

(No Model.)

E. E. WERNER.
CURRENT CONTROLLER OR RHEOSTAT.

No. 574,231.

Patented Dec. 29, 1896.

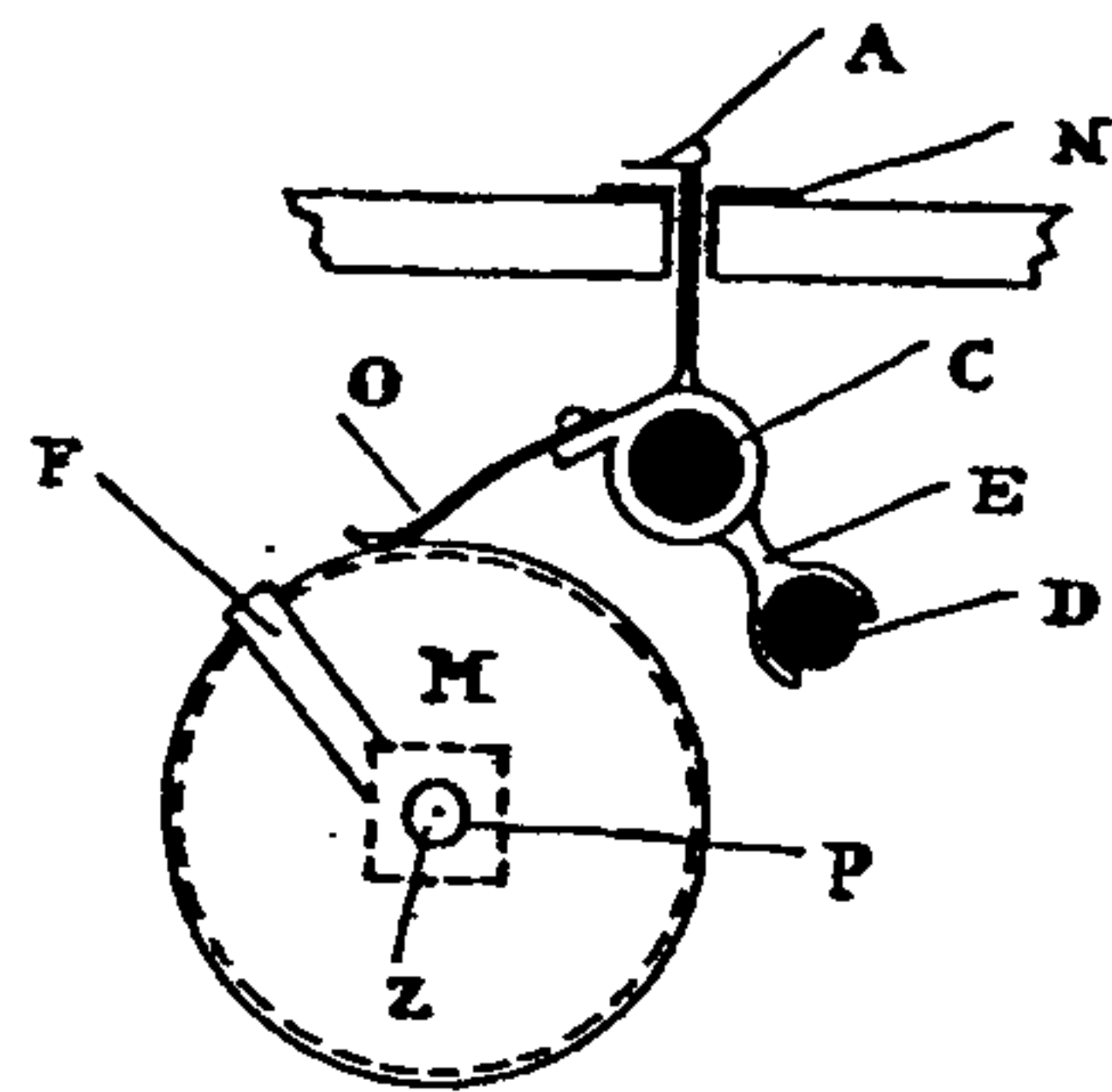
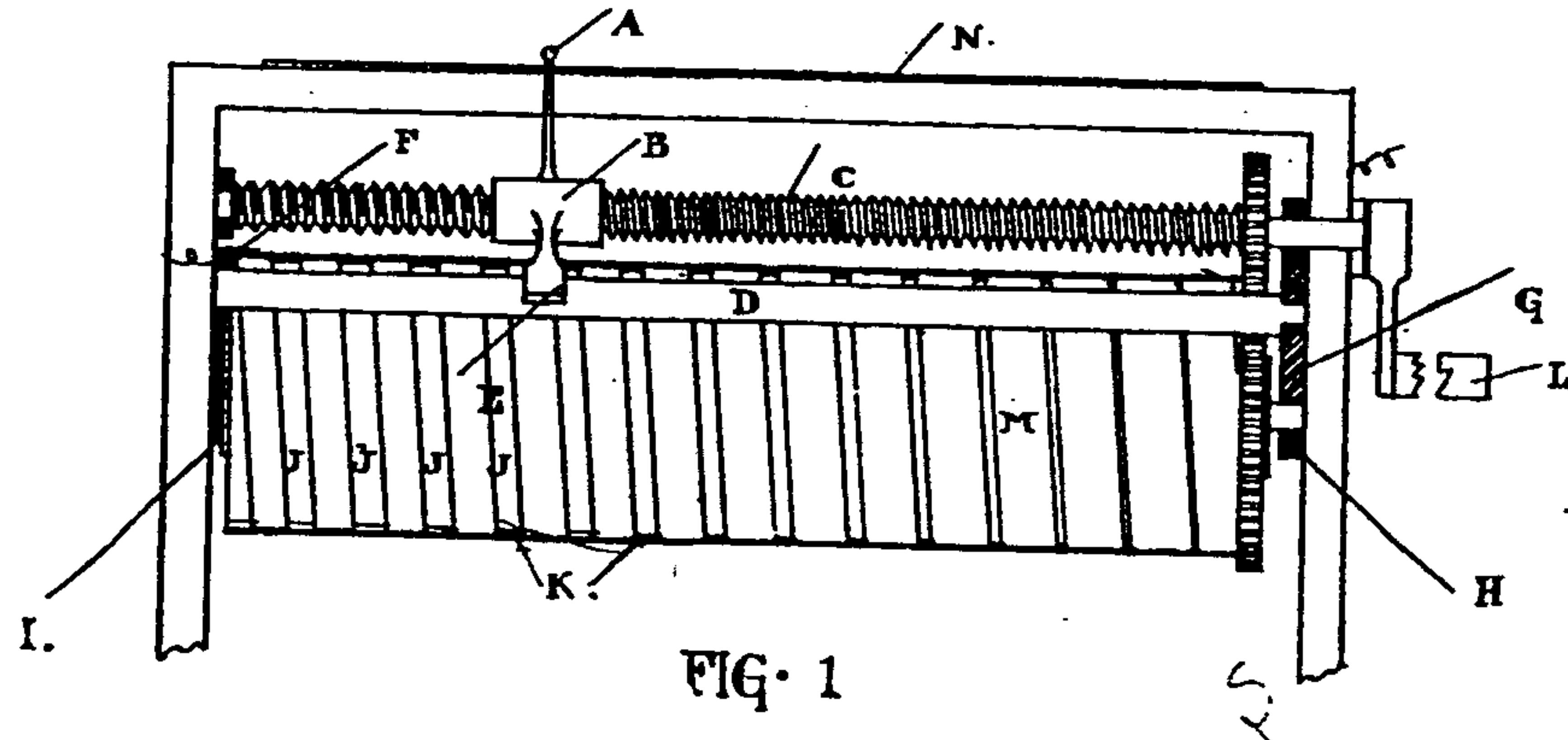


FIG. 2.

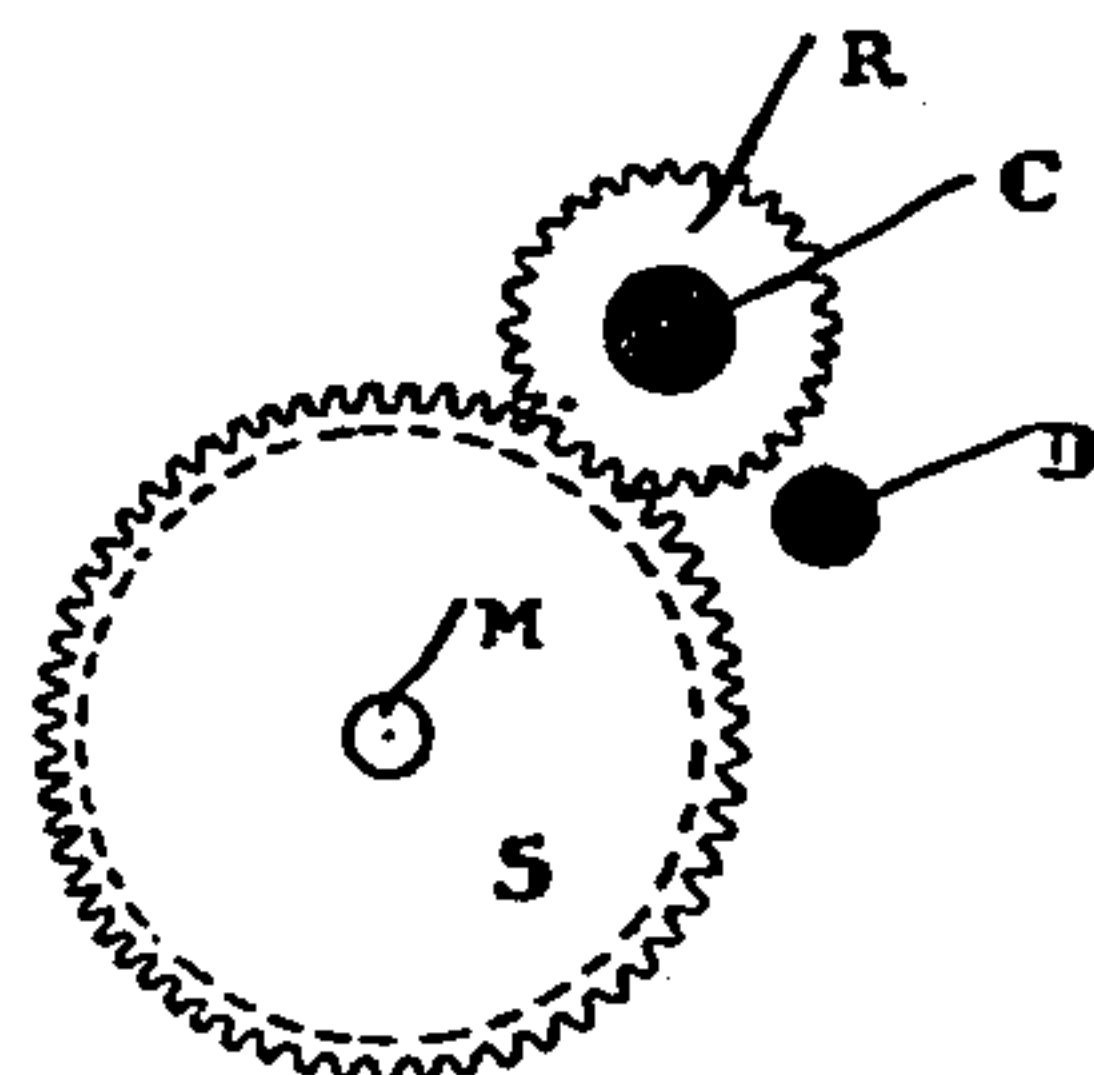


FIG. 3.

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ERNEST EMIL WERNER, OF DALLAS, TEXAS.

CURRENT-CONTROLLER OR RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 574,231, dated December 29, 1896.

Application filed June 22, 1896. Serial No. 596,402. 'No model.'

To all whom it may concern:

Be it known that I, ERNEST EMIL WERNER, a subject of the Emperor of Austria-Hungary, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Current-Controllers or Rheostats; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in electric-current controllers or rheostats, and more particularly to those adapted for use where a very close, accurate, and absolute graduation of the current is necessary, being particularly useful in the medical and dental applications of the electric current, where a very delicate graduation is necessary either in passing the plain galvanic current or where the current is used for producing anesthesia.

To more fully describe my said invention, reference is had to the accompanying drawings, wherein similar parts are designated by similar letters throughout the several views.

Figure 1 represents a side elevation of my improved controller or rheostat. Fig. 2 represents an end elevation, partly in section, of the rheostat, showing the contact-brush and relative positions of the other parts; and Fig. 3 represents a detail view of the gears and guide-rod.

M represents a roller or cylinder of non-conducting material, as dry wood, rubber, fiber, or other suitable insulating substance. On the periphery of this roller M is cut a helical groove J, which, beginning near one end of the roller in a delicate point, gradually increases in depth and width until it reaches the other end of the roller, as shown at I. This groove is filled with a paste of high-resisting power, composed, preferably, of black-lead and an alcohol solution of shellac mixed to the consistency of a very stiff paste, which paste after being inserted in the groove is turned off level with the surface of the roller. This roller is mounted in a frame provided with the bearing-pieces H and Z, and in the same frame and above the center of the said roller is mounted the screw C. This screw C carries near one end a gear-wheel R, which

meshes with a large gear-wheel S, mounted on the same shaft with the roller M.

B represents a brush-holder tapped to fit the threads of the screw C. This brush-holder carries the brush O, needle-pointer A, and arm E and travels on the screw C in such a manner as to keep the brush O in contact with the resistance-helix as the latter also turns, explained more fully hereinafter.

N represents a scale, finely graduated, over the face of which passes the pointer A, this said scale being graduated to indicate the resistance of the circuit at the different positions of the brush and roller.

The brush-holder is held in its proper position by the arm E, which is adapted to engage and slide on the rod D.

The electrical circuit from the resistance substance J to the terminal I is made complete by means of the spring F, which, being electrically connected with the terminal, is bent at its upper end, where it engages the ring of resistance substance J. The screw C is provided with a crank L, by means of which said screw may be rotated.

The current entering the metallic piece at I passes through the spring contact-maker F, then through the resistance J into the brush O, then through the screw C, and out through the bearing H. The resistance in the circuit, it will be seen, is varied by varying the position of the brush and also by rotating the resistance substance on the roller M beneath the brush. To accomplish this, the operator turns the crank L, which when being turned in one direction shifts the brush one way and therefore rotates the roller in one direction, which increases the resistance, and by reversing the motion of the crank the resistance may be diminished. This relative motion and arrangement of both the resistance substance J and brush O accomplishes an increase or diminution of resistance by such insensible degrees as would otherwise be practically unattainable.

If the brush O occupies a position near the end H or exactly at the small end of the resistance substance, the whole resistance would be thrown in circuit, while by turning the crank L in the proper direction the brush is gradually shifted to the left in Fig. 1, cutting

out by infinitely small degrees the resistance which is at every step indicated by the pointer A on the scale N.

It is obvious that the size and depth of the resistance material may be varied in order to adapt the device more readily to use in regulating the resistance in electric-light and power circuits, such as for stage effects or for varying the resistance in either field or armature of dynamo-electric machines or motors, or, in fact, the device is applicable to any art in which the accurate control of the current is necessary.

It will furthermore be obvious that the herein-described resistance material, consisting, as it does, of a compound of black-lead and an alcohol solution of shellac, becomes exceedingly hard when dry, and inasmuch as this substance, in addition to its hardness, is flush with and not above the surface of the hard roller the liability to wear away and therefore change the resistance under the action of the brush is reduced to a minimum, if not entirely obviated, which overcomes a fault present in all known forms of controllers wherein a paste is used as a resistance substance.

It will be furthermore obvious that certain changes in the structure of the herein-described invention may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A rheostat consisting of a revoluble cylinder having upon its periphery a substance adapted to resist an electrical current, composed of black-lead and an alcoholic solution of shellac, with a brush adapted to travel laterally along said cylinder and making contact with said resistance and means for revolving said cylinder and imparting motion to said brush, substantially as described.

2. In a rheostat, the combination with a cylinder, or roller having a helical groove in its periphery, of a resistance substance, composed of black-lead and an alcoholic solution of shellac, carried in said groove; a screw mounted parallel with the axis of said cylinder; a brush-holder engaging, and adapted to move on, said screw; a brush carried by said brush-holder, and engaging said resistance substance, and means for revolving said screw and cylinder, and means for indicating the amount of resistance in circuit, substantially as described.

3. In a rheostat, the combination with a revoluble cylinder having a helical groove in its periphery, said groove increasing in depth and width from one end of said cylinder toward the other end, of a resistance substance carried in said groove, composed of black-lead and an alcoholic solution of shellac; a screw mounted parallel with the axis of said cylinder; a brush-holder engaging, and adapted to move on, said screw, a brush, carried by said brush-holder engaging said resistance

substance, and means for revolving said screw and cylinder, and means for indicating the amount of resistance in circuit, substantially as described.

4. In a rheostat, the combination with a revoluble cylinder having a helical groove in its periphery, of a resistance substance composed of a mixture of black-lead and an alcoholic solution of shellac, carried in said groove; a screw mounted parallel with the axis of said cylinder; a gear-wheel carried on the same axis with said screw and a gear carried on the same shaft with said cylinder engaging said first gear; a brush-holder adapted to engage and move on said screw; a brush carried by said brush-holder and engaging said resistance substance; a scale with graduations to indicate the amount of resistance in circuit; a pointer adapted to pass over said scale; a crank for revolving said screw and electrical connection with said brush and resistance substance, substantially as described.

5. In a rheostat, the combination with a revoluble cylinder, having a helical groove in its periphery, increasing in depth and width from one end of said cylinder toward the other end, of a resistance substance composed of black-lead and an alcoholic solution of shellac, carried in said groove; a screw mounted parallel with the axis of said cylinder; a gear-wheel keyed on same axis with said screw and a gear-wheel keyed on same shaft with said cylinder and meshing with said first gear; a brush-holder adapted to engage and move on said screw; a brush carried by said holder and engaging said resistance substance; a scale and a pointer adapted to travel on said screw and pass over the face of said scale; a sliding contact-maker between said resistance substance and terminal contact and a crank for revolving said screw, substantially as described.

6. In a rheostat, the combination with a revoluble cylinder, having a helical groove in its periphery, increasing in depth and width from one end of said cylinder toward the other end, of a resistance substance carried in said groove; a screw mounted parallel with the axis of said cylinder; a gear-wheel keyed on same axis with said screw and a gear-wheel keyed on same shaft with said cylinder and meshing with said first gear; a brush-holder adapted to engage and move on said screw; a brush carried by said holder and engaging said resistance substance; a scale; a pointer adapted to travel on said screw and pass over the face of said scale; a sliding contact-maker between said resistance substance and terminal contact, and a crank for revolving said screw, substantially as described.

7. In a rheostat, the combination with a revoluble cylinder, having a helical groove in its periphery, increasing in depth and width from one end of said cylinder toward the other end, of a resistance substance composed of black-lead and an alcoholic solution of shellac carried in said groove; a screw mounted

parallel with the axis of said cylinder; a gear-wheel keyed on same axis with the said screw and a gear-wheel keyed on same shaft with said cylinder and meshing with said first gear;
5 a brush-holder adapted to engage and move on said screw; a brush carried by said holder and engaging said resistance substance, a scale, and a pointer adapted to travel on said screw and pass over the face of said scale; a
10 sliding contact-maker between said resistance substance and terminal contact, and a crank

for revolving said screw, and a guide-rod mounted parallel with the axis of said screw and an arm from said brush-holder engaging said rod, substantially as described.

Dated at Dallas, Texas, this 18th day of ¹⁵ June, 1896.

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Witnesses:

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