

No. 885,782.

PATENTED APR. 28, 1908.

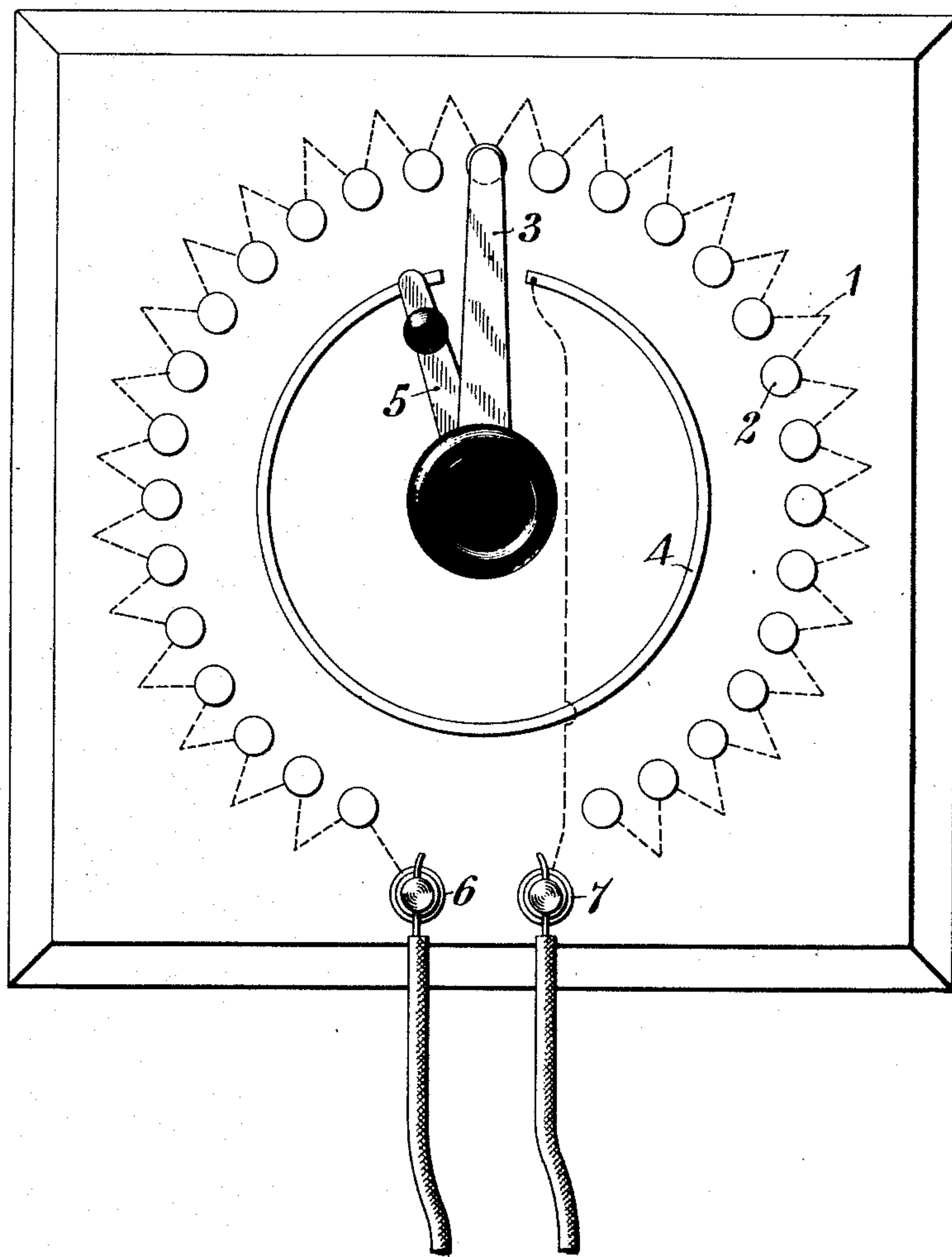
G. F. PACKARD.

RHEOSTAT.

APPLICATION FILED APR. 28, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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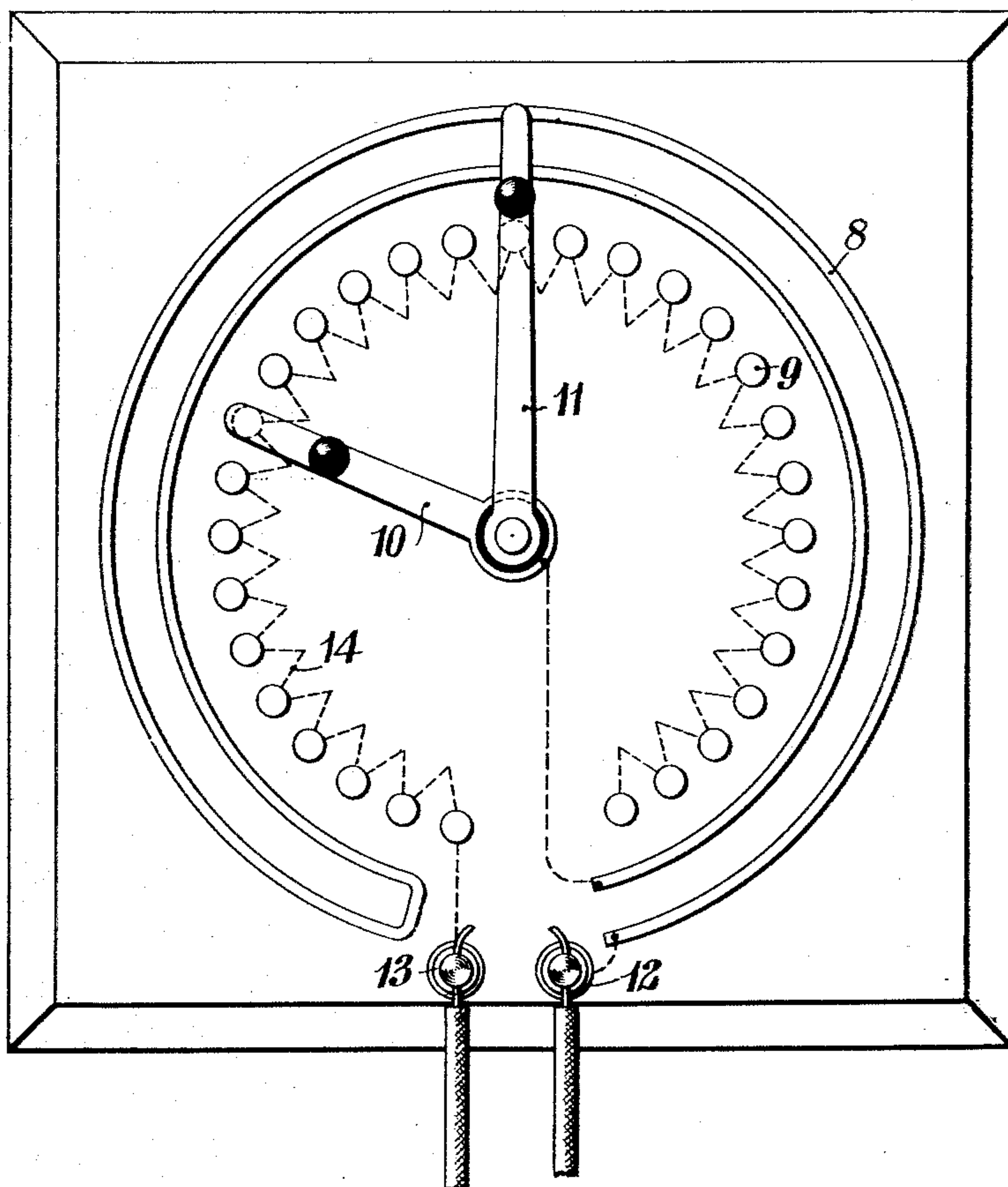
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2 SHEETS—SHEET 2.

Fig. 2.



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RHEOSTAT.

No. 885,782.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed April 28, 1906. Serial No. 314,275.

To all whom it may concern:

Be it known that I, GRANVILLE F. PACKARD, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rheostats, of which the following is a specification.

My invention relates to rheostats and it has for its object to provide a rheostat whereby any desired resistance between the limits of the device may be obtained.

Rheostats which have heretofore been provided for the purpose of adjusting the resistances in the circuits of the shunt field magnet windings of electric motors have usually comprised sub-divided resistance elements and switch arms or other means for making circuit connections to the points of sub-division thereof. When so constructed, the resistances in the field circuits have of necessity been varied in steps or gradations and consequently the speeds of the motors have also been varied in steps. When motors are employed in the operation of machine tools it is often essential, or at least very desirable, that they may be caused to operate at definite speeds that may correspond to resistance values between the steps of the rheostats. According to the present invention, I propose to provide the ordinary rheostats having sub-divided resistance elements with another resistance element the resistance of which is approximately equal to that between the points of sub-division of the other element and to which continuous circuit connection may be made.

Figure 1 of the accompanying drawings is a face view of a rheostat constructed in accordance with my invention and Fig. 2 is a similar view of a modification of the device of Fig. 1.

In Fig. 1 a resistance element 1 is sub-divided by means of a set of annularly-arranged contact terminals 2 that are connected thereto at intervals with which a pivoted switch arm 3 is adapted to engage in the usual manner. Arranged concentrically with and within the set of contact terminals 2 is a resistance strip or element 4 with which a shorter switch arm 5 is adapted to engage, the switch arm 5 being pivoted concentrically with and being electrically connected to the switch arm 3. A composition which has been found suitable for the

resistance strip 4 comprises graphitoidal silicon, silicon oxid, iron and aluminum in appropriate and varying proportions, such a composition having been found to have a specific resistance approximately 5,400 times that of copper. The resistance of the strip is preferably approximately equal to the resistance between adjacent contact terminals. An end of each of the resistance elements 1 and 4 is connected, respectively, to binding posts 6 and 7 by means of which the rheostat may be connected to an external circuit. If the rheostat is included in the circuit of the shunt field magnet winding of a motor, the resistance may be adjusted by moving the switch arm 3 until the speed of the motor is approximately that desired. Then, in order to obtain exactly any desired or predetermined speed which it may be impossible to obtain by the adjustment of the switch arm 3, more or less of the resistance element 4 may be included in circuit by operation of the switch arm 5.

In Fig. 2 I have shown a rheostat in which is employed a resistance strip 8 of greater length and which may, consequently, be either of greater cross-sectional area or of less specific resistance than that of Fig. 1, the greater length of the resistance strip being obtained by doubling it and placing it outside of and concentrically with an annularly-arranged set of contact terminals 9. Concentrically pivoted switch arms 10 and 11, that are insulated from each other, are adapted to engage, respectively, with the contact terminals and with both portions of the doubled resistance strip. The switch arm 10 is connected to one end of the resistance strip, the other end of which is connected to a binding post 12 or circuit terminal of the rheostat.

In operation of the rheostat the current enters at binding post 13, traverses sub-divided rheostat element 14, switch arm 10, the inner portion of the resistance strip 8, switch arm 11 and the outer portion of the resistance strip 8.

The structural details and arrangements of the parts may obviously be varied within considerable limits from what has here been shown and described without altering the mode of operation of the invention or departing materially from its spirit, and I therefore desire that all such modifications be included within its scope.

I claim as my invention:

1. In a rheostat, the combination with a sub-divided resistance element and means for making circuit connections to the points of sub-division thereof, of another resistance element and means for making continuous circuit connection thereto.
2. In a rheostat, the combination with a sub-divided resistance element and means for making circuit connections to the points of sub-division thereof, of another resistance element the resistance of which is approximately equal to that between the points of sub-division of the other element and means for making continuous circuit connection thereto.
3. In a rheostat, the combination with means for varying the resistance in steps or gradations, of means for varying the resistance uninterruptedly.
4. In a rheostat, the combination with means for varying the resistance in steps or gradations, of means for varying the resistance uninterruptedly between the steps or gradations.
5. A rheostat comprising two resistance elements, means whereby circuit connection may be made to one of them at intervals and means for making continuous circuit connection to the other.
6. In a rheostat, the combination with a set of annularly arranged contact terminals and a resistance strip arranged concentrically therewith, of switch arms that are concentrically pivoted and are adapted, respectively, to engage the contact terminals and the resistance strip.
7. In a rheostat, the combination with a set of annularly arranged contact terminals and a resistance strip arranged concentrically therewith, of switch arms that are con-

centrically pivoted and are adapted, respectively, to engage the contact terminals and the resistance strip, and means for making external circuit connections, respectively, to one of the contact terminals and to the resistance strip.

8. In a rheostat, the combination with a sub-divided resistance element and another resistance element, of means whereby the elements may be connected in series relation and whereby connection may be made to the points of sub-division of the one element and continuously to the other element.

9. In a rheostat, the combination with a set of contact terminals and a switch arm to engage therewith, of a doubled resistance strip and means for making continuous circuit connection to both portions thereof.

10. In a rheostat, the combination with a sub-divided resistance element and means for making circuit connection to the points of sub-division thereof, of a doubled resistance strip and means for making continuous circuit connection to both portions thereof.

11. In a rheostat, the combination with an annularly arranged set of contact terminals and a doubled resistance strip that is arranged concentrically therewith, of switch arms that are concentrically pivoted and that are adapted, respectively, to engage the contact terminals and both portions of the resistance strip.

In testimony whereof, I have hereunto subscribed my name this 21st day of April, 1906.

GRANVILLE F. PACKARD.

Witnesses:

VERYL B. BROUGHTON,
BIRNEY HINES.