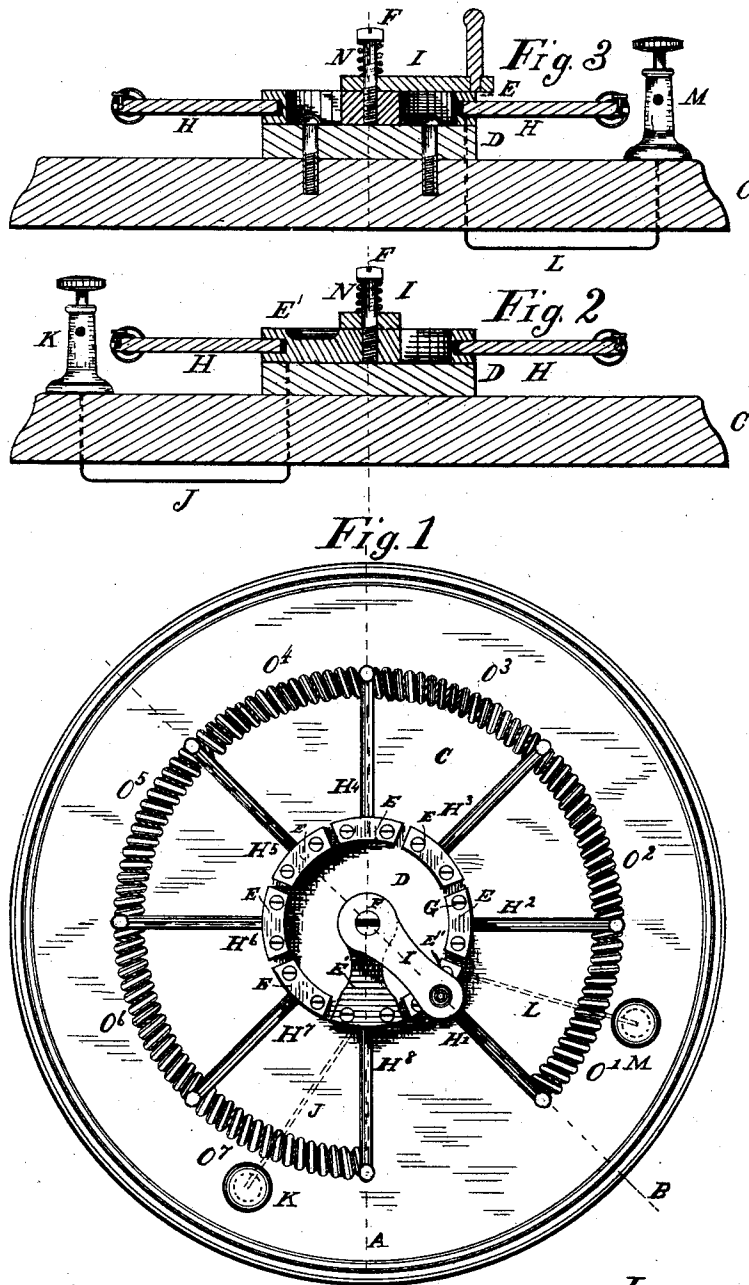


(No Model.)

I. W. COLBURN.  
ELECTRICAL RESISTANCE BOARD.

No. 372,012.

Patented Oct. 25, 1887.



Witnesses.  
J. L. Graves,  
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# UNITED STATES PATENT OFFICE.

IRVING W. COLBURN, OF FITCHBURG, MASSACHUSETTS, ASSIGNOR TO  
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## ELECTRICAL RESISTANCE-BOARD.

SPECIFICATION forming part of Letters Patent No. 372,012, dated October 25, 1887.

Application filed February 8, 1887. Serial No. 226,902. (No model.)

*To all whom it may concern:*

Be it known that I, IRVING W. COLBURN, a citizen of the United States, residing at Fitchburg, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Resistance-Boards, of which the following is a specification.

My invention relates to improvements in electrical resistance-boards to be used in connection with dynamo-electric machines for the purpose of regulating the intensity of the current. The nature of such devices being well understood by persons familiar with the science of electricity, it will only be necessary for me to explain the objects attained by and the construction of my invention.

The objects of my invention are as follows: first, to provide a circular resistance-board of large range having an electrically-divisible resistance-coil made independently and integrally separate from the radial arm supports upon which it rests; second, to provide a construction which will admit of making the combined electrical sections of the said resistance-coil mechanically in one integral piece of material, for the purpose of forming more perfect electrical connection of the parts when more than one section is used; third, to form the pivot-support of the switch-arm integrally with one of the insulated section-blocks of the board. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top view of the entire apparatus. Fig. 2 is a vertical section on line A, Fig. 1. Fig. 3 is a vertical section on line B, Fig. 1.

Similar letters refer to similar parts throughout the several views.

Referring to the drawings, C represents the main table, which is preferably made of wood, to which the whole of the mechanism comprising my "resistance-board" is attached.

D is an elevated support of non-magnetic or non-conducting material.

E, E', and E'' represent a series of metallic section-blocks, which are disposed in a circle around one common center, F. These blocks E are separated from each other by a small intervening space, and are screwed to the non-

magnetic support D by means of screws G. Radiating from each of the said blocks E is an arm, H H', &c. These arms may be of any length commensurate with the length of the wire coils which it is desirable to have between them, as will be hereinafter more fully explained. Attached to and extending from or near the outer extremity of each arm to the next adjoining arm is a section-coil of resistance-wire or resistance material, O' O'', &c. These sections O', O'', O<sup>3</sup>, O<sup>4</sup>, O<sup>5</sup>, O<sup>6</sup>, and O<sup>7</sup> connect all the arms H, except the arms H<sup>3</sup> and H'. The reason for this omission will be made clear in the description of the operation.

The block E' extends inward to the center F of the circle, and has pivotally attached thereto a switch-arm, I. A wire (shown in dotted line at J) connects the block E' with the screw-post K, and another wire (shown in dotted line at L) connects the block E'' with the screw-post M. Surrounding the screw at F is a coiled spring, N, the object of which is to press the switch-arm I upon the blocks E E' E'', for the purpose of insuring more perfect electrical contact of the said parts.

Having described the construction of my invention, its operation is as follows: The posts or poles K and M having been connected by means of wires in the ordinary manner with any source of electricity, it is obvious that a circuit will be formed when the switch-arm I is in the position shown in Fig. 1, (which position is identical with that represented in Figs. 2 and 3,) the connection being through the parts K J E' F I E'' L M. In this position it is likewise obvious that none of the resistance-coil sections is in the circuit. When it is desired to place one of the resistance-sections, O', in the circuit, the switch-arm I is moved to the position of the arm H<sup>3</sup>. The circuit will then be through K J E' F I + E H<sup>3</sup> O' H' E'' L M. Likewise, when two sections, O' and O<sup>3</sup>, are desired in the circuit, the switch-arm is moved to the position H<sup>3</sup>. The circuit will then be through K J E' F I + E H<sup>3</sup> O' O<sup>3</sup> H' E'' L M. In like manner the sections O<sup>4</sup>, O<sup>5</sup>, O<sup>6</sup>, and O<sup>7</sup> may be added to and placed in the circuit to offer further and additional resistance, as may be desired. It will be observed that the resistance capacity

of this mechanism is very easily and cheaply changed by lengthening or shortening the arms H, which are inserted in sockets in the outer faces of the blocks E, (as seen in the sectional views,) by removing them from such sockets and substituting other longer or shorter arms, H, thereby adapting the instrument to the use of longer or shorter coil sections corresponding with the alteration of the length of the said arms. The number of arms H and number of sections O may also be varied without changing the nature of my invention.

Having described my invention I do not claim, broadly, the use of resistance-coils made of wire or other material, nor, broadly, mechanism for changing the resistance of an electrical circuit; but

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

1. The herein-described resistance-board, comprising the detachable segmental insulated blocks E, disposed in a circle around a common center, arms H, extending radially from said blocks and being removably connected therewith, and resistance-coil sections O, integrally separate from and removably connected to the outer ends of said arms, in combination with an arm, I, centrally pivoted at one end within said circle and adapted to make electrical connection at its other outer end with either of said blocks.

2. The herein-described resistance-board, comprising the detachable segmental insulated blocks E, disposed in a circle around a common center, arms H, extending radially from said blocks and being removably connected therewith, and one continuous helical resistance-coil, O, integrally separate from and removably connected to the outer ends of said arms, in combination with an arm, I, pivoted at one end centrally within said circle and adapted to make electrical connection at its other outer end with either of said blocks.

3. The herein-described resistance-board, comprising the detachable segmental insulated blocks E, disposed in a circle around a common center, one of said blocks, E', being ex-

tended to the center, arms H, extending radially from said blocks and being removably connected therewith, and resistance-coil sections O, integrally separate from and removably connected to the outer ends of said arms, in combination with an arm, I, pivoted at one end centrally within said circle in electrical contact with said block E', and adapted to make electrical connection at its other outer end with either of said blocks.

4. The herein-described resistance-board, comprising the detachable segmental insulated blocks E, disposed in a circle around a common center, one of said blocks, E', being extended to the center, arms H, extending radially from said blocks and being removably connected therewith, and one continuous helical resistance-coil, O, integrally separate from and removably connected to the outer ends of said arms, in combination with an arm, I, pivoted at one end centrally within said circle in electrical contact with said block E' and adapted to make electrical connection at its other outer end with either of said blocks.

5. The herein-described resistance-board, comprising the detachable segmental insulated blocks E, disposed in a circle around a common center, one of said blocks, E', being extended to the center and there provided with a vertical screw-threaded hole, arms H, extending radially from said blocks and being removably connected therewith, and one continuous helical resistance-coil, O, integrally separate from and removably connected to the outer ends of said arms, in combination with an arm, I, a screw, F, passing loosely through a hole in the inner end of said arm and being screwed into said hole in the block E', and an expansible spring, N, coiled upon said screw below the head thereof and above said arm I, the latter being adapted to make electrical connection at its outer end with either of said blocks.

IRVING W. COLBURN.

Witnesses:

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