H. T. JONES.

RHEOSTAT.

APPLICATION FILED OCT. 19, 1908.

934,973.

Patented Sept. 21, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

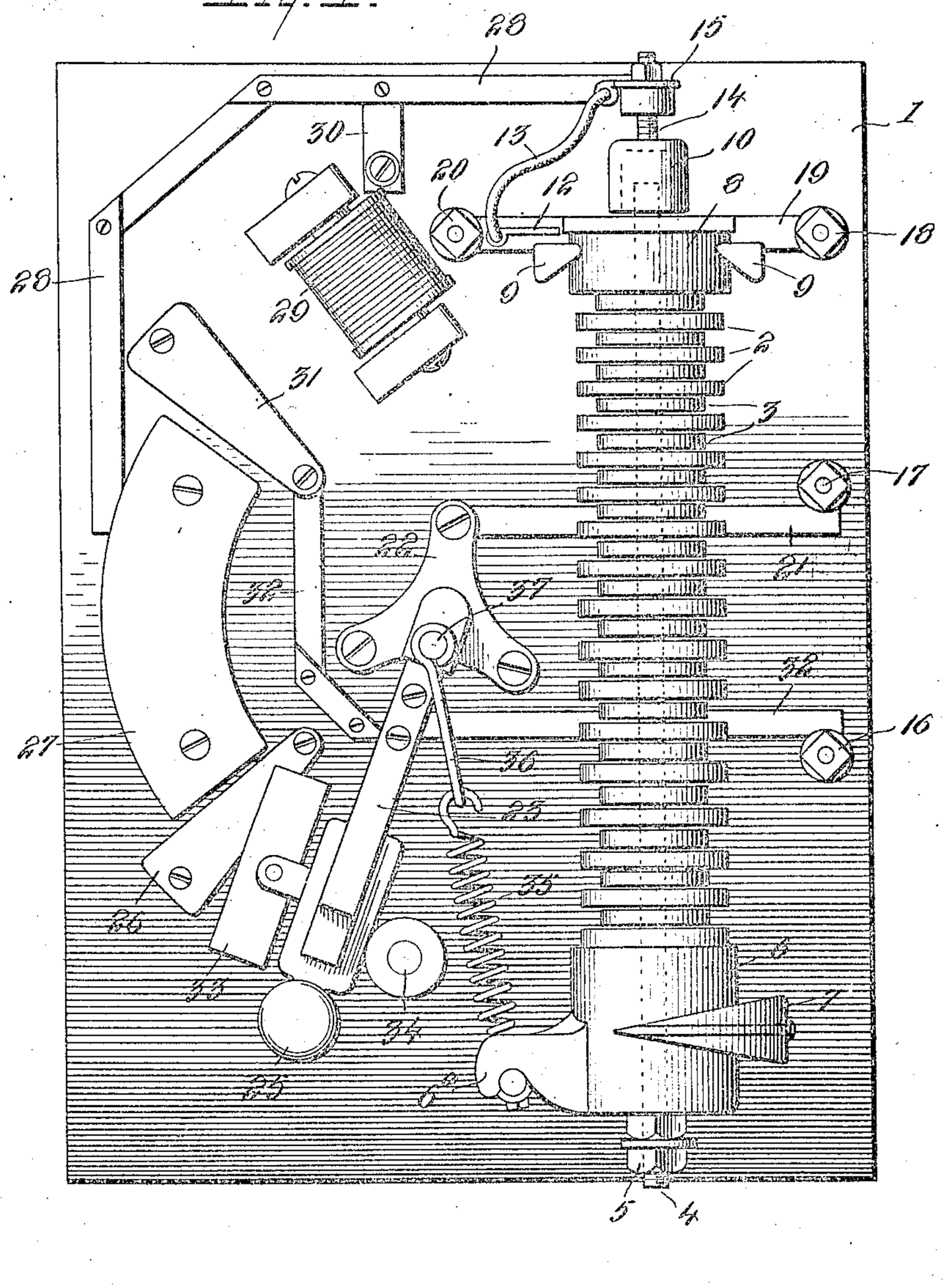
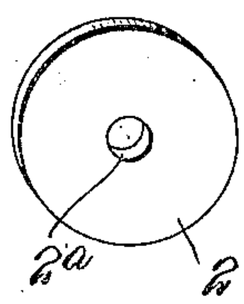


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

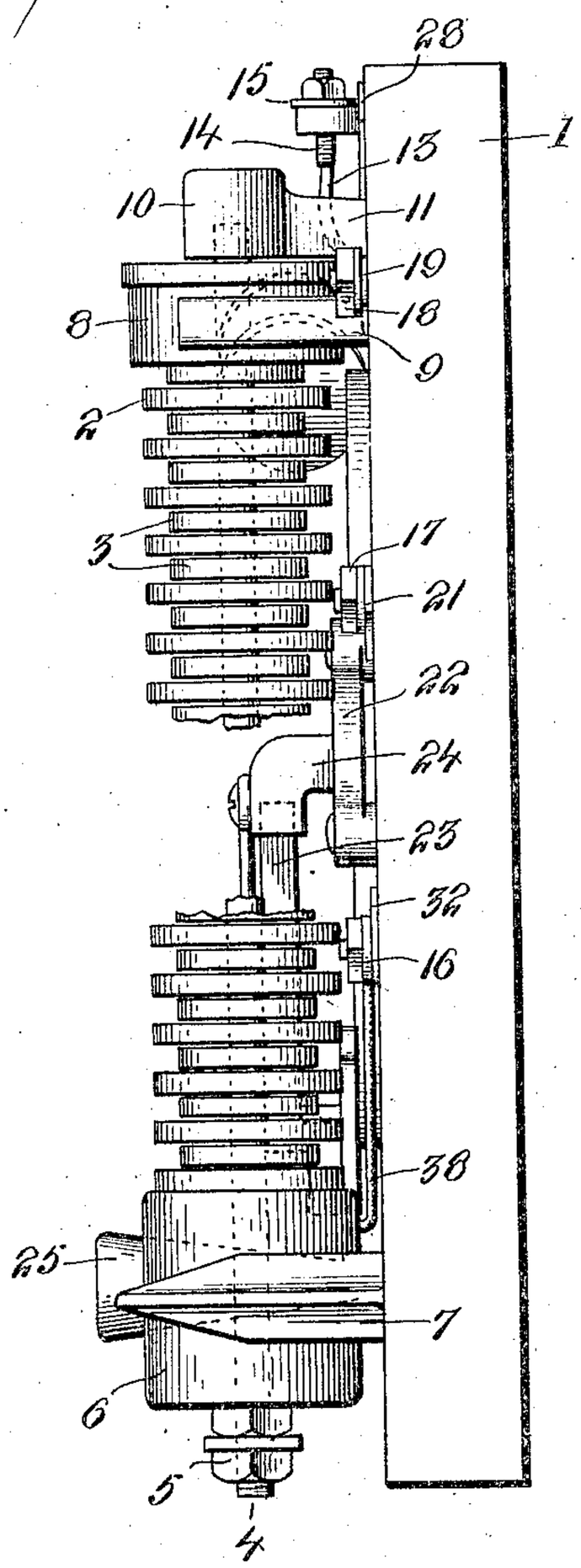
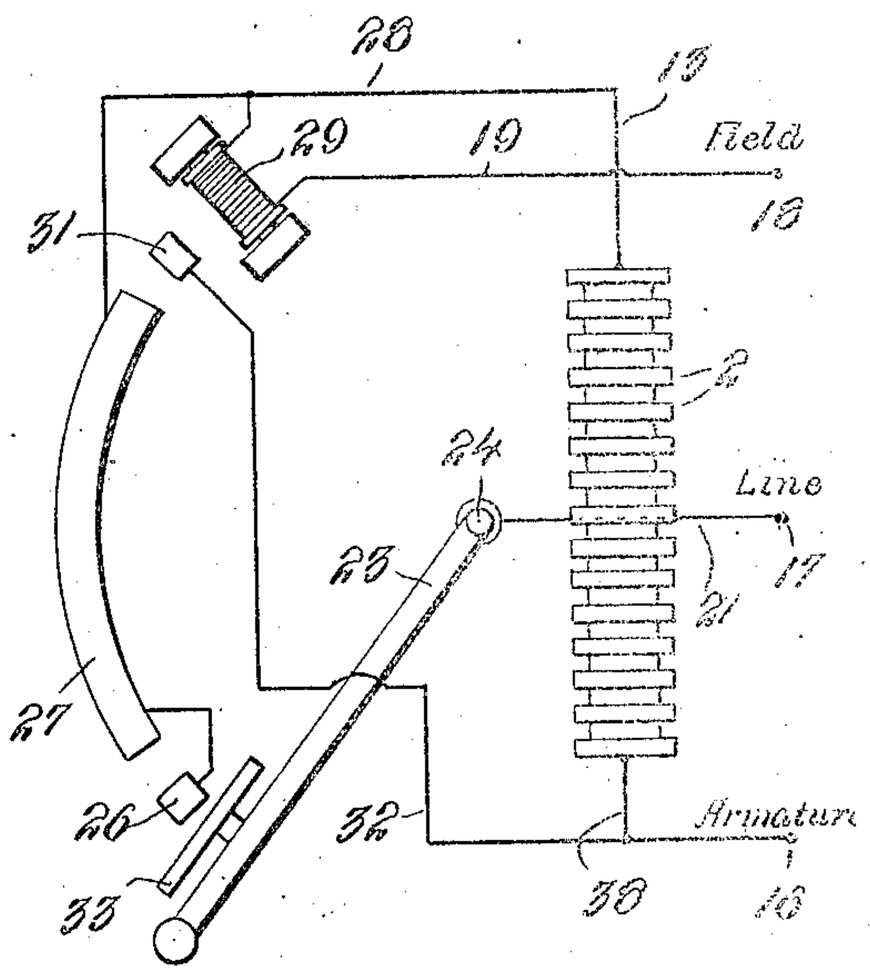


Fig. 4.



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RHEOSTAT.

934,973. Specification of Letters Patent. **Patented Sept. 21, 1909.**

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To all whom it may concern:

Be it known that I, HENRY T. JONES, citizen of the United States, residing at Bellevue, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Rheostats, of which the following is a specification.

My invention relates to resistance devices, and more particularly to resistance devices of the imperfect contact type. As is well known, such devices usually consist of a pile or column of plates or disks of some material, such as carbon or graphite, which disks, owing to the peculiar nature of their composition, make more or less imperfect contact with each other. When, however, pressure is applied to such a column or pile, the disks are forced into more intimate contact, and the resistance of the pile diminished. Also, the reduction of resistance is proportional to the degree of pressure applied.

In its broader aspects, my invention seeks to provide an improved construction of such a resistance device, so that it may be adapted for use in controllers, dimmers, lightning arresters, and other electrical apparatus in which a resistance medium is employed.

More specifically, the invention aims to produce an improved rheostat device having the above mentioned resistance medium as a basis.

One object of the invention is, therefore, to provide a resistance device of the above character so constructed as to readily dissipate the heat generated by the passage of the current.

A further object is to provide a rheostat having a sweep arm of the ordinary type so connected with my improved resistance device that the movement of such arm about its pivot will serve to vary the amount of current transmitted, as in the well known forms of such apparatus.

A still further object of the invention is to provide a resilient connection between the sweep arm and resistance device so arranged that it serves the double purpose of exerting pressure on said resistance device, and of returning the arm to its "off" position when the release magnet becomes deënergized.

With the above and other objects in view, and to improve generally upon the efficiency and simplicity of such apparatus, my invention consists in the construction and arrangement of parts hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation showing my improved rheostat, complete. Fig. 2 is a perspective view of one of my novel resistance elements, detached. Fig. 3 is a side elevation of the device shown in Fig. 1, parts being broken away. Fig. 4 is a diagram illustrating the circuits employed.

Referring to the drawings in detail, 1 designates a base or support of suitable size, which may be a panel of slate, or similar non-conducting material. On the front of such panel, and near one edge thereof, I support my improved resistance device comprising a column or pile of conducting disks or plates 2, 3. As clearly shown in Fig. 2, each of these disks has a central circular opening 2^a, through all of which openings, when the disks are superposed, and concentrically arranged, passes a rod 4, which serves to support such disks and maintain them in position. The disks are preferably of some granular material such as graphite, or a compound of graphite and another substance or substances.

It will be understood that while I have herein shown the disks in the shape of annular rings, I do not desire to limit myself to circular disks, since it is evident they may be of other shapes.

It will be observed, by reference to Figs. 1 and 3, that the disks 3 are of smaller diameter than the disks 2 and are arranged to alternate with them. In this manner, portions of the disks 2 project beyond the edges of the disks 3 and thus give to the column a corrugated appearance. This corrugated surface, as is well known, has the property of readily radiating heat, and thus serves to maintain the resistance device at a comparatively low temperature while working. I regard this as an important feature of my invention.

While I have shown the series of disks or resistance elements as assembled in the form of a vertical column, it is obvious that they may be readily arranged adjacent each other in a horizontal row, or diagonally.

At the lower end of rod 4 is a nut 5, and above this is arranged a suitable block 6, on or against which the first resistance element of the series rests. This block is provided with an offset or ear 6^a, for the purpose hereinafter described. A bracket 7 is secured in

the panel 1 and embraces block 6, as shown. At the other end of the column or series of resistance elements, is another block 8, supported by brackets 9, set into the panel. Beyond the block 8 is a cup-shaped bracket 10, supported on a stud 11, and adapted to receive and guide the end of the rod 4. It will thus be seen that the series of resistance elements is freely supported and held in position, solely by the rod 4, in such manner that air can readily circulate around it on all sides. Connecting with the end element of the series is a lead 12, to which is attached a flexible connector 13, secured at its other end to a clip 15, having a screw 14 passing therethrough.

Connection is made with my improved rheostat by means of the three usual binding posts 16, 17, 18, from which extend wires to the motor armature, line, and motor field, respectively, as indicated in Fig. 4. The leads from these binding posts to the various parts of the device are herein illustrated as mounted on the front of the panel. It is evident that they may be carried on the back of the panel, if desired, however. From binding post 18 a conducting strip 19 extends to a binding screw 20, hereinafter referred to.

From the binding post 17 extends a conducting strip 21, to a plate 22, secured to the panel near its center. On this plate 22 is pivoted, as at 24, one end of a sweep arm 23, of usual construction, provided at its outer end with a handle 25. This arm 23 is adapted, when swung on its pivot to engage successively, with the "first point" contact 26, the arc-shaped contact segment 27, and the short circuiting contact 31. A conducting strip 28 extends from contact plate 27 to clip 15, above described, and from this strip, extends a strip 30 to form one terminal of the usual "no voltage release" magnet 29. The binding screw 20, above referred to, forms the other terminal of this magnet. From the short circuiting contact 31, extends a conductor 32 to the binding post 16, connected to the motor armature. An armature 33 is carried, as usual, by the sweep arm, for engagement with the poles of magnet 29. A stop 34 limits the movements of the arm in the other direction. A stiff helical spring 35 has one end attached to the ear 6ª of the block 6 and the other end connected, as by a link 36, to a stud 37, set into the arm 23 at a point slightly removed from its pivot. A conductor 38 (see Fig. 3) extends from the lower end of the resistance column to the armature lead 32, thus completing the circuit.

The operation of the device is obvious. When the arm contacts with the first point 26, current flows from line through post 17, conductor 21, plate 22, handle 23, contact 26, plate 27, conductors 28, 13 and 12 to top of column, thence through column of resistance elements and out through conductors 38, to conductor 32, binding post 16, and motor armature. A branch circuit can also be traced through conductor 30, magnet 29, and conductor 19 to motor field. With the arm in contact with 26 the resistance of the column is a maximum and the starting current for the motor a minimum. As the arm is moved around over plate 27, however, it acts through spring 35 to draw up block 6 and thus compress the column of resistance elements thereby gradually lessening its resistance, and allowing more and more current to flow. Finally, when the arm engages plate 31, the resistance column is short-circuited, and the current reaches its maximum value.

It will thus be seen that I have provided a very simple, durable and compact resistance device, applicable to a large variety of uses, and it is thought the numerous advantages of my invention will be readily appreciated by those skilled in the art.

What I claim is—

In a rheostat, the combination with a supporting base, of a sweep arm pivoted at one end near the center thereof, an arc-shaped series of contacts mounted on one side of the base with which the other end of said arm coöperates, a column of flat conducting disks arranged near the other side of said base, a block above which said conducting disks are held, a fixed rod on which said block and disks are both freely slidable, and a connection extending between said block and said arm, whereby, as said arm is moved on its pivot, it serves to force said block upward on said rod and thus compress said column of disks.

In testimony whereof I affix my signature, in presence of two witnesses.

HENRY T. JONES.

Witnesses:

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