(No Model.) 2 Sheets—Sheet 1.

M. WADDELL.

RHEOSTAT.

No. 528,243. Patented Oct. 30, 1894.

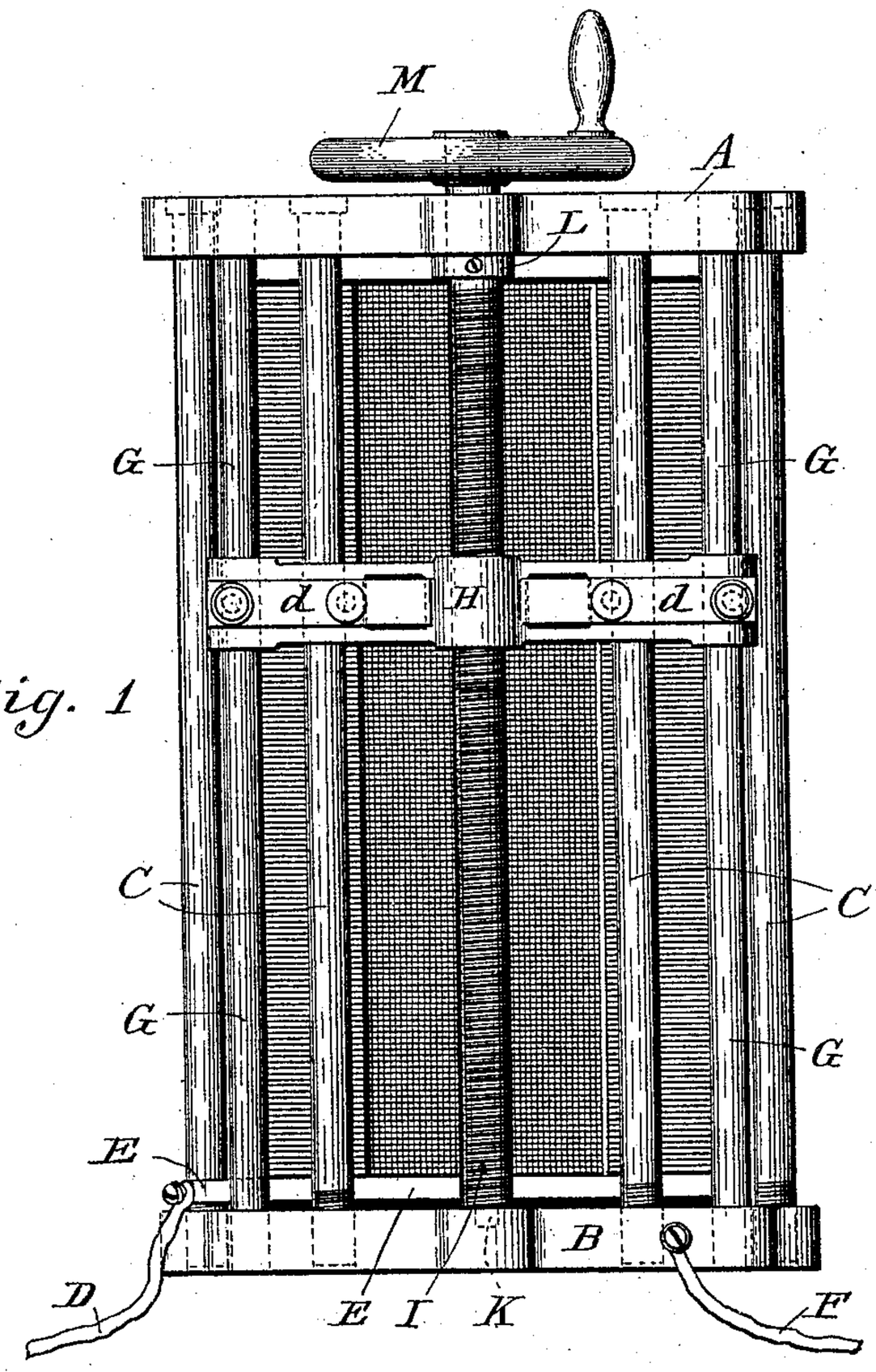

Fig. 1

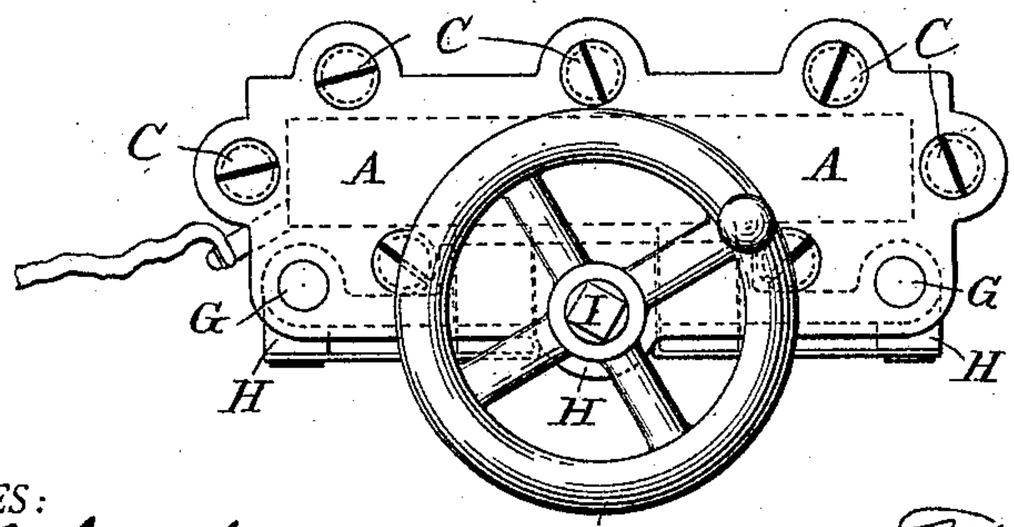

Fig. 2.

WITNESSES:

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Fred. E. Mowry

INVENTOR

Montgomery Waddell,

BY Briesen & Knauth

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

M. WADDELL.

RHEOSTAT.

No. 528,243. Patented Oct. 30, 1894.

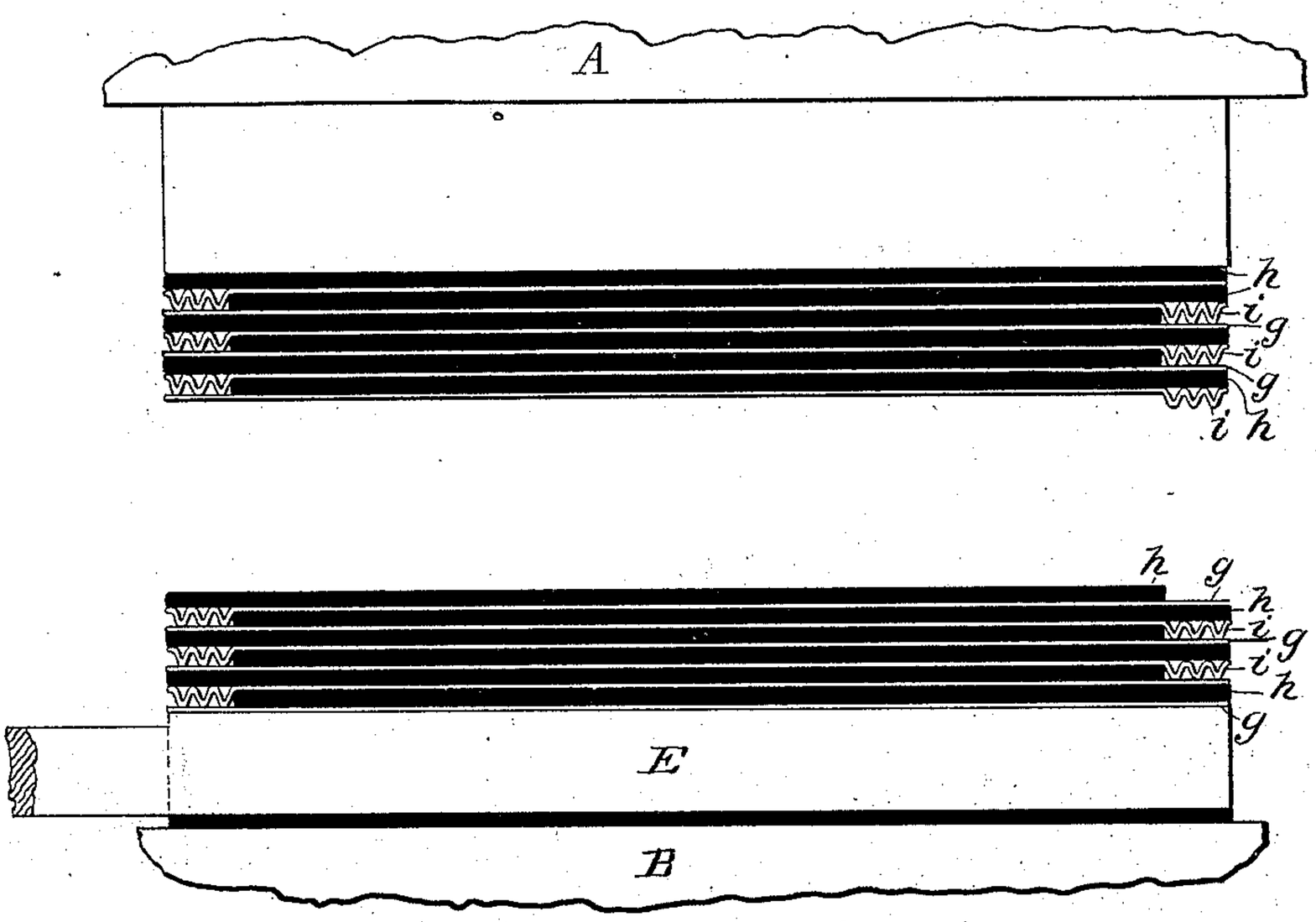

Fig. 3.

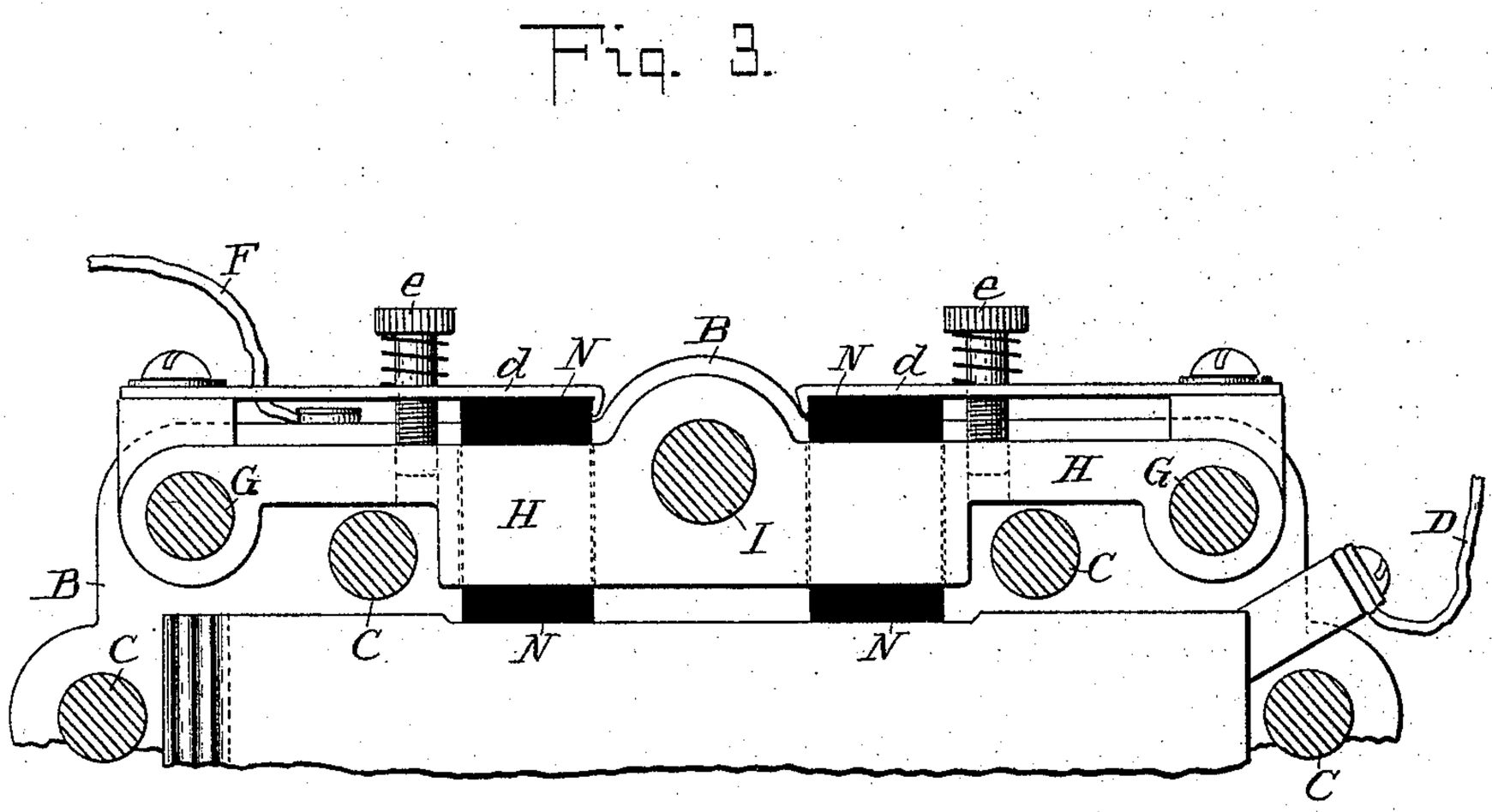

Fig. 4.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 528,243, dated October 30, 1894.

Application filed September 6, 1893. Serial No. 484,919. (No model.)

To all whom it may concern:

Be it known that I, MONTGOMERY WADDELL, a resident of Bridgeport, Fairfield county, Connecticut, have invented an Improved Rheostat, of which the following is a specification.

My present invention relates to rheostats and has for its object to produce a compact and efficient resistance for use in electric currents. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of my improved rheostat. Figure 2 is a top view thereof. Figure 3 is an enlarged detail view showing the method of forming and insulating the variable resistance. Figure 4 is an enlarged detail view showing the contact brushes and the carriage upon which they are mounted.

In the drawings, A and B represent retaining end plates of the rheostat, and C C connecting bolts holding the end plates, and forming a suitable containing frame for the variable resistance. These connecting bolts pass through the plate A and are headed on this end, and screw-threaded at the other end to enter and engage tapped holes in the end plate B. A conducting wire D is connected to the plate E, which is insulated from the plate B. Another conducting wire F is connected to the plate B in electrical connection with guide-rods G upon which traverse the brush carriage H. Movement may be given to the brush carriage by any suitable means as by a screw I engaging therewith, stepped at K in the plate B, passing through the plate A, and secured from longitudinal movement by a collar L. A hand wheel M serves to rotate the screw to move the brush carriage in either direction. Suitable conducting brushes N N on the carriage bear upon the variable resistance which is arranged so as to present the edges of alternate strips of conducting and insulating material. This variable resistance consists of strips or sheets of conducting material of high specific resistance such as sheet-iron built up into a substantially sinuous form with strips of insulation such as mica between the plates. The preferred mode of construction is as follows: The plates B and E (see Fig. 1) are first placed in position with a sheet of insulation between them. The resistance is then built up of alternate plates of conducting and insulating material *g h*. (See Fig. 3). The conducting plates *g* are preferably crimped, bent or fluted at one end in one or more crimps as at *i*, and the first is laid on the plate E. Then a sheet of insulation is laid on *g* which, however, does not cover the crimped part *i*. Another sheet *g* is now laid on, with its crimped part *i* on the opposite side of the pile from that of the first. Then another sheet of insulation *h* is laid on in the same manner as before, and the pile built up to the desired height, the crimped plates being alternately turned end for end in the manner shown, the plain end of each plate resting upon the crimped end of the sheet below, the crimps being made deeper than the width of the sheets *h*, in order to permit contact of the ends of the conducting plates *g*. The last plate *g* is completely insulated from the end plate A. The end plates with superposed layers of conducting and insulating material are now placed in a press to squeeze the plates and sheets tightly together to form a compact body. The bolts C are now put in place and are then screwed down tightly, after which the whole structure as thus composed is placed in a planer and a portion of one edge dressed down true to form a bearing surface for the brushes N N. The guides G G with the brush carrier thereon are next secured in place and when the screw I has been placed in position, the device is ready for use.

When pressure is applied to compact the mass the crimped ends will be compressed between the plain ends of the plates *g* and the insulating sheets *h*, and the plates *g* will be electrically connected in series and will be equivalent to a single sinuous conducting strip with the space between its sinuosities filled with the insulation. Both ends of the plates *g* may, if desired, be crimped and arranged to contact at alternate ends in the same manner as the plain and crimped ends. Other means may be employed for electri-

cally connecting the plates either by integral connections, as shown, or by separate connections either attached to the plates or held in place in any suitable manner as by the compression of the plates. The current enters by wire F and passes through plate B and guides G to the brush carrier H and brushes N, thence by the strips *g*, to the plate E and out by wire D. It will be understood that the plates *g* are of high specific resistance, and as these plates are in series, the amount of resistance in circuit may be materially altered by shifting the position of the brushes to include a greater or less number of these plates in circuit. This may be accomplished by turning the screw in the desired direction to move the brush carrier.

I prefer to use carbon brushes to avoid the destructive effect of sparking when the carriage is shifted to vary the resistance.

While I have shown and described but one form of plate and but one method of building up the rheostat from the plates, I would have it understood that I do not thereby limit myself to the precise form of plate or the construction shown and described, as it is obvious that the form of the plates and construction of the rheostat may be varied without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. A plate for rheostats, having one or more of its edges crimped, substantially as described.

2. A rheostat consisting of alternate plates of conducting and insulating material, one or more of the conducting plates having an edge crimped and in electrical connection with the next adjoining conducting plate, substantially as described.

3. A rheostat consisting of alternate plates of conducting and insulating material, the said insulating plates being smaller than the conducting plates; one or more of the conducting plates having an end bent and in electrical connection with the next adjoining conducting plate, substantially as described.

4. A rheostat consisting of conducting plates and intervening insulating plates, one or more of said conducting plates having crimped edges to form electrical connections between adjoining conducting plates, as and for the purpose set forth.

5. The combination in a rheostat, of superposed plates of conducting and insulating material *g*, *h*, the conducting plates each having a crimped end *i* and laid with an end of one conducting plate in contact with one end of the next, to form a continuous conductor, and circuit terminals connected therewith, substantially as described.

6. The combination in a rheostat of superposed plates of conducting and insulating material *g*, *h*, the conducting plates each having one edge crimped and laid end for end, with the crimped end of one plate in contact with the plain end of the next, to form a continuous conductor, and circuit terminals connected therewith, substantially as described.

7. A rheostat consisting of conducting plates and intervening insulating plates smaller than the conducting plates, and circuit connections between the conducting plates, substantiaily as described.

8. A rheostat consisting of conducting plates and intervening insulating plates, one or more of said conducting plates having crimped edges to form electrical connections between adjoining conducting plates, and means substantially as described for including a greater or less number of the plates in circuit, as and for the purpose set forth.

9. A rheostat consisting of conducting plates and intervening insulating plates, one or more of said conducting plates having crimped edges to form electrical connections between adjoining conducting plates, movable brushes bearing upon the plates to include a greater or less number of the plates in circuit, and circuit-connections to the brushes, as and for the purpose set forth.

10. In a rheostat, the combination of superposed plates of conducting and of insulating material, the conducting plates, each having one edge crimped and laid with the crimped end of one plate in contact with the plain edge of the next, to form a continuous conductor, with a containing frame therefor consisting of plates A B, connecting bolts C and guide rods G, of a plate E connected electrically to the resistance plates, and to one circuit terminal, a carriage H traversing the frame and guide rods, and electrically connected with the other circuit terminal, said carriage carrying brushes N N bearing upon the conducting plates, substantially as described.

MONTGOMERY WADDELL.

Witnesses:
HARRY M. TURK,
CHARLES E. SMITH.