Sept. 19, 1933. C. L. WEICHELT 1,927,301

LAMP SOCKET RHEOSTAT

Filed Feb. 10, 1930

Fig. 1.

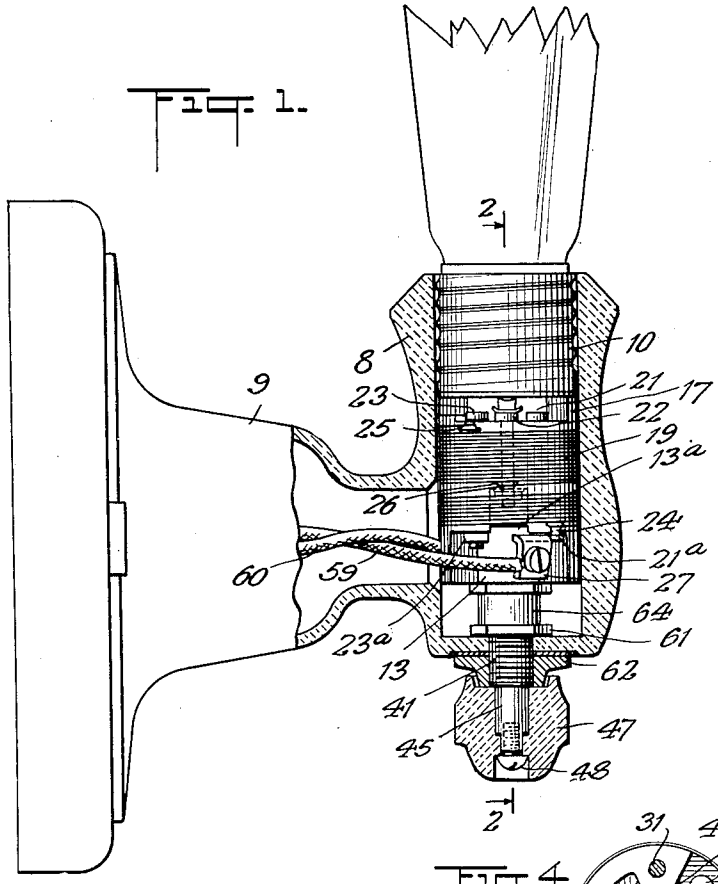


Fig. 4.

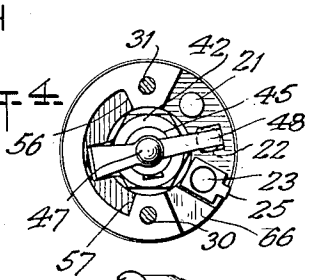


Fig. 2.

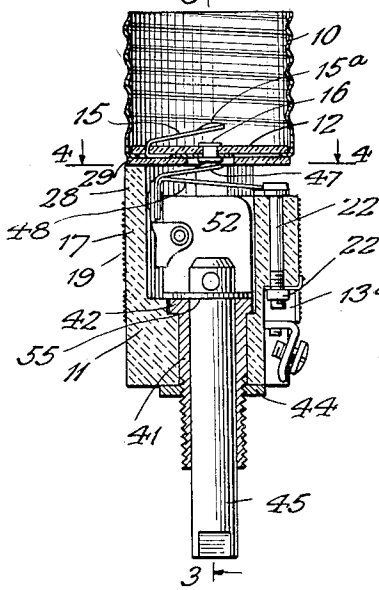


Fig. 3.

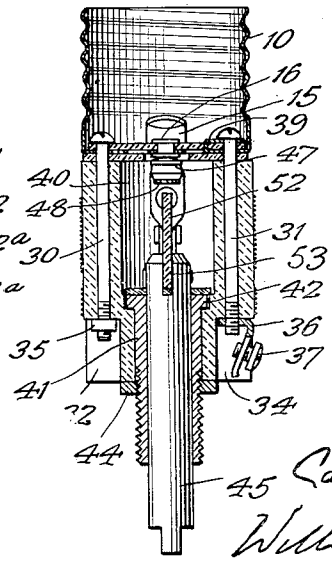
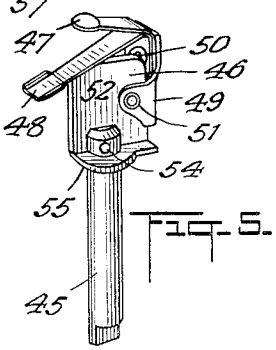


Fig. 5.



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LAMP SOCKET RHEOSTAT

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13 Claims. (Cl. 201—49)

The present invention relates to attachments for incandescent lamps by means of which the flow of current to the filament may be regulated and the intensity or candle power of the light produced thereby controlled.

An object of the invention is to provide such a device in which the parts thereof are so constructed as to enable them to be cheaply manufactured and easily assembled into a compact, durable, reliable, and otherwise satisfactory unit, the latter being appropriate particularly for use with fixtures in which a lamp socket is enclosed within an ornamental protecting jacket member which may be secured to another suitable support or which may comprise part of a lighting fixture.

The invention is directed more particularly to provide a current reducing device, including a lamp socket and a rheostat fixed in axial alinement thereto, said connected parts being readily inserted longitudinally in a tubular member which may form a part of an ornamental fixture.

A further feature of the invention is the provision of a sliding contact arrangement which insures the maintenance of a positive and efficient engagement of a rotatable switch-wiper arm with the co-operating stationary contacts.

Briefly, these objects are accomplished by an arrangement of parts in which a tubular rheostat ring is connected in axial alinement with a lamp socket and a rotatable shaft extends axially through the ring and carries flexible switching means adapted to engage the rheostat terminals and the center contact of a lamp simultaneously.

Other objects and advantages of the invention will become apparent from the following description taken in conjunction with the accompanying drawing, in which Fig. 1 is a view partly in elevation and partly in section of a dimmer or lamp socket rheostat illustrating one embodiment of the invention; Fig. 2 is a vertical section view of the dimmer with the enclosing jacket and the lower operating knob removed, taken along the plane indicated by the line 2—2 of Fig. 1; Fig. 3 is a similar vertical sectional view taken at right angles to Fig. 2, as indicated by the line 3—3 of Fig. 2; Fig. 4 is a horizontal sectional view of the complete device looking downwardly on the plane indicated by the line 4—4 of Fig. 2; and Fig. 5 is a perspective view of the operating shaft and rheostat switching means associated therewith.

The drawing illustrates an electrical fixture of a type with which a device embodying the invention is particularly adapted to be used, comprising a tubular jacket 8 and its supporting member 9, composed of a molded or baked insulating material, such as porcelain. The parts to which the present invention is directed comprise the electric lamp socket 10 and the associated dimmer 11, removably mounted in, but rigidly secured to, the jacket 8. The lamp socket 10 may be of the standard screw-threaded type, and to the base of this shell is mounted an insulating disc 12. The latter carries a flexible contactor 15 which may be secured thereto by the rivet 16. The contactor 15 extends within the socket 10 for engagement with the end or center terminal of a lamp inserted in the socket and the rivet 16 co-operates with the switching means of the associated dimmer.

In the general form of device to which the invention relates, the desired current reduction is produced by the use of a fixed rheostat having terminals adapted to be successively engaged by a moving contact or wiper to complete a series circuit including a source of potential and a lamp filament. In the present embodiment of the invention, I have shown the rheostat as a tubular member 17, composed of a molded or baked insulating material, on the periphery of which is wound a resistance coil 19 having its ends and a point intermediate the latter connected respectively to terminals 21, 23 and 22 disposed at the upper end of the rheostat. The coil 19 may be coated with a cemental composition, not shown in the drawings, which embeds said coil 19 in a in a layer of insulating material. The terminals 21, 22 and 23 may conveniently take the form of screws extending through longitudinal openings formed through the member 17, the heads of said screws providing the terminal contacts at the upper end of said member 17 for co-operation with the switching means, which will be later described. The tubular member 17 is formed with an arcuately disposed recess 13 at its lower end, which recess provides seating ledges for the nuts 21—*a* and 23—*a* which co-operate, respectively, with the terminal screws 21 and 23. Another recess 13—*a* formed upwardly from said recess 13 provides an upper seating ledge for the nut 22—*a* which co-operates with the terminal screw 22. The nut 21—*a* securely holds a lug 24 in electrical connection with same, to which lug 24 is soldered or otherwise secured the lower end of the resistance coil 19. The head of the screw 23 securely holds another lug 25 in electrical connection with same, to which lug 25 is soldered or otherwise connected the upper end of the resistance coil 19. A third lug 26 is held by the nut 22—*a* in electrical connection with same, to which lug 26 is soldered or otherwise secured an intermediate point of the resistance coil 19. A line wire terminal 27, which may take the form of a lug and screw associated therewith, is mounted within the recess 13 so as to be in electrical connection with the terminal screw 21, the lug of said terminal 27 being held by or made integral with the nut 21—*a*.

The tubular rheostat member 17 is formed at its upper end with an arcuate projection 28 extending on either side of the terminal contacts 21, 22 and 23. The socket shell 10 is mounted on said projection 28, which thus provides a space between the shell 10 and the member 17 for proper operation of the switching means with said contact terminals 21, 22 and 23. Preferably, a centrally apertured disc of insulating material 29 is mounted between the shell 10 and the extreme upper end of the tubular member 17, said shell 10, disc 29 and member 17 being fixedly secured together by means of screws 30 and 31 extending longitudinally through openings formed through the base of the shell 10, the disc 29 and the member 17 including the extension 28. The tubular member 17 is formed at its lower end with recesses 32 and 34 which provide seating ledges for the nuts 35 and 36 co-operating, respectively, with the screws 30 and 31. Another line wire terminal 37 is disposed in one of said recesses, 34, so as to be in electrical connection with the screw 31 and hence with the shell 10. Said terminal 37 may also take the form of a lug and screw associated therewith, the lug being held by or made integral with the nut 36. From the above description, it becomes apparent that there is provided an arrangement of parts in which the rheostat may be readily and rigidly secured in axial alinement with and to the lamp socket and in which the lamp socket shell and rheostat may be reliably connected in circuit with line wires.

The insulating disc 12 is preferably mounted within the shell 10 at the bottom thereof, and carries a flexible contact strip 15 which forms an upper center contact 15—*a* for connection thereto with the center terminal of a lamp when inserted in the socket shell 10. A portion of this strip 15 is passed through a slot formed in the insulating disc and bent inwardly so as to be clamped on the bottom surface of said disc 12 by the center rivet 16. The latter forms a lower center contact for co-operation with the rheostat switching means, the lower portion of the strip 15 and its clamping rivet 16 being disposed within the opening formed through the bottom of the shell 10. A lug 39 formed on the bottom of the shell 10 is passed through another slot formed through the disc 12 and bent outwardly on the upper surface of the disc 12 so as to be clamped beneath the head of the screw 31. This lug 39 thus serves as initial securing means, in the process of assembly of the device, of the disc 12 to the socket shell 10, and to establish positive electrical connection betwen the socket shell 10 and the line wire terminal 37 through the medium of the screw 31. Also, this arrangement of parts, including the form of mounting the contactor 15 on the disc 12, insures a permanent positioning of the various conducting parts relative to one another.

In accordance with a feature of the present invention, the rheostat switching means is one adapted to engage the center contact 16 while successively engaging the rheostat contact terminals 21, 22 and 23, and thereby complete a series circuit through the rheostat and the lamp socket from a source of current to a lamp filament. Referring to the drawing, the tubular rheostat member 17 is formed at its upper end with a central recess 40 of appreciable diameter and depth, and a tubular sleeve 41 extends axially from the bottom of said recess 40 through the lower portion of the tubular member 17 to an appreciable distance below the bottom of said member 17. The upper end of said sleeve 41 may be formed with a nut portion 42 engaging a seat of corresponding shape formed at the bottom of the recess 40, and has its lower end threaded and provided with a lock nut 44, the latter in conjunction with the nut portion 42 providing rigid connection of the tubular sleeve 41 to the tubular rheostat member 17. The sleeve 41 serves as a bushing or bearing for a longitudinal switch shaft 45 carrying at its upper end switching means 46 co-operating with the center contact 16 and the rheostat terminals 21, 22 and 23, and on its other end a key or knob 47 secured thereto through the medium of a screw 48 threaded into the lower end of said shaft.

The switching means 46 comprise two contacts 47 and 48 in electrical connection with one another and co-operating, respectively, with the center contact 16 and with the rheostat contacts 21, 22 and 23, whereby current passage is provided between the contact 15—*a* and the rheostat 11. In the form shown in the drawing, the switch contacts 47 and 48 are in the form of spring fingers extending from a common point in directions transverse to the shaft 45, and are secured together and to a supporting strip 49 in proximity to this common point by a rivet 50. The supporting strip 49 may be secured by a rivet 51 to an insulating block 52 secured to the upper end of the shaft 45. As shown in the drawing, the insulating block 52 is inserted into a vertical slot 53 formed at the upper end of the shaft 45, and a rivet 54 driven through said shaft 45 and block 52 secures the block 52 to the shaft 45. Preferably, a collar 55, having a portion fitted at the bottom of the aforesaid slot 53, provides a base for the seating thereon of the bottom of the insulating block 52, thereby insuring a firm positioning of the switching means described relative to the shaft 45. This collar 55 bears against the upper end of the guide tube 41 or nut portion 42, and, in order to limit the rotary movement of the shaft and switching means described, shoulders 56 and 57 may be formed on the tubular member 17 within its central recess 40, which shoulders engage the supporting strip 49 to limit the rotation of said shaft and switching means in both directions. Evidently, the apertured insulating disc 29, intermediate the socket shell 10 and the tubular rheostat member 17, permits engagement of the arm 47 with the contact 16, but insulates said arm 47 from the bottom of the shell 10.

When an electrical fixture of the general type shown in the drawing is employed, it is usually customary to provide the connection between the lamp socket shell 10 and the main or house wiring circuit in the form of lead-in wires 59 and 60. With this form of connection, it is desirable that provision be allowed for making the necessary wiring connections and that the socket and rheostat co-operating therewith be readily detachable from the fixture jacket 8 in order to facilitate assembling the parts in the first instance and their subsequent removal and repair, if necessary. This object is accomplished by extending the sleeve 41 secured to the rheostat 11, through the bottom of the jacket wall and threading thereon a pair of lock nuts, 61 and 62, adapted to engage the inner and outer walls of the jacket end, respectively. To insure the correct location of the socket and rheostat relative to the jacket and hence the desired position of the nut 61 on the sleeve 41, an outer tubular spacing

member 64 is inserted between the nuts 44 and 61. The lead-in wires 59 and 60 are secured at one end to the house wiring circuit and their other ends are connected to the terminals 27 and 37.

Upon rotation of the shaft 45, the free end of the contact 48 is brought successively into engagement with the rheostat terminals, 21, 22 and 23, while the contact 47 is maintained in engagement with the socket contact 16. The switching means described and the socket contact co-operating therewith, by reason of the resiliency of the contacts 47 and 48, provide positive engagement of the contact 48 with said terminals 21, 22 and 23, and flexibility in the assembly of the parts in that no particular attention is needed in the adjustment of the operating knob 47 to the bottom of the actuating shaft 45. Any tendency of loose play to shorten the life of the device as, for example, a possible loosening of the nut 62, or of the screw 48, as the knob 47 is protractedly rotated, is thus effectively eliminated.

It now becomes apparent that, upon rotation of the shaft 45, electrical circuits will be established through lead-in wire 59, terminal 27 and rheostat unit 11 to the arm 48, and thence through the arm 47 to the center contact 16. Since the contactor 15 is in electrical connection with the rivet 16, current then passes through the end terminal, the filament and the sheath of a lamp to the socket shell 10, and thence through the screw 31 to the terminal 37 and lead-in wire 60, thereby completing a circuit for a resistance and a lamp filament in series. When the switching means are rotated to engage with the shoulder 57, the free end of the arm 48 is on the rheostat terminal 21, and, in this position of the switching means, current is established directly from the lead-in wire 59 through the screw 31 to the switching means, and the lamp will burn with full brilliancy. The arm 48 may then be caused to rotate in engagement with the rheostat terminal 22, and, in this position of the switching means, current is established from the lead-in wire 59 through the terminal 27 and lug 24 and through the lower portion of the resistance soil 19 to the lug 26 and thence through the screw 22 to the switching means, the lamp then burning with an intermediate dimness. When the arm 48 is rotated in engagement with the rheostat terminal 23, current is established from the lead-in wire 59 through the terminal 27 and lug 24, through the complete extent of the resistance coil to the lug 25, and thence to the rheostat terminal 23 and the switching means, the lamp then burning with minimum dimness. Preferably, a small ledge 66 is formed on the upper end of the tubular member 17 in horizontal alinement with the upper surfaces of the rheostat terminals, the free end of the arm 48 sliding on this ledge to interrupt the current through the device when the switching means are rotated in engagement with the rotation limiting shoulder 56.

From the arrangements of parts described, it will be seen that the device described comprises a simple construction in which the various parts are maintained in rigid mechanical and electrical contact with each other, in which the switching parts may be easily rotated to produce a firm positive engagement of the stationary contacts by the rotating contacts, and in which the socket and dimmer may be readily detached from the fixture jacket with which it is associated. Also, by constructing the body of the rheostat of a single, hollow cylindrical piece of insulating material, it is possible to wind the resistance coils directly on its exterior surface, enclose the movable parts in its central recess and rigidly secure the lamp socket to its upper end by means of securing devices extending longitudinally through the body and one of which also serves to secure a wiring terminal.

What is claimed is:

1. A current reducer for electric lamps comprising a lamp socket shell carrying a center contact, a stationary rheostat body secured in axial alinement with said socket and having resistance windings provided with terminals disposed circularly at the upper end of the rheostat beneath one edge of the shell, said body having a central recess at its upper end, a shaft carrying switching means located in said recess and adapted to engage said terminals upon rotation of the shaft and providing electrical connection to the center contact, and lead-in terminals on the body in electrical connection with the shell and the rheostat windings.

2. A current reducer for electric lamps comprising a lamp socket carrying an insulating disc having a center contact, a tubular rheostat body secured to said socket and having resistance windings provided with terminals at its upper end, said body having a central recess at its upper end, a sleeve mounted in the rheostat, a shaft within the sleeve, switching means in said recess mounted on said shaft and seated on the upper end of the sleeve and adapted to engage the center contact and the resistance terminals, means to limit the rotary movement of said shaft and switching means, and circuit connections on said body in electrical contact respectively with the rheostat and the socket shell.

3. A current reducer for electric lamp fixtures comprising a lamp socket shell, an insulating disc secured to said shell having a center contact, a rheostat disposed below said shell and disc, said rheostat comprising a resistance provided with terminals adjacent to said disc, securing devices extending through said disc for connecting said rheostat and shell, a switch arm cooperating with the rheostat terminals, means for actuating said arm, and a spring member in liaison with said means to provide electrical connection from the center contact to the switch arm and to provide pressure on said switch arm for establishing positive engagement of the switch arm with resistance terminals.

4. A current reducer for electric lamps comprising a socket embodying a shell and a center contact, an insulating block secured at one end to the bottom of said shell and having a resistance coil wound on its periphery, terminals for said coil disposed at the upper end of the block, a securing device extending through the bottom of the shell and the block for connecting said parts together, rotary switching means adapted to engage the resistance terminals and providing electrical connection to the center contact, and lead-in terminals on the block connected to said securing device and said coil respectively.

5. A current reducer for electric lamps comprising a socket embodying a shell and a center contact, a tubular rheostat body secured at one end to the bottom of the shell and having a resistance element wound on its periphery, a plurality of screws extending longitudinally of the rheostat body and connected to predeter-

mined points of the resistance element to provide terminals at the upper end of the rheostat, a screw extending through the bottom of the socket shell and the rheostat body for securing said parts together, a rotary shaft extending centrally of the rheostat and carrying switching means co-operating with the rheostat terminals and said center contact, and lead-in terminals on the rheostat secured to one of said first mentioned screws and said last mentioned screw respectively.

6. In a current regulator for electric lamps, the combination with a cylindrical insulating body having a central recess and a notch provided at its upper end at one side of the recess, terminals on the face of the notch and a rheostat winding on the body connected to said terminals, of a lamp socket shell secured to the upper end of the body and having an insulated center contact, a post journaled axially in the body, and switching means in said recess carried by the post and engaging said center contact and extending into said notch and cooperating with the terminal contacts therein.

7. In a current regulator for electric lamps, the combination with a cylindrical insulating body having a central longitudinal opening and provided with a notch at its upper end at one side of the opening, said body being provided with a cut-away portion in its cylindrical outer surface, of a resistance coil wound on the cylindrical outer surface of the body, terminals for said coil lying in said notch, means in part located in said cut-away portion and in part extending through the body for connecting the coil at a predetermined point thereof to a terminal, a lamp socket shell secured at the upper end of the body and having a center contact, and a post journalled in said opening carrying switching means engaging the center contact and cooperating with the terminals in said notch.

8. In a current regulator for electric lamps, the combination with a cylindrical porcelain body having a central circular recess provided with an inwardly extending rib and a notch at one side carrying a plurality of terminals, a resistance winding carried by said body and connected at various points to said terminals, and a lamp socket shell mounted on the end of the body and provided with a center lamp contact, of a post rotatable axially in said body, an insulating carrier in said recess and carried by the post and co-operating with the rib to limit its rotary movement, and switching means attached to said carrier and co-operating with said center contact and said terminals.

9. In a current regulator for electric lamps, the combination with a cylindrical insulating body having at its upper end a center recess and a notch at one side of said recess, said body being provided with a cut-away portion in its outer cylindrical surface, of a resistance coil wound on the outer cylindrical surface of the body, terminals for said coil lying in said notch, means in part located in said cut-away portion and in part extending through the body for connecting the coil at a predetermined point thereof to a terminal, a lamp socket secured at the upper end of the body and having a center contact, and switching means in said recess co-operating with said center contact and said resistance terminals.

10. A current reducer for electric lamps comprising a lamp socket embodying a shell and a center contact at the bottom of said shell, a stationary insulating body disposed in axial alinement with said socket and having one end abutting and secured to the bottom of said socket, said end being formed with a lateral notch, said body also having a resistance provided with terminals disposed at the bottom of said notch, and switching means in said body and rotatable in the axis thereof, said means engaging said contact and adapted to successively cooperate with the terminals.

11. A current regulator for electric lamps comprising a lamp socket shell, a contact member at the bottom of said shell adapted to provide electrical connection to the center contact of a lamp, a stationary tubular insulating body disposed in axial alinement with said shell and having one end abutting and secured to the bottom of the shell, said end being formed with a lateral notch, said body also having a resistance wound on its periphery and provided with terminals disposed on the bottom of said notch, resilient switching means rotatable in the axis of the rheostat and cooperating with said contact member, whereby electrical connection between said contact member and means and positive engagement of said means with said terminals are established, and an actuating shaft connected to said means and extending through said body longitudinally thereof.

12. A regulator for electric lamps comprising an electric socket having a center contact at its bottom, a stationary insulating body disposed in axial alinement with said socket and having its upper end abutting and secured to the bottom of the socket, said end being formed with a lateral recess, said body carrying a resistance having terminals laterally disposed on the bottom of said recess, resilient switching means in said recess rotatably engaging said center contact and cooperating with the resistance terminals whereby electrical connection between said center contact and said terminals and positive engagement of said means with said terminals are established, circuit connections accessible in recesses in the peripheral surface of the body in electrical connection with the resistance and the lamp socket respectively, and means extending through the body longitudinally thereof for operating said switching means.

13. In a current reducer for electric lamps, the combination with a lamp socket shell and a stationary solid cylindrical body of insulating material secured thereto and having wound exteriorly on its peripheral surface a winding of resistance wire, said body having longitudinally extending apertures adjacent its periphery, of a plurality of conductive elongated members inserted in said apertures providing terminals at one end mounted on the end of the body adjacent the shell, two of said members being connected respectively to the ends of said wire, another of said members having at the other end a conductive element extending outwardly to the periphery of the body whereby it may be connected to an intermediate point of said wire, a contact for one side of a current supply circuit leading directly to a member connected to one end of said wire, a center lamp circuit contact in the shell, a switch wiper cooperating with the center contact and movable into successive engagement with said terminals, and means for completing the lamp circuit through said shell.

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