

W. C. YATES.
RHEOSTAT.

APPLICATION FILED JAN. 5, 1903.

NO MODEL

2 SHEETS—SHEET 1.

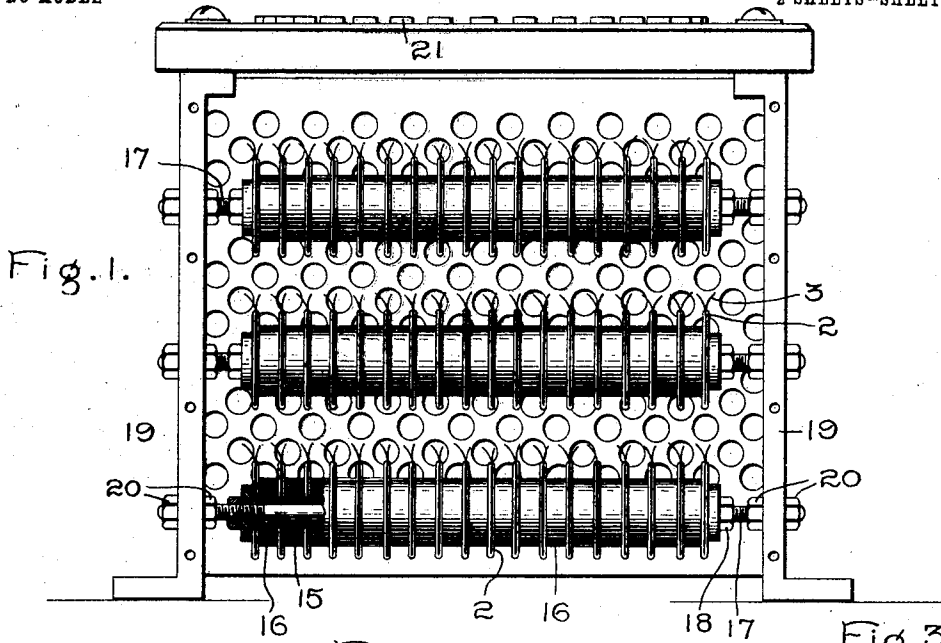


Fig. 1.



Fig. 2.

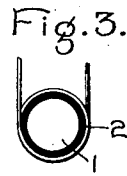


Fig. 3.

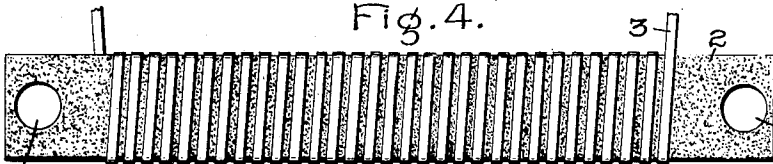


Fig. 4.

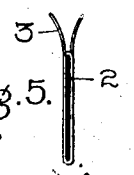


Fig. 5.

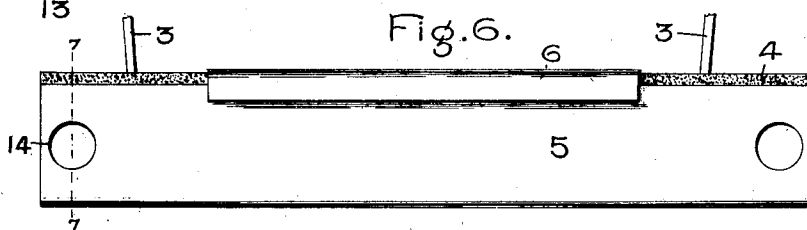


Fig. 6.

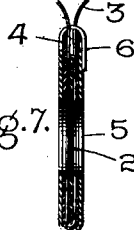


Fig. 7.

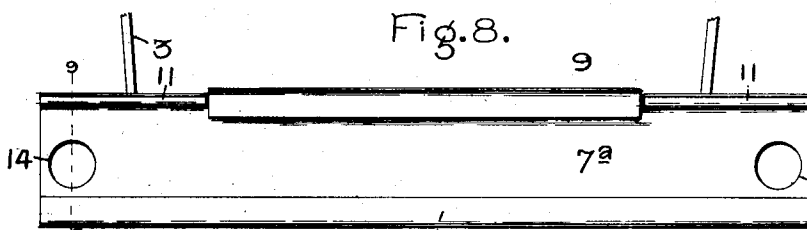


Fig. 8.

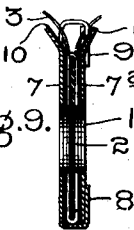


Fig. 9.

Witnesses:
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No. 738,970.

PATENTED SEPT. 15, 1903.

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RHEOSTAT.

APPLICATION FILED JAN. 5, 1903.

NO MODEL.

3 SHEETS—SHEET 2.

Fig. 10.

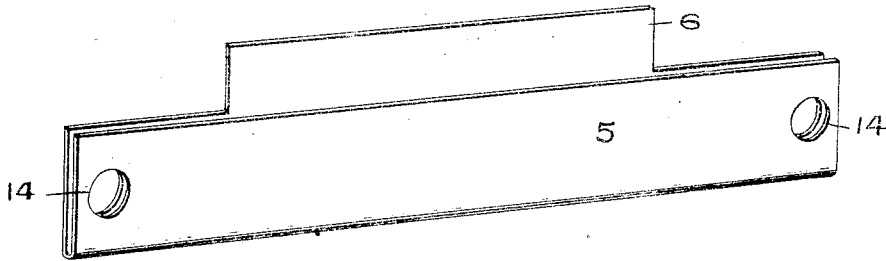
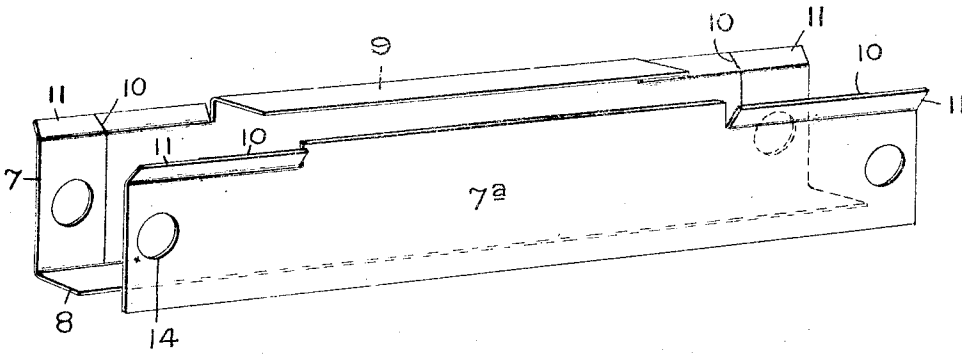


Fig. 11.



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UNITED STATES PATENT OFFICE.

WILLIAM C. YATES, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 738,970, dated September 15, 1903.

Application filed January 5, 1903. Serial No. 137,769. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. YATES, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Rheostats, of which the following is a specification.

This invention relates to rheostats, and has for its object to increase the current-carrying capacity without increasing the cross-section of the resistance medium.

My invention further has for its object to provide a rheostat which is simple and compact in construction and durable and effective in operation.

Another object is to provide a simple rheostat unit convenient for assembly in a device having a considerable range of resistance.

In carrying out my invention the conductor is inclosed in a metallic casing, which not only protects it from injury by rough usage, but increases the current-carrying capacity by rapidly dissipating the heat generated in the resistance-conductor, the said metallic casing presenting a large cooling-surface.

Referring to the accompanying drawings, which serve to illustrate one embodiment of my invention, Figure 1 is an end elevation of a rheostat having one of its end plates removed to show the interior. Figs. 2 and 3 represent a step in the manufacture of a unit. Fig. 4 is a side elevation of one of the units without its casing. Fig. 5 is an end elevation of the same. Figs. 6 and 7 are respectively a side elevation and a cross-section of a completed resistance unit in its protecting-casing. Figs. 8 and 9 are respectively a side elevation and a cross-section of a modified form of a completed unit. Fig. 10 is a perspective view of a protecting-casing, and Fig. 11 is a perspective view of a modified form of protecting-casing such as is shown in Fig. 8.

In Figs. 2 and 3 the arbor 1 is covered with an asbestos tube 2, on which is wound helically the resistance-conductor 3 of suitably-selected material and of any desired cross-section. The tube and conductor are then removed and pressed flat, as shown in Figs. 4 and 5, after which they may be placed in an asbestos envelop 4 of the same general shape as that of the metallic casing 5. (Shown

in Figs. 6 and 10.) The metallic casing 5 is a punching of sheet metal, which is afterward given a substantial U shape. One side of the casing is provided with a lip 6, which is afterward bent over to prevent the sides of the casing from separating. It also serves to retain the resistance-conductor and its support in place. By reason of this construction it will be seen that a single clamping device is provided which holds the sides of the casing together and also retains the asbestos envelop and resistance in place.

Instead of using an asbestos envelop I may coat the inner surfaces of the protective casing with enamel, as is indicated at 10, Fig. 11. The important point is to provide a body of insulating material of fairly good heat conductivity between the resistance-conductors and the metal casing.

In Figs. 8, 9, and 11 is shown a slight modification, wherein 7 and 7^a are plates which form the protective casing. The plates are coated with enamel or other insulating material 10, which is the equivalent of the asbestos envelop 4. The enamel should be of an elastic or yielding nature, so as to permit the parts to be bent without crumbling it. Formed integral with the plate 7 are lips 8 and 9. The former acts as the bottom of the two casings and also serves to unite the two plates at this point. When the unit is completed, the lip is bent around the plate 7^a, as is shown in section, Fig. 9. The lip 9 serves to unite the parts of the casing at the upper end in the same manner as the lip 6 previously described. It will be seen that the casing still preserves its U shape although made in separate pieces.

In order that the leads from each unit may be brought out without difficulty, the sides of the metal casing are flared outwardly, as at 11, and the said lip is coated with insulation.

In order to properly support the units, each of them is provided at its ends with perforations or openings 13, through which the supporting-rods 17 pass. The metal casings are also provided with similar holes 14, which register with those in the flattened tubes 2. The units as thus constructed may be assembled in a frame, as in Fig. 1. Surrounding each of the rods 17 and extending longitudi-

nally thereon is an insulating-tube 15, and between the resistance units are insulating bushings or spacers 16, which engage with the tubes 15. Each rod has its ends threaded 5 to receive the clamping-nuts 18, which hold the section in place. After a section comprising a plurality of units is assembled it is placed in the frame 19 of the rheostat-casing and held by the nuts 20. Connections 10 are then made from the resistance sections or parts thereof to the contact-buttons 21 in the well-known manner. The rheostat-arm is not illustrated, but may be of the ordinary type. By reason of my improved construction 15 the units are separated from each other throughout their entire length, with the exception of the ends where the small spacers or bushings 16 are situated. This means that air-currents have free access to virtually the 20 entire surface of the unit-casing, and as air blows over the casing the heat due to the resistance-conductors is quickly dissipated. Moreover, the septum or partition of asbestos or enamel between the conductor and the casing 25 permits easy conduction of the heat from the resistance. By inclosing each unit in a separate casing it is protected from injury as well as dust and dirt. It also serves as a protection in handling and shipping the units as 30 supply parts. With such a structure the resistance-conductors cannot be displaced on their support, neither can the insulation be injured. The units being spaced an appreciable distance apart and provided with flaring 35 lips through which the terminals project, the connections between one unit and the next or between each unit and the contact-button can be readily made, and this without danger of breaking the leads, which is a source of 40 great trouble in rheostats of the ordinary construction. The inclosing casing, in addition to protecting and cooling the resistance-conductor, prevents it from sagging. Thus a very rigid construction is provided and the 45 cooling effect greatly enhanced.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A rheostat composed of resistance units each inclosed in a sheet-metal casing, which 50 is insulated therefrom and split longitudinally.

2. A rheostat composed of resistance units each inclosed in a split-metal casing having

a lip formed thereon which unites the sides of the casing, and a lining of insulation between the resistance material and the casing. 55

3. In a rheostat, a resistance unit comprising insulating material wound with a conductor, a protecting-casing insulated therefrom, and means formed integral with the casing 60 for securing the whole together.

4. In a rheostat, a resistance unit comprising insulating material wound with a conductor, a U-shaped protecting-casing insulated therefrom, and means formed integral with 65 the casing for securing the whole together.

5. A resistance unit for rheostats, consisting of a flattened tube of insulating material wound with a flat conductor and inclosed in a split envelop of insulating material and sheet 70 metal.

6. A rheostat composed of resistance units inclosed in a sheet-metal casing having an insulating medium on the sides next to the resistance, and means formed integral with the 75 casing for securing the casing to the unit.

7. A rheostat composed of resistance units wholly inclosed in a two-piece sheet-metal casing having an insulating medium on the sides next to the resistance, the two pieces 80 interlocking.

8. A resistance unit for a rheostat having a folded sheet-metal support which is detachably secured to the unit for preventing it from 85 sagging, substantially as specified.

9. A resistance unit for a rheostat, comprising a flat resistance-helix inclosed within but insulated from a split perforated heat-conducting shell, a lip for holding the adjacent 90 edges of the shell, and a means passing through the perforations in the shell for securing them in place.

10. A resistance unit for a rheostat, comprising a flat resistance-conductor, and a folded metal casing insulated from but inclosing 95 said resistance-conductor.

11. A resistance unit for a rheostat inclosed within a folded metal casing having openings located at points between the ends for the 100 leads.

In witness whereof I have hereunto set my hand this 30th day of December, 1902.

WILLIAM C. YATES.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.