May 27, 1930. R. B. HUNTER 1,759,903

OPERATING MECHANISM FOR DIMMER RHEOSTATS

Filed Dec. 11, 1924

Fig. 1.

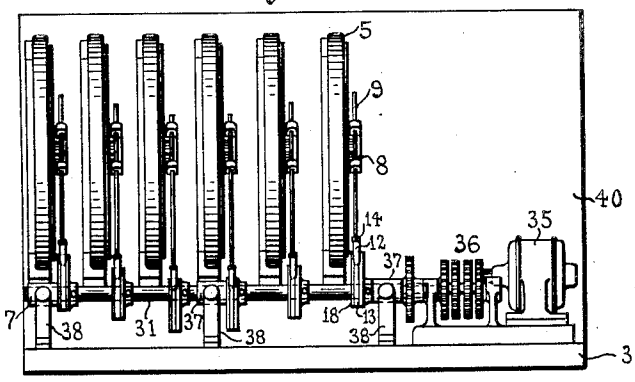


Fig. 2.

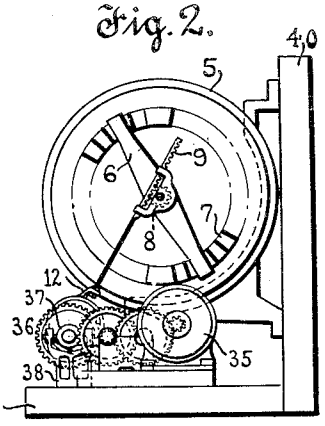


Fig. 3.

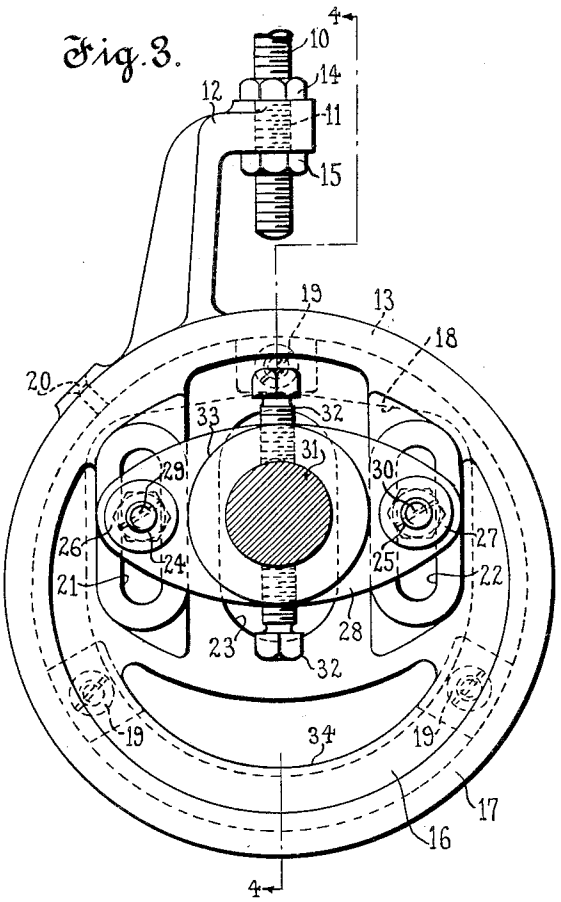
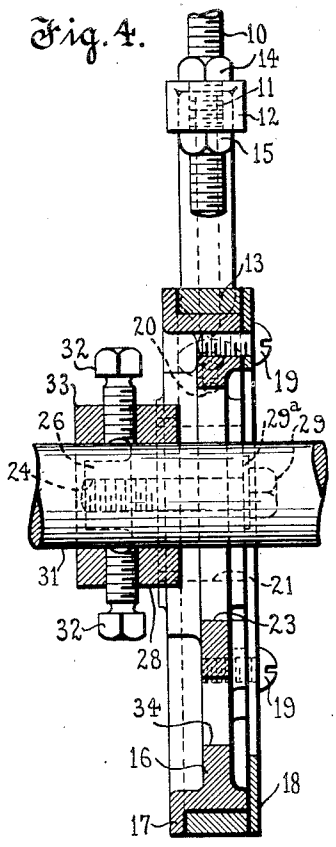


Fig. 4.



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UNITED STATES PATENT OFFICE

RICHARD B. HUNTER, OF MILWAUKEE, WISCONSIN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CUTLER-HAMMER, INC., OF MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

OPERATING MECHANISM FOR DIMMER RHEOSTATS

Application filed December 11, 1924. Serial No. 755,208.

This invention relates to operating mechanism for dimmer rheostats, and more particularly to operating mechanism for theatre or lobby dimmers.

The invention has among its objects to provide novel means for effecting continuous or repeated operation of a plurality of dimmers or other control devices through predetermined cycles, the operative connections for the dimmers being individually adjustable to enable attainment of any desired combination of control characteristics including reversal of the cycles with respect to each other.

Another object is to provide means for individually adjusting the operative characteristics of a plurality of dimmers for operation thereof in a predetermined relation, including common means for automatically effecting continuous operation thereof in said predetermined relation.

Another object is to provide driving means for a plurality of control elements enabling employment of a master operating member adapted to be driven continuously in one direction.

Another object is to provide a plurality of control devices each having a movable control element, with means enabling joint and simultaneous drive of said control elements at the same speed or at predetermined relative speeds or for neutralizing said drive with respect to certain of said control elements.

Various other objects and advantages of the invention will hereinafter appear.

The accompanying drawing illustrates an embodiment of the invention which will now be described, it being understood that the embodiment illustrated is susceptible of modification without departing from the scope of the appended claims.

In the drawing:

Figure 1 is a front elevational view illustrating somewhat diagrammatically a plurality of dimmers having my improved operating means associated therewith.

Fig. 2 is a side elevational view of the device shown in Fig. 1.

Fig. 3 is a detail side elevational view of one of the operating elements shown in Figs. 1 and 2, and

Fig. 4 is a sectional view on the broken line 4—4 of Fig. 3.

Referring to Figs. 1 and 2 the same illustrate a row of dimmer plates of a well known type comprising a rheostat 5 having a pivoted contact arm 6 mounted thereon which is adapted to sweep over a series of contacts 7 connected to a resistance carried by said plate. Contact arms 6 each have a pinion 8 fixed thereto and adapted to mesh with a rack member 9. Each of the rack members 9 is provided with a threaded portion 10 slidable within an opening 11 in a bracket or projection 12 on a ring or collar 13, said threaded portion 10 being held in adjusted position with respect to projection 12 by means of cooperating clamping nuts 14 and 15.

Each of the rings 13 is adapted to be supported by a wheel or disk 16 which is freely rotatable therewithin, said wheel preferably having an integral flange 17 at one side thereof and a flange or disk 18 removably secured to the opposite side thereof by means of suitable screws 19, said flanges being adapted to hold said wheel and ring in assembled relation. A channel-shaped bearing surface is thus provided for three sides of the ring 13, and said ring is preferably provided with an oil-hole 20 to facilitate lubrication of the contacting surfaces.

Each wheel 16 is provided with three parallel slots 21, 22 and 23, the slots 21 and 22 being adapted to register with screw-threaded openings 24 and 25 extending through bosses or projections 26 and 27 adjacent the ends of a coupling member 28. Said wheel and coupling are adapted to be clamped together by means of bolts 29 and 30, the threaded shanks of the latter extending through slots 21 and 22 and into the openings 24 and 25 aforedescribed. The headed ends of said bolts are preferably provided with washers (as indicated in dotted lines at 29^a in Fig. 4).

The coupling member 28 is in turn supported upon a master operating shaft 31 and is held in any desired angular position with

respect thereto by means of one or more set screws 32 penetrating the hub portion 33 of said coupling. The intermediate enlarged slot 23 in wheel 16 permits the aforementioned relative adjustment of said wheel and coupling member 28 when the parts are in assembled position. Wheel 16 is preferably cast or formed with an opening 34 to reduce or balance the weight thereof.

The master operating shaft 31 is arranged to be continuously driven unidirectionally by means of an electric motor 35 or other suitable driving agency, any suitable speed reducing gearing, such as indicated generally at 36 in Figs. 1 and 2, being preferably interposed between the drive and said master operating shaft. Shaft 31 is preferably provided with bearings 37 supported by bearing brackets 38 suitably spaced along said shaft. The various parts of the device are preferably mounted upon suitable base members 39 and 40.

The slots 21, 22 and 23 in wheel 16 are so arranged that when the lower extremities of slots 21 and 22 are moved into engagement with the clamping bolts 29 and 30 the periphery of said wheel will be concentric with shaft 31, so that upon rotation of said shaft no motion will be imparted to the rack 9 of the rheostat associated therewith,—thus providing for maintaining the contact arm 6 of one or more of the rheostats in any desired position while simultaneously effecting movement of the contact arms of other of said rheostats through predetermined cycles. A similar result may be obtained by withdrawing set screws 32 from engagement with shaft 31 to permit free rotation of the latter with respect to the coupling member 28,—the wheel 16 in such case being preferably in the angular position illustrated in Fig. 3 wherein the opening 34 is located directly below the shaft 31. On the other hand, if said wheel is clamped to coupling 28 so that the upper extremities of said slots are in engagement with bolts 29 and 30, a complete rotation of the shaft 31 will effect one forward and one reverse movement of the contact arm 6 through substantially 180 degrees,—which is the maximum range of movement of said arm. The adjustment of rack 9 by means of the clamping nuts 14 and 15 is adapted to compensate for any movement of said rack due to the adjustment of the wheel 16 with respect to the coupling member, as just described, to permit initiation of the particular cycle of operation with the contact arm 6 in the desired position.

Assuming each of the wheels 16 to be mounted on and adjusted with respect to shaft 31 as illustrated in Fig. 3, and the threaded portion 10 of rack 9 adjusted with respect to ring 13 as shown in said figure, it will be apparent that upon rotation of shaft 31 identical cycles of operation of all the rheostats will be effected. That is to say each of the contact arms 6 will move back and forth across a given number of resistance contacts, and the contacts at each limit of the oscillating movement will be correspondingly located on the respective dimmer plates. If desired, the rack bars 9 may be individually adjusted by means of the nuts 14 and 15, so as to vary the resistance values at which the individual cycles of operation are initiated, it being understood, however, that the several contact arms 6 will engage a like number of contacts during oscillation thereof.

To vary the amplitude of oscillation of the individual contact arms 6 with respect to each other the clamping bolts 29 and 30 are loosened and the wheels 16 thrown off center to any desired degree with respect to shaft 31,—maximum eccentricity of said wheels providing for maximum sweep of the respective contact arms 6, whereas concentricity of said wheels permits the respective contact arms to remain stationary during movement of shaft 31, as aforedescribed.

Furthermore, assuming adjustment of the driving connections of the several rheostats for operation thereof in given cycles, any of said cycles of operation may be completely reversed with respect to the others by simply loosening the set screws 32 and turning the respective coupling members 28 around shaft 31 through 180 degrees, the said screws of course being again tightened after such adjustment. By this arrangement the resistance value of certain of the rheostats may be increased while simultaneously decreasing the resistance value of other of said rheostats. Obviously by the arrangement just described the parts may also be adjusted to any position short of a complete reversal of the individual cycles of operation. While I have shown slots 21, 22 and 23, extending only to one side of the center of wheel 16, it will be apparent to those skilled in the art that I may obtain like results by increasing the length of said slots so that the same will extend a corresponding distance on the opposite side of the center of said wheel,—in which case the coupling member 28 may be keyed or otherwise permanently secured to shaft 31.

It is to be understood that irrespective of the difference in the length of the arcs traversed by the several contact arms 6, each of said arms will complete its predetermined cycle of operation upon each complete rotation of drive shaft 31. Thus, assuming adjustment of one rheostat for operation of its contact arm 6 through an arc of substantially 180 degrees whereas another rheostat is adjusted for operation of its contact arm 6 through an arc of 90 degrees, the rate of resistance variation of the latter will be substantially half that of the former.

I have thus provided novel and efficient means for obtaining continuous and auto-

matic operation of a plurality of control elements the control characteristics of which may be varied with respect to each other to provide practically innumerable relations or combinations, which combinations may be definitely predetermined by the various adjustments aforedescribed.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a master operating shaft adapted to be continuously driven in one direction through successive cycles, of a plurality of oscillatable rheostat control elements, and means providing individually adjustable connections, between said shaft and said elements, said connections providing for maximum or minimum or any intermediate range of oscillating movement of the respective control elements during each cycle of operation of said shaft.

2. The combination with a power driven shaft adapted to be continuously rotated in one direction through successive cycles, of a plurality of oscillatable dimmer rheostat control elements, and means providing adjustable connections between said shaft and said elements, said connections providing for varying the range or amplitude of oscillation of said control elements individually with respect to each other.

3. The combination with a plurality of rheostats each including a movable control element, of operating means for said elements comprising a shaft adapted to be continuously rotated unidirectionally through successive cycles, a plurality of eccentrics on said shaft, and rack members to be reciprocated thereby, means for adjusting said eccentrics individually to vary the degree of reciprocating movement of the respective racks during each complete rotation of said shaft, and means for individually adjusting any of said racks to vary the angular position of the respective control elements operated thereby without effecting the degree of movement of said racks under the action of said shaft.

4. The combination with a plurality of rheostats each having a movable control element, and adjustable means for effecting forward and reverse movement of said elements across all or any portion of the active surfaces of the respective rheostats to provide predetermined individual cycles of control, said means including a master operating shaft adapted for continuous movement in one direction through successive cycles for effecting repeated movement of said elements jointly through said predetermined cycles, said means further providing for selectively reversing the direction of movement of any any of said elements at any point in their respective cycles of operation irrespective of the concurrent direction of movement of other of said elements.

5. The combination with a plurality of dimmer rheostats having oscillatable contact elements, of a power driven member continuously rotatable through successive cycles for automatically effecting operation of said oscillatable contact elements jointly and repeatedly through predetermined individual cycles, and means providing individually adjustable operative connections between said member and said contact elements for varying the amplitude of said cycles of operation of the latter with respect to each other, all of said cycles of operation being initiated and completed during each complete rotation of said shaft, said adjustable connections further providing for completely reversing said individual cycles of operation of said contact elements with respect to each other.

6. The combination with a plurality of dimmer rheostats having oscillatable contact elements, of a power driven member continuously rotatable through successive cycles for automatically effecting operation of said oscillatable contact elements jointly and repeatedly through predetermined individual cycles, and means providing individually adjustable operative connections between said member and said contact elements for varying the amplitude of said cycles of operation of the latter with respect to each other, all of said cycles of operation being initiated and completed during each complete rotation of said shaft, said adjustable connections further providing for completely reversing said individual cycles of operation of said contact elements with respect to each other while maintaining the preselected amplitudes of the respective cycles.

7. The combination with a plurality of rheostats each having a movable resistance varying member, of a power driven member continuously rotatable unidirectionally through successive cycles, connections between said power driven member and said resistance varying members providing for joint operation of the latter by the former, said connections providing for varying the operating speeds of said resistance varying members individually with respect to each other while maintaining substantially constant the time within which each resistance varying member goes through a cycle of increasing and/or decreasing resistance.

8. The combination with a plurality of rheostats each having a resistance varying member movable alternately in reverse directions throughout a given maximum range, of power driven means operable unidirectionally through successive cycles for concurrently and repeatedly effecting operation of said resistance varying members throughout all or any portion of their respective maximum ranges, and including means for independently varying the ranges of movement of said resistance varying members with respect to each other.

9. The combination with a plurality of rheostats each having a resistance varying member movable alternately in reverse directions, of a shaft rotatable unidirectionally through successive cycles, connections between said shaft and said resistance varying members for effecting joint and continuous operation of the latter through preselected individual ranges of movement, said connections providing for individually varying the respective ranges of movement of said resistance varying members, and said connections further providing for initiation and completion of operation of said resistance varying members through their respectively preselected ranges during each complete rotation of said shaft.

10. The combination with a plurality of rheostats each having an oscillatable resistance varying member carried thereby, of a power driven member continuously rotatable unidirectionally through successive cycles, connections between said power driven member and said resistance varying members for effecting joint and repeated operation of the latter through predetermined individual ranges, said connections being individually adjustable to provide for selectively varying the ranges of movement of said resistance varying members with respect to each other.

11. The combination with a plurality of rheostats each having an oscillatable resistance varying member carried thereby, of a power driven member continuously rotatable unidirectionally through successive cycles, connections between said power driven member and said resistance varying members for effecting joint and repeated operation of the latter through predetermined individual ranges, said connections being individually adjustable to provide for selectively varying the ranges of movement of said resistance varying members with respect to each other, said connections further providing for effecting forward or reverse movement of any of said resistance varying members individually from any point in their respective ranges irrespective of the concurrent direction of movement of other of said resistance varying members.

In witness whereof, I have hereunto subscribed my name.

RICHARD B. HUNTER.