No. 732,489. PATENTED JUNE 30, 1903.

J. J. WOOD.

RHEOSTAT FOR ARC LAMPS.

APPLICATION FILED APR. 25, 1903.

NO MODEL.

FIG. 1.

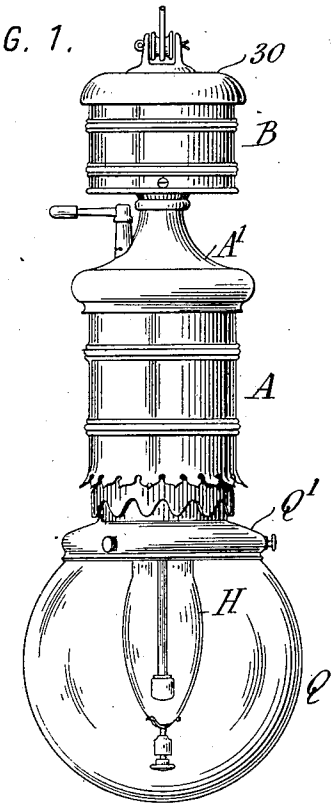


FIG. 2.

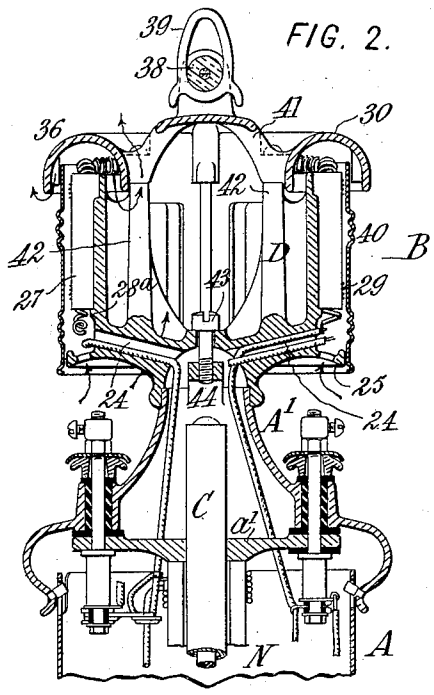


FIG. 3.

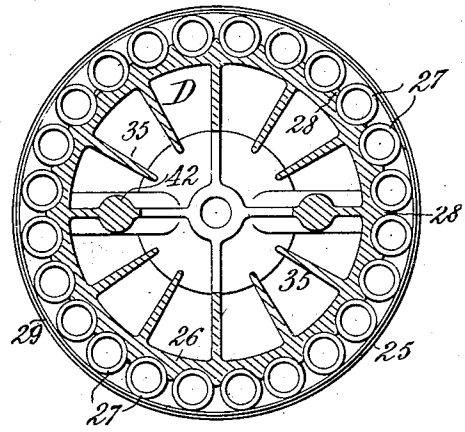
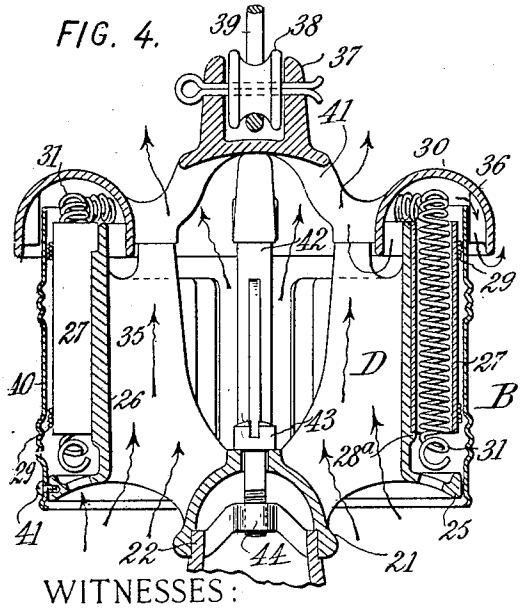


FIG. 4.



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UNITED STATES PATENT OFFICE.

JAMES J. WOOD, OF FORT WAYNE, INDIANA.

RHEOSTAT FOR ARC-LAMPS.

SPECIFICATION forming part of Letters Patent No. 732,489, dated June 30, 1903.

Application filed April 25, 1903. Serial No. 154,197. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. WOOD, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Rheostats for Arc-Lamps, &c., of which the following is a specification.

This invention relates to rheostats or resistances especially designed and adapted for use with electric-arc lamps, but applicable in part to other uses.

Arc-lamps for use on constant-potential circuits are provided with an external resistance, which usually and preferably is contained in a special box or case, which commonly is arranged above the lamp or lamp-case, the connecting-wires being extended between the respective cases. The external-resistance case or box has to be adapted for supporting a considerable length of resistance-wire in such manner as to facilitate the disengagement and radiation of a considerable quantity of heat, this being especially important in a series lamp, where the compensating resistance consumes practically the same amount of energy when the lamp is extinguished that is consumed in the lamp when it is in operation, this energy being converted into heat, which is radiated from the resistance-wire.

My invention provides certain improvements, pertaining chiefly to the construction of the resistance-case and the support and insulation of the resistant wire, designed to afford free ventilation and ready escape of the heat.

The accompanying drawings show my invention as adapted to an arc-lamp.

Figure 1 is an elevation of the lamp as a whole. Fig. 2 is a vertical section of the upper portion of the lamp-case and of the external-resistance case. Fig. 3 is a horizontal section through the external-resistance case, the resistant wire being omitted. Fig. 4 is a vertical section of the resistance-case or rheostat in a plane at right angles to that of Fig. 2.

Referring to Fig. 1, A designates the lamp-case, and B the external-resistance case. The lamp-case A is constructed at the top with a hood A′, beneath which is attached a plate *a*′, to which plate is fastened the central tube C of the lamp. H is the inner or arc-inclosing globe, and Q is the outer globe, held by a globe-holder Q′.

The rheostat or resistance-case B is mounted on top of the lamp-case, so that it serves as the medium for suspending the latter. The hood A′ of the lamp-case is formed at its upper part with a tubular neck, and the resistance-case has at its bottom a tubular base fitting it. The rheostat has as its support a cast shell D, which is covered over at the top by a cap or hood 30 and inclosed within a cylindrical sheet-metal casing or shell 40. The casting D is formed at its bottom with a neck 21, which fits on the neck 22 of the hood A′, so that, as shown in Fig. 2, there is formed a communicating passage between the interior of the hood and the lower part of the resistance-case, from which two passages 24 24, Fig. 2, lead through the casting D to the exterior thereof. There is thus provided a clear passage for the respective wires communicating between the resistance-coil in the box B and the electrical elements inclosed within the lamp-case A, whereby these wires are carried internally instead of being extended externally between the lamp-case and the resistance-box. The casting D is formed at its bottom with a perforated flange 25, above which is a cylindrical shell 26, extending up to any suitable height, its dimension being variable according to the length of the resistant-coil which is to be provided for. Around the exterior of the shell 26 are arranged vertical insulating and heat-resisting tubes 27 27 to any desired number, these tubes being preferably arranged as close together as can be, with or without actual contact. To guide these tubes and retain them parallel, it is preferable to form the casting D with vertical ribs 28, which project partly between the tubes and determine their correct spacing and keep them properly in place. The tubes are held against the casting by any suitable means, preferably by bands 29, of wire, wound around the entire series of tubes and binding them against the cylindrical shell. To keep the tubes from slipping down in case the heat relaxes the bands, a flange or foot 28^a is carried circumferentially around the shell 26 and comes just beneath the lower ends of the tubes. The tubes are covered and inclosed by the outer sheet-metal wall or shell 40,

which is fastened at any suitable number of points by screws 41 engaging the flange 25. The resistant wire is coiled into a helix of such size that it will enter freely within the tubes 27. This coil or helix 31 is then extended through the tubes, passing upwardly through one, then downwardly through the next, upwardly through the next, and so on around the entire series, its opposite ends being joined to wires which extend down and join the lamp-circuit. The heat which is generated by the current passing through the resistance-coil 31 is in part conducted away by currents of air circulating upwardly through the tubes 27 and in part is communicated to these tubes, which are preferably of porcelain, and therefore good heat-conductors, the tubes conducting the heat to the shell or casting D, which in turn radiates it to the air. To facilitate the dissemination of this heat, the shell or casting D is formed with vertical ribs 35 at intervals, these being arranged preferably to project inwardly, as shown in Fig. 3, into the space or chamber within the cylindrical part 26, and this space or chamber is open at bottom and top, so as to constitute an air-flue through which the air may ascend, being caused to circulate by the heat imparted to it, and in ascending flowing over the surfaces of the ribs 35, so as to conduct away the heat therefrom. By reason of the shell 26 being of cast metal it has such mass as to rapidly absorb heat from the tubes 27 and conduct it to the flanges 35. The cap-plate 30 is arranged to cover over the annular series of tubes, so as to prevent any rain falling on the resistant wire, while its central portion is left open to afford free escape for the air ascending through the central chamber within the resistance-case. Thus the cap 30 forms an annular portion 36, which covers the series of tubes, but is so far separated therefrom on both the outer and inner sides as to permit of free escape of the air, which, entering the perforations through the flange 25, ascends through the tubes 27 and between these tubes and the outer shell 40 and escapes from beneath the dependent flanges of the annular portion 36 of the cap. For suspending the lamp the cap is provided with ears 37, between which is confined the usual insulator 38 for the suspension-ring 39. The ears 37 are joined by a base connected by four arms or spokes 41 to the annular portion 36, and the cap is fastened to the casting D by screws, as shown in Fig. 2, which enter post 42. The casting D is in turn fastened to the hood A′ by means of a central screw 43, which screws into a boss on a cross-bar 44, crossing the neck 22 of the hood.

The described construction of resistance-case is well adapted to rapidly radiate the heat which is generated in the resistance-coils, since ample opportunity is afforded for the free upward circulation of air and ample surface is provided for the radiation of heat to the air.

It must not be inferred from the particularity of detail with which I have herein described the preferred embodiment of my invention that I am by any means limited to the mechanical details herein set forth, since my invention is susceptible of a wide range of modification without departing from its essential features.

What I claim is—

1. A rheostat comprising a body-shell having an upright wall, a series of upright insulating-tubes supported thereagainst, and a resistance-coil extended through said tubes.

2. A rheostat comprising a body-shell having an upright wall, a series of upright insulating-tubes supported thereby, open at top and bottom, and a helically-wound resistant wire extended back and forth through the successive tubes.

3. A rheostat comprising a body-shell having an upright wall, a series of upright porcelain tubes supported against said wall, and a resistance-wire in said tubes.

4. A rheostat comprising an upright body-shell, a series of upright insulating-tubes supported thereagainst, open at top and bottom for circulation of air through them, and a resistance-coil extended continuously through said tubes, passing up through one, down through the next, and so on.

5. A rheostat comprising an upright wall of cast metal having heat-radiating flanges projecting therefrom, insulating-supports fastened against said wall, and a resistance carried by said supports.

6. A rheostat comprising an upright wall of cast metal having heat-radiating flanges projecting therefrom, insulating-tubes fastened against said wall, and a resistance-wire in said tubes.

7. A rheostat comprising an upright body-shell, a series of upright insulating-tubes supported thereagainst, an outer wall adjacent to and inclosing said tubes, with an air-space between, and a resistance-coil extended through said tubes, with openings at bottom and top for circulation of air around said tubes between said shell and outer wall.

8. A rheostat comprising a body-shell having an upright cylindrical portion, a perforated flange projecting beyond the same at its bottom, a series of insulating-tubes supported against said shell above said flange, and an outer wall attached to said flange and inclosing said tubes.

9. A rheostat comprising a body-shell having an upright cylindrical portion with a circumferential flange near its bottom, and a series of insulating-tubes supported against said shell above said flange, whereby said flange engages their lower ends and prevents their displacement.

10. A rheostat comprising a body-shell having an upright cylindrical portion, a series of

insulating-tubes supported against said shell, and a cap-plate for said shell covering the tops of said tubes and adapted to prevent entrance of rain thereinto.

11. A rheostat comprising a body-shell having an upright cylindrical portion, a series of insulating-tubes supported against said shell, an outer wall inclosing said tubes, adapted to admit upward circulation of air through and around said tubes, and a cap-plate covering the upper ends of said tubes, spaced apart therefrom to permit escape of the ascending air, and adapted to exclude rain.

12. A rheostat comprising a body-shell having a cylindrical portion, a series of insulating-tubes arranged against the outer side of said cylindrical portion, and a band around the exterior of said series of tubes, whereby they are fastened against said shell.

13. A rheostat comprising a cylindrical portion having parallel exterior flanges, and a series of insulating-tubes arranged against said cylindrical portion, and entering the spaces between said flanges, and fastened against said shell.

14. A rheostat comprising a body-shell and a series of insulating-tubes arranged against said shell, said shell formed with projections at intervals engaging said tubes to hold them in place.

15. A rheostat comprising a body-shell, having an upright tubular portion, open at bottom and top to form an air-flue within it, and having upright heat-radiating flanges projecting from its inner surface into said air-flue.

16. A rheostat comprising a body-shell, having an upright tubular portion, open at bottom and top to form an air-flue within it, having at its bottom a central base, and having vertical ribs projecting inwardly from said tubular portion and joining said base, whereby to connect the shell and case and to conduct heat from the shell into said flue, and radiate it to the ascending air.

17. A rheostat comprising a body-shell having an upright tubular portion 26, a central hollow base 21, and integral passages 24, 24, communicating from the interior of said base to the exterior of said tubular portion.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES J. WOOD.

Witnesses:
W. H. CRIGHTON,
A. L. HADLEY.