C. D. KESTNER.

RHEOSTAT.

APPLICATION FILED DEC. 31, 1909.

981,572. Patented Jan. 10, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

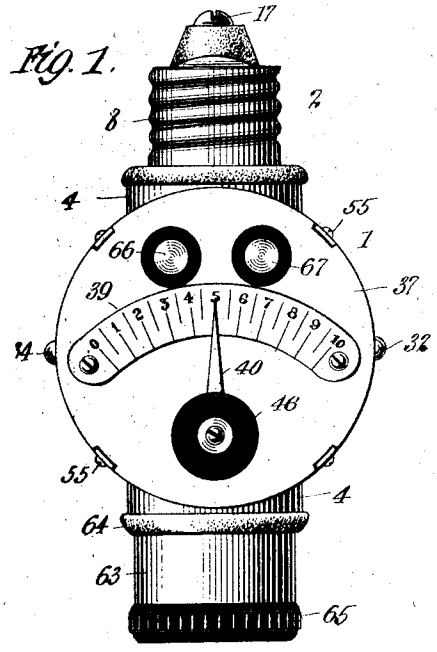


Fig. 2.

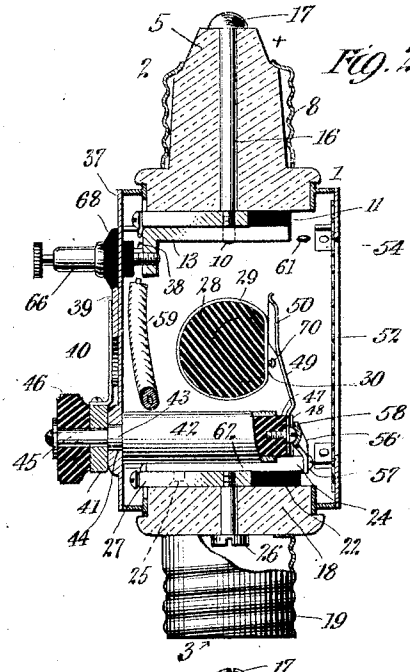


Fig. 3.

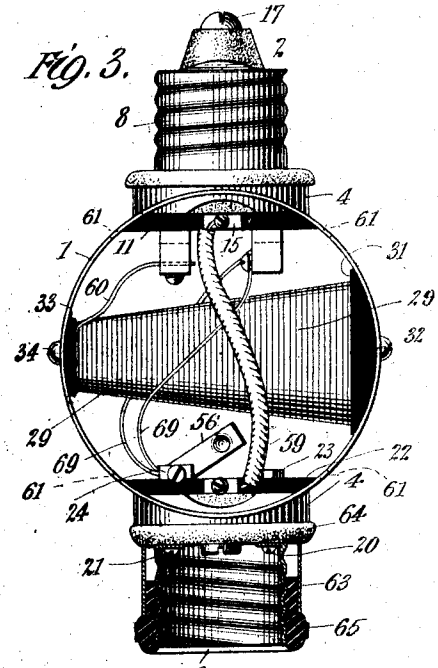
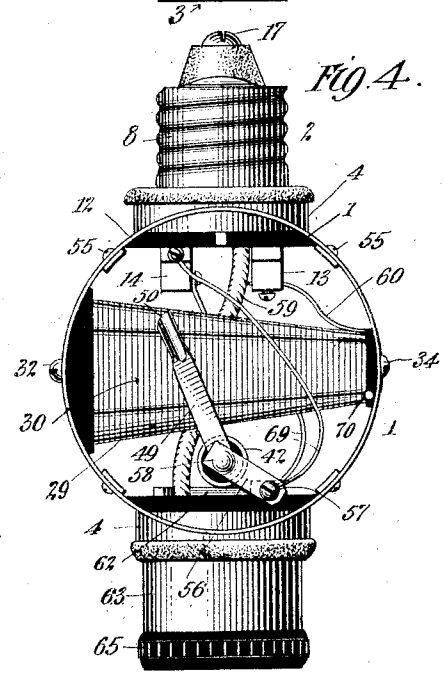


Fig. 4.



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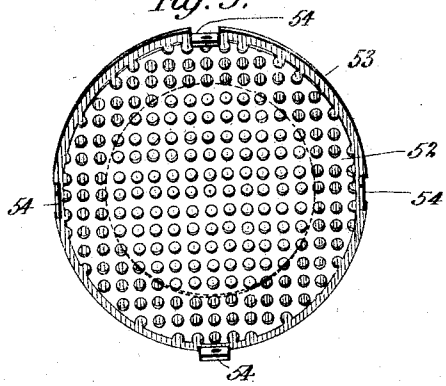
2 SHEETS—SHEET 2.

Fig. 5.



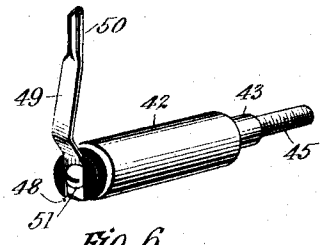
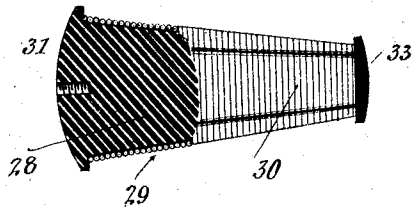


Fig. 6.

Fig. 7.



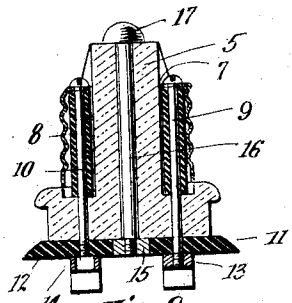


Fig. 8.

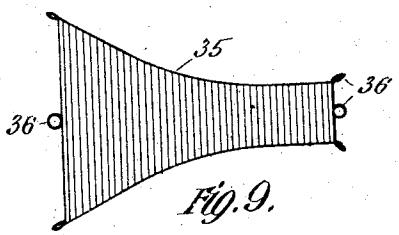


Fig. 9.

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UNITED STATES PATENT OFFICE.

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RHEOSTAT.

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Application filed December 31, 1909. Serial No. 535,812.

To all whom it may concern:

Be it known that I, CHARLES D. KESTNER, a citizen of the United States, residing in the city of New York, in the borough of Manhattan and State of New York, have invented certain new and useful Improvements in Rheostats, of which the following is a full, clear, and exact description.

This invention relates to a lamp rheostat, and has for its object the production of a compact device adapted to be inserted in a lamp or other electric circuit for the purpose of regulating the resistance therein and more especially to provide a device in which said resistance may be varied by some convenient means, such for example as a knob or handle, and securing thereto a pointer adapted to coöperate with a scale, the graduations of which should preferably be substantially equally spaced. This arrangement is of special utility in connection with tungsten lamps, and more particularly those of low voltage. These lamps, the bulbs of which may be very small, are used in connection with various surgical appliances to illuminate the mouth or nasal cavities or like parts, and it becomes necessary frequently to vary the size of the bulb and consequently the voltage of the lamp to fit the cavity or the instrument. When, for example, a six volt lamp is used, it is found necessary to insert a given resistance into the ordinary lamp circuit to accommodate a lamp of this low voltage. Upon a subsequent change to, for example, a lamp of twelve volts, the relative travel of the movable element in a rheostat of the usual type will not be proportional to the change in voltage of the lamp, and were a scale to be used in connection with the aforesaid resistance, as an indicating means of the amount thereof in circuit, the graduations upon said scale would be unequally spaced so that at one end thereof the division lines would be spaced far apart, while at the other end they would be disproportionately close together. For convenience in use therefore, it is desirable that some means be provided whereby when for example the required voltage is to be doubled trebled or quadrupled the handle and pointer shall preferably traverse distances proportional to the voltage required, thereby permitting of less care in the adjustment of the rheostat. Particularly is this the case where the scale is graduated for a considerable range, since here the graduations at one end are undesirably close while at the other, unnecessarily large, and to overcome this objectionable feature the present invention has been evolved, embodying a new form of rheostat which admirably adapts itself to the required conditions. Further, the device considered as a whole and even more especially the novel rheostat herein presented is admirably adapted to various other uses.

The following is a description of one embodiment of my invention, which is illustrated in the accompanying drawings, like parts being designated by like reference characters.

Referring to said drawings, Figure 1 is a front elevation of a socketed lamp rheostat. Fig. 2 is a vertical section taken on the median line of Fig. 1. Fig. 3 is a front elevation, partly in section, of the device with the scale or front plate and arbor removed. Fig. 4 is a rear elevation with the back plate removed. Fig. 5 is a perspective view of said back plate. Fig. 6 is a view of the arbor showing the insulating member therein. Fig. 7 is the rheostat proper; shown partly in section. Fig. 8 is a vertical section of the top socket-stem base, and connecting parts. Fig. 9 is a modification of the rheostat proper.

In the drawings, 1 designates a cylindrical casing, preferably of sheet metal, having disposed on opposite sides thereof male and female socket connections respectively 2 and 3. These socket portions are carried upon bosses or extensions 4 formed by soldering annular members into apertures of said casing, and insulating base members are seated in said extensions. The upper insulator 5, is formed with vertically disposed recesses adapted to receive conductive sleeves 6, and the lugs 7 of a threaded conductive shell 8. Bolts 9 and 10 extend through apertures in said lugs and through the lower portion of the insulating base, and are respectively screwed solidly into the fiber strips 11—12. Clips 13 and 14, preferably of brass, are independently secured to strips 11 and 12, being positioned one on either side of the center line of the base; the bolt 9 contacting with clip 13. The fiber strips serve to space the clips from a conductive bar 15, united to the insulating base by a riveted extension upon a metallic through-bolt 16, the head 17

of which is positioned on the top of the base and together with the threaded shell aforesaid, forms the male socket connections. The lower insulating base 18 carries upon the lower portion thereof a threaded shell 19, said shell being secured to said socket by screws 20, 21. Said screws extend upward from the base and through a fiber block 22; screw 20 threading into a nut 23, and screw 21 threading into a metal bar 24. Said bar may be further secured to the fiber block 22 by screws 25 if desired. Extending upward through the base 18 is a contact screw 26 threaded into a bar 27. The fiber block 22 being recessed for the reception of said bar. Transversely positioned in said casing is the rheostat proper, in this instance formed by winding a coil of conductive material 29, preferably German silver wire, upon an insulating core or base 28, in this instance of fiber, having the form substantially of a truncated cone. The various turns of the coil are substantially insulated from each other by a coating of lacquer, or other insulating medium, and the said core and coils positioned thereupon are in this instance shown flattened, as at 30, along one side thereof, the insulating coating being scraped from the exposed surfaces of the coil along this flattened portion. The core 28 tapers gradually from the end 31, which is secured to the casing by screw 32, and the opposite or reduced extremity of said core is flanged as at 33 to better retain the wire wrapping, said end in turn being secured to the casing by a screw 34. This exemplification of my rheostat is merely one of many possible diverse forms thereof, and should the exigencies of the case require a structure of other shape than that of a truncated cone, as for example that shown in Fig. 9 such structure would be considered within the purview of my invention.

One modification of my rheostat is illustrated in Fig. 9, wherein the core is omitted, the wire forming the rheostat being of sufficient rigidity to permit dispensing with the said core. The metallic parts 35 in this form of device may be supported by loops 36 adapted to be engaged by screws or like means secured to the walls of the casing; the coil being of course properly insulated by strips of mica or the like.

Positioned on the front of casing 1 is a face plate 37, secured in position upon the casing by lugs 38. Said plate carries upon the outer face thereof a scale 39. A pointer 40 carried upon a sleeve 41 coöperates with said scale. An arbor 42 having a reduced portion 43 adapted to be seated in an aperture 44 in said face plate, carries the sleeve 41 upon an extension 45 thereof; a knurled nut 46, preferably of insulating material, clamping said sleeve firmly in position upon the arbor and thereby securing said arbor in its bearing. The rear end of the arbor is recessed for the reception of an insulating fiber block 47, and said block carries in the slotted extremity 48 thereof a resilient conductive finger 49, preferably of rolled copper or like material. The upper extremity 50 of said finger is dished for reasons hereinafter set forth, and said finger is secured to said block by a screw 51.

A perforated rear or back plate 52 formed or provided with a stiffening flange 53 preferably soldered thereto, completes the casing proper; said plate being secured to the casing by struck-up lugs 54, similar to those on the front plate. These lugs may be threaded for the reception of securing screws 55. The resilient strip 56 is secured by a screw 57 to the bar 24, and extends obliquely upward therefrom toward the inner extremity of arbor 42. The end of said strip is cupped at 58 to engage a considerable surface of screw 51 carried by the said arbor. The connections of the several parts above described can be best explained while describing the course of current through the apparatus. Assuming that the socket stem 2 has been screwed into position in the usual lamp socket, current will enter let us say, at 17, passing thence down through conductor 16 to bar 15. A wire 59 connects said bar with bar 27, current thence proceeding through contact screw 26 to the center contact of a lamp; returning from the lamp through shell 19, screw 21, bar 24, the resilient member 56, screw 51 into finger 49; then according to the position of said finger upon the rheostat coil, through a greater or less extent of said coil to a lead 60 extending therefrom to the L-shaped bar 13, and from thence through screw 9 and sleeve 6, back to the shell 8, completing the circuit.

Ventilating holes 61 provided in the walls of the casing, together with the perforated back plate afford a sufficient circulation of air to prevent the device from becoming overheated when in use. As a matter of precaution to avoid any possibility of short-circuiting, a layer of mica 62 is provided between the arbor and conductive bar 27.

To afford a finished appearance to the exterior of the bottom socket member, a metallic sleeve or ring 63 is placed in position thereupon, engaging the flange 64 of the insulating base, and being secured in position by a knurled nut 65.

As it may not always be desirable or possible to use my device in connection with a lamp socket, I have provided threaded binding posts 66, 67, upon the face thereof. Said posts are insulated from the face plate by washers 68; post 66 being screwed into the short leg of L-shaped clip 13, while post 67 is correspondingly screwed into clip 14. This latter bar is not in electrical connection with the shell of the socket stem, since the

screw 10 thereof does not contact with this bar by reason of an enlarged aperture therein around the extremity of said screw. The lead wires 69 connect the ends of bar 14 with bar 24 and screw 57, thereby placing binding post 67 in electrical connection with finger 49. Bar 13 is connected by lead 60 with the rheostat coil in a manner already described, and hence the circuit is adapted to be completed between said binding posts through the medium of said rheostat.

The operation of the rheostat proper is obvious, and it may be merely added that it is possible by varying the sizes of the various turns of the coil to effect any predetermined changes of resistance desired while permitting the scale used in connection therewith to be graduated evenly or otherwise. It will be noted also that the rheostat is adapted to operate as a switch, since if the revoluble arm 49 be rotated to the extreme left (Fig. 4) the end thereof will engage merely the fiber core and hence no current will flow. A stop 70 is provided upon the end of said core for limiting the throw of said arm, and the end of said arm is dished as hereinbefore mentioned to better permit a sharp line contact with the respective turns of the resistance coil.

The equal spacing of the scale obviates the objections to the use of an unevenly graduated one, to wit the difficulty of reading and interpolating when the lines of the scale are most closely spaced and the liability of the operator to turn the controlling knob to an improper position for a given lamp, which may cause the burning out thereof; the interpolation above referred to being in such case necessitated by the fast that when the graduations are close the designating numerals or marks cannot all be applied, since such figures would be too small, and interpolation must be resorted to, with the consequent liability of erroneously adjusting the rheostat.

What I claim, is:—

1. In a rheostat, a tapering insulating core, a conductive member wound thereon, and means for cutting turns of said wound conductive member out of an electrical circuit.

2. In a rheostat, a coil of conductive material, having the turns thereof of unequal size, and a member adapted to contact with various turns of said coil when relative movement occurs between said coil and said member.

3. A rheostat comprising a rigid tapered coil of conductive material in combination with a contact adapted to make successive connection with the turns thereof.

4. A rheostat comprising a rigid coil having the turns thereof of varying size and an insulating base therefor in combination with a contact adapted to make successive connection with the turns thereof.

5. A rheostat comprising a tapered coil, flattened upon one side, a revoluble arbor disposed substantially at right angles to the axis of said coil, and an arm carried by said arbor and having a protuberance adapted to resiliently engage various portions of said flattened portion.

6. A lamp rheostat comprising a scale, a coil having the various turns thereof of differing size, a revoluble member carrying an arm and a pointer, said arm being adapted to engage various turns of said coil, and said pointer indicating upon said scale when the arm is in proper position for use with a given lamp.

7. A lamp rheostat comprising a casing having means for connecting said rheostat in circuit with a lamp, a non-conductive core having the shape substantially of a truncated cone secured to a side of said casing, a resistance wire wound thereupon, and means for engaging the turns of said coil for adapting the current to the lamp to be used.

8. A rheostat comprising a non-conductive base the successive transverse sections of which are of varying areas, a coiled conductive member mounted upon and conforming to the variations of the base, and an arm adapted for engagement with the turns of said member.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

CHARLES D. KESTNER

Witnesses:
CHAS. R. JOHNSON,
LOUIS PH. GEYER.