 which lie between the ends of the resistance, and which are therefore not connected thereto. This interval may extend over different angular distances on different bracket plates for selective installation in a system, in accordance with a desired pattern.

The value of the rheostat resistances may be designed to be such that each half of a resistance will be sufficient to reduce the amount of current passing through the corresponding branch to a minimum, not only so as to dim the corresponding light bulb to practical darkness but also to reduce the tendency of sparking as the arm 40 enters or leaves an end segment.

The light bulbs 41 in the system may be connected by individual male plugs 42 to the corresponding outlet plugs 4.

Either the resistances 10 or the arms 40 may be made angularly adjustable about the shaft 16 to properly set the branch circuits in the relative phase relations desirable to carry out a predetermined pattern. In the form shown in Figure 1, the arms 40 are adjustable about the shaft and may be moved to any angular position relative to each other and set by the lock screws 43.

Figure 6 shows one branch circuit diagrammatically, wherein one side of the power supply 9 is connected through the light bulb 41, the rheostat resistance 10, the arm 40, and shaft 16 to the other side of the power supply 11. In practice the side 9 of the power supply may be split

into as many strands 9' as there are plugs 4, one strand being connected to each plug; or preferably the terminals 7 on all the plugs in the system may be connected together by a common bar or other connector 44, the bar being connected to the single strand 9, as shown schematically in Figures 7, 8, and 9.

The schematic wiring diagram in Figure 7 shows a combination wherein the contact arms 40 are adjusted to different relative phase positions. Figure 8 illustrates a combination wherein both the contact arms 40 and the resistances 10, 10' and 10'' are relatively adjustable and are set to different phase positions.

Figure 9 illustrates a combination wherein resistances of different circumferential lengths are used to provide different periods as well as phases of illumination from the several light bulbs 41 to get a desirable illumination effect, either in single color illumination or with multi-colored bulbs.

The illumination effects possible with this system are many. Obviously, as already suggested, in combination with single colored lights, traveling waves of light may be produced by advancing the phase of operation of the rheostats for each successive light, arranged in a bank, along which the waves are to travel. Various combinations of such waves may be produced, as will be readily apparent, in multi-bank arrangements, by suitable adjustments of the corresponding rheostats.

In the operation of multi-colored lights, a unit of three lights of the basic colors, blue, red and yellow, besides a white light, may be used in any bank of such units and in any combination of such banks, to get the wave effects desired. But, in addition, color changes in any desired combination may be obtained including all the colors of the rainbow. As is well known, a combination of blue and red lights will produce a purple effect, the shade of which will depend on the relative intensity of the two colors, and its brilliancy will depend on the total intensity thereof. Likewise, red and yellow will combine to produce orange; blue and yellow, to produce green; and all three to produce brown; etc. The white light may be used to provide the brilliancy, or the basic supply of light to the medium which is being illuminated, in the case of indirect lighting, and from which the colored rays projected from the lights are reflected. By a proper control of intensities of the several colors to produce desired color changes, furthermore, the total intensity may be maintained substantially constant, producing a traveling wave of color without any dark portions.

Obviously, various combinations of color wave and light wave effects may be produced with the present device by a proper selection of light bulbs, and selection and adjustment of rheostats therefor.

It is to be understood that, instead of having a single light bulb connected to each of the male plugs 42, corresponding bulbs in two or more banks of lights on one or more signs, billboards or the like may be connected in parallel, so as to be controlled by the same set of rheostats in one control box.

Thus, my device is adapted to produce not merely a switching operation, but a means for controlling intensity and color variations simultaneously over any portion of a billboard, sign or the like.

What is claimed is:

A control box for displays of electric lights, comprising a rectangular casing having a hinged

lid, a drive shaft axially mounted therein, a series of rheostat plates having circumferential resistance units thereon mounted concentrically about said shaft and having means for detachably securing them to the walls of said casing, a series of contact segments arranged circumferentially about said shaft on each of said plates, said resistance units having connections at intervals to consecutive segments, a movable contact arm for contacting the segments on each of said plates, adjustably fixed to said shaft, insulated bearings mounted at the ends of said casing for said shaft, a series of outlet plugs mounted at one end of said casing for accessibility from the top of said casing, the end of the lid being cut away for this purpose, each of said plugs having two terminals, one of which is electrically connected to the midpoint of one of said resistance units, the other of which being connected to one side of a power supply, a contact wheel fixed to said shaft, a contact arm insulatedly mounted on said casing in contact with said contact wheel and having a terminal post for connection to the other side of said power supply.

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