

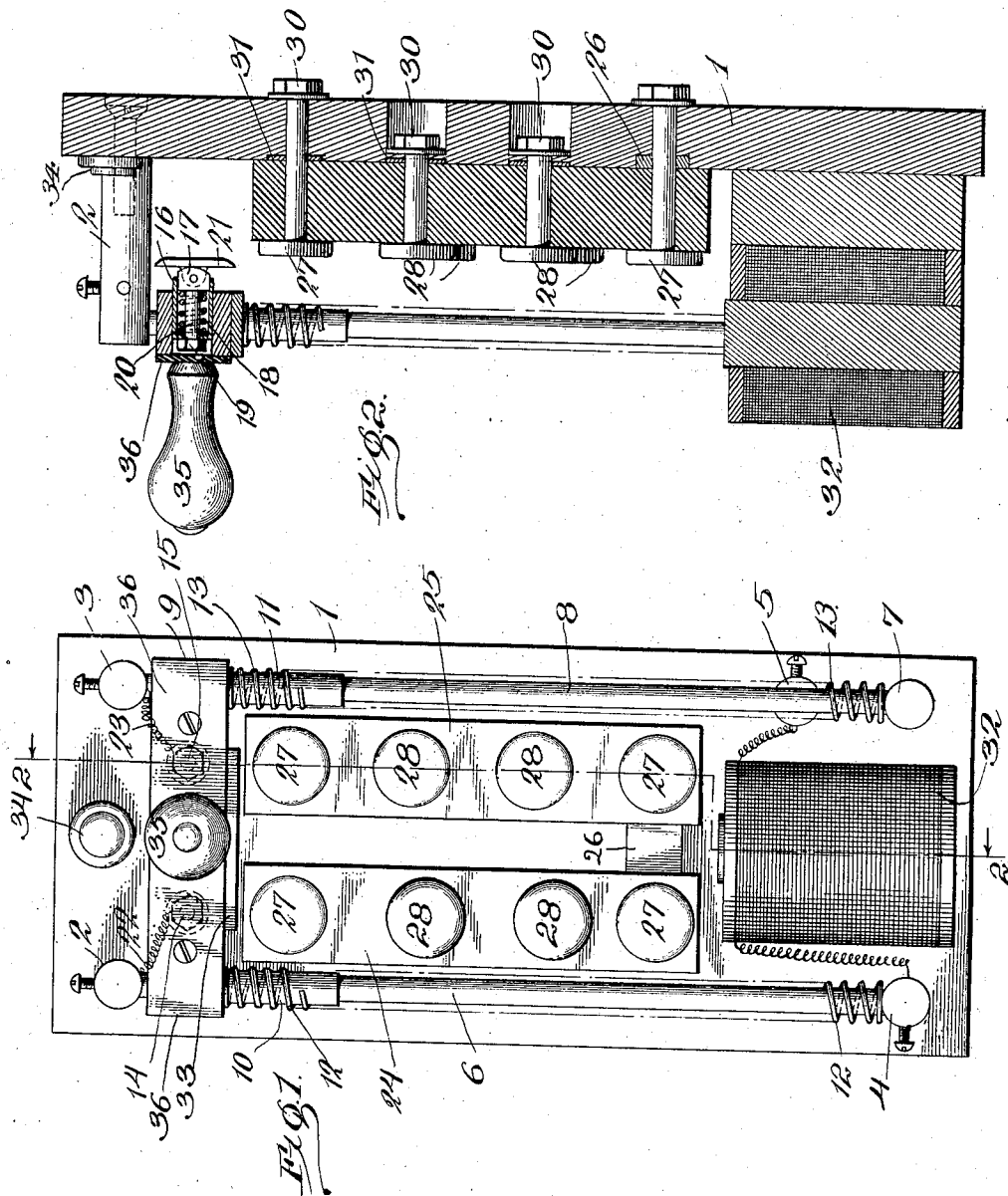
No. 757,880.

PATENTED APR. 19, 1904.

R. W. BROWN.
ELECTRIC RHEOSTAT.
APPLICATION FILED APR. 21, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



2 Witnesses
Edward F. Nally
John O. Lempler

Roy W. Brown, Inventor
By his Attorney J. O. Lempler.

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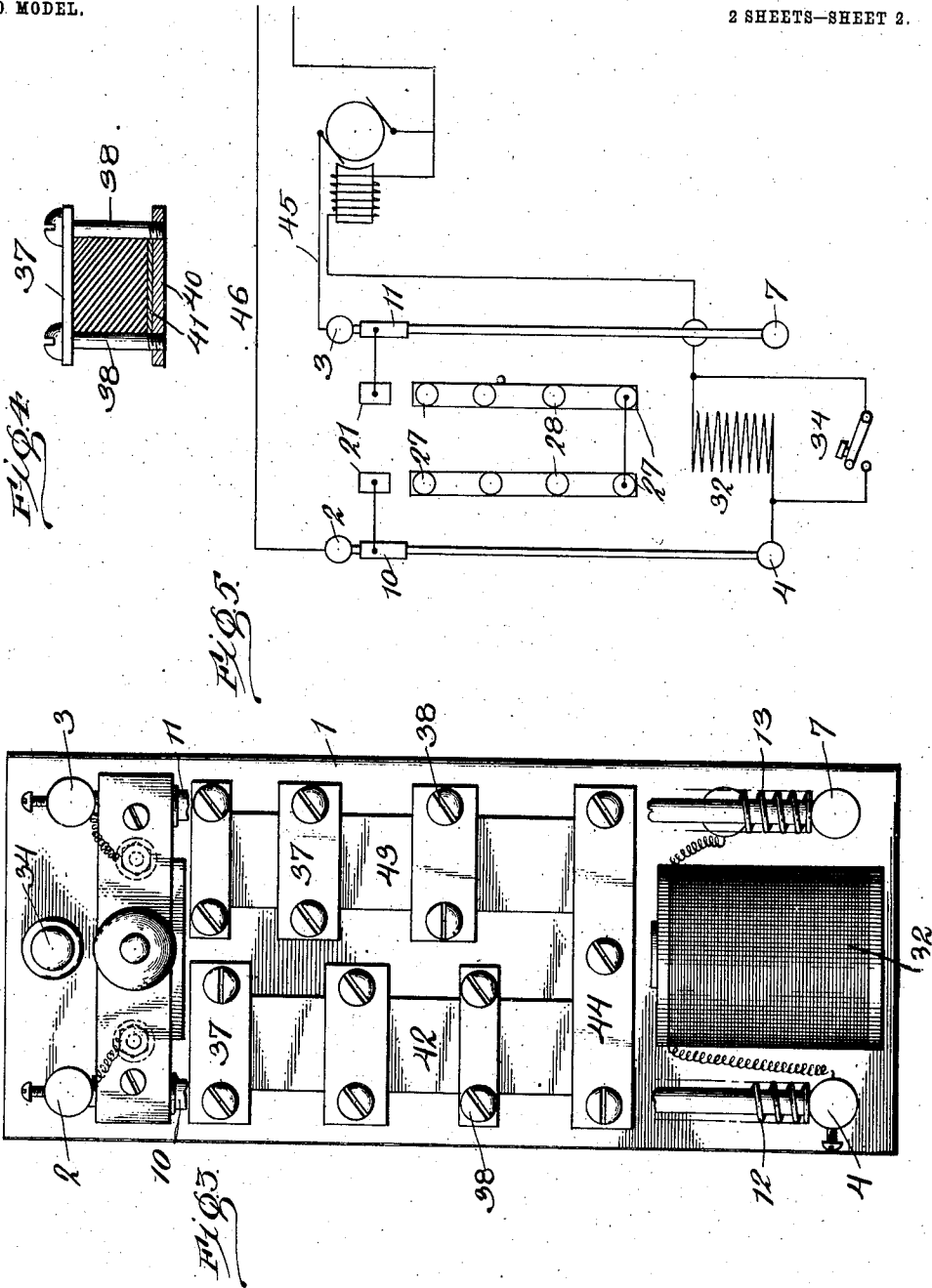
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Witnesses
Edward F. Nally
John O. Kinsler

Roy W. Brown Inventor
By his Attorney J. F. Langston

UNITED STATES PATENT OFFICE.

ROY W. BROWN, OF AMSTERDAM, NEW YORK.

ELECTRIC RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 757,880, dated April 19, 1904.

Application filed April 21, 1903. Serial No. 153,592. (No model.)

To all whom it may concern:

Be it known that I, ROY W. BROWN, a citizen of the United States, and a resident of the city of Amsterdam, New York, have invented a certain new and useful Improvement in Electric Rheostats, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to rheostats; and it has for its object to provide a simple and efficient means for varying the current of an external circuit.

The invention may be used to control the current flowing through any device, such as a motor or other translating device. The invention is particularly designed to be used where there is more or less shock and jar, such as for controlling the motor of a street-car.

The invention consists in providing a resistance body and contacts supported thereon at different points of the resistance body in order to connect more or less of the resistance-body in the circuit.

The invention also consists in arranging the contacts on the resistance body so that the contacts at the ends of the resistance body will alternately make connection with a moving contact-piece.

The invention also consists in forming a resistance body of carbon, such as graphite or of a composition carbon and other materials or of other substances. When formed of friable substances, means are provided for clamping the contacts thereto instead of boring or puncturing the resistance body, and thereby greatly weakening it.

The invention also consists in providing a contact with a contact-shoe which is hinged to and operated by a spring to make good electric connection.

The invention also consists in other features disclosed in the following description, illustrated in the accompanying drawings, and claimed in the claims.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 illustrates the top view of the preferred form of my invention. Fig. 2 illus-

trates a sectional view of the invention, taken along the line marked 2-2 shown in Fig. 1. Fig. 3 illustrates a top view of a modified form of my invention. Fig. 4 illustrates the manner of securing the contacts to the resistance body of the form of the invention illustrated in Fig. 3. Fig. 5 illustrates diagrammatically the circuit connections of the invention.

Referring to Fig. 1, 1 indicates a supporting-base. 2, 3, 4, and 5 are binding-posts mounted on the said base 1. The binding-posts have the usual form of a binding-screw for making electrical connections. In the upper end of the posts 2 and 4 there is secured a rod 6. In the same manner there is also secured to the upper end of the post 3 and another post 7 a second rod 8. A contact-piece 9 is adapted to move along the rods 6 and 8, which consists of fiber for purposes of insulation. The contact-piece 9 may, however, be formed of any other material, provided that the necessary insulation is provided for. Sleeves 10 and 11 are carried by the contact-piece and prevent any binding of the contact-piece with the rods. Springs 12 and 13 are located on the rods 6 and 8 and between the contact-piece 9 and the posts 4 and 7, so that when the contact-piece is moved along the rods the springs will be compressed and will tend to return the contact-piece to its normal position. A pair of contacts 14 and 15 are located in the contact-piece 9. The contacts 14 and 15 consist of sleeves 16, which are secured in the cross-block of fiber. In each of the sleeves is located a plunger 17, adapted to move freely along the sleeve. A spring 18 tends to force the plunger outward, and a nut 19, located on the plunger-rod 20, regulates the extent of movement of the plunger. A contact-shoe 21 is hinged to the plunger, which permits of free movement of the contact-shoe and causes it to make good connection with surfaces that may be located at different angles with respect to each other. Connections are made through the wires 22 and 23, which are connected to the contacts 14 and 15 and to the sleeves 10 and 11. The sleeves 10 and 11 make electrical connections through the rods 6 and 8, which are supported by the binding-posts 2 and 3. As the contacts 14 and 15 are carried

downward they make connections with the contacts connected with the resistance body. The resistance body consists of two rods 24 and 25, which may be formed of graphite or a mixture of carbon with other materials, or other compositions or substances may be used. The resistance may be, moreover, greatly varied as to shape and arrangement of its parts. The lower ends of the rods 24 25 are connected together by a strip of metal 26. Contacts 27 27 27 27 are located on the ends of the rods 24 25, while the remaining contacts 28 are staggered along the rod—that is, the contacts on one of the rods are located nearer one end of that rod than the corresponding contacts located on the other rod, as illustrated in Figs. 1 and 3. When the contact-piece 9 is moved along the contacts on the resistance body, connections are made first with the contacts 27 27, located at the upper end of the rods, and the current then passes through the whole length of the two rods. As the contact-piece is moved farther along the resistance body one of the contact-shoes comes into contact with but one of the contacts located a short distance along the rod before leaving the upper contact of the other rod. This reduces the length of the resistance body along which the current passes. As the contact-piece is moved still farther down the rods the other contact-shoe comes into contact with a contact located another step along the other end of the resistance body. Connection is thus made between the terminal contacts and the resistance body, so as to cut out of an external circuit parts of the resistance body, and thereby reducing the resistance of the external circuit. When the contact-piece reaches the lower end of its movement, the shoes make connection with lower contacts 27 27 and the resistance of the resistance body is completely cut out of the circuit. The contacts carried by the resistance body have rods for securing them to the resistance body. The rod or shank passes through a hole bored through the resistance body and secured by a nut 30. In order that a good connection may be made with the resistance body, a washer 31 of non-corrosive material, such as aluminium, is closely pressed against the resistance body. When the contact-piece 9 is moved to a point such that the resistance body is completely cut out of the circuit, it is retained in that position by means of the retaining-magnet 32, which attracts and holds the armature 33, located on the contact-piece 9. The electro-magnet 32 is connected in the circuit, so as to be energized, and thus retains the contact-piece when the armature located on the moving contacts comes within its field of force. A push-button or other switch 34 is provided for either opening the circuit of the magnet or short-circuiting it in order that it may be deenergized and the contact-piece allowed to return to its normal position by the operation

of the springs 12 13. In the preferred form of my invention the magnet is short circuited. For operating the contact-piece a handle 35 is provided. An insulating-strip 36 is located over the contacts 14 and 15 to avoid all danger of short-circuiting of the contacts.

In the modified form of my invention I use contact-heads, which may be clamped to the resistance body. If the resistance body is bored or punctured, it is liable to break either while in the process of manufacture of the rheostat or while it is being shipped or in the use of the device. The body being of friable nature, it is greatly weakened thereby. In Figs. 3 and 4 I have illustrated contacts which are secured by clamping them around the resistance body. The contact consists of a strip or contact-head 37, through which pass clamping-bolts 38 39. The clamping-bolts have screw-threads at one end of each of the bolts, which is adapted to be screwed into the strip 40, located at the back of the rod, and thereby securely fastening the contact-head or strip to the resistance body. In order to make a good contact between the contact and the resistance body, a strip of aluminium 41 is located between the resistance body and the back strip. Any non-corrosive material may be used in place of the strip of aluminium. The strips are securely clamped to the rods 42 43, which are mounted on the base-plate 1 and secured thereto by means of the bolts which pass through the base-plate 1. The lower ends of the resistance-rods may be provided with contacts, or a single contact-strip 44 may be used for connecting their lower ends together. A corresponding strip is located at the back of the resistance-rods, into which the bolts are screwed for securing the strip to the resistance body.

In Fig. 5 is illustrated the circuit connections of the rheostat and the connections of the rheostat with an external circuit. The rheostat may be used as a controller for any electrical device. I have illustrated the rheostat in the diagram as being used in connection with a motor. The resistance body is connected in the armature-circuit, and the magnet is connected in the field-circuit of the motor. When it is desired to start the motor, the contact-piece is moved down, so as to close the connection of the armature-circuit 45 with the main line 46 through the whole of the resistance body. The contact-piece is then moved so as to decrease the amount of the resistance in the armature-circuit until the whole of the resistance body is thrown out of the circuit. When it is desired to disconnect or open the circuit of the motor, the push-button or switch 34 is closed, which short-circuits the magnet 32, and the circuit of the armature of the motor is opened. The speed of the motor can be controlled by placing in the circuit of the armature varying resistances of the resistance-body.

The invention can be varied in many ways without departing from the spirit thereof. The arrangement of the contacts may be varied and the manner of connecting them to the resistance body without avoiding my invention.

What I claim, and desire to secure by Letters Patent, is as follows:

1. In a rheostat the combination of a resistance body, a movable contact-piece, contact-pieces located and supported on the resistance body and arranged so that as the movable contact-piece is moved along the resistance body parts of the resistance body will be cut out of the circuit, first a part at one end and then a part at the other end.

2. In a rheostat the combination of a resistance body, an external circuit, a movable contact-piece having two contacts connected directly to the said external circuit, contact-pieces supported by the said resistance body and arranged so as to make contact with the contact-pieces connected to the ends of the resistance body and then to make contact with a contact-piece at a point farther from one end of the resistance body and then to a contact-piece at a point farther from the other end as the movable contact-piece is moved over the said contact-pieces.

3. In a rheostat the combination of a resistance body composed of a friable material, contacts supported by the said friable body and arranged so that the corresponding contacts counting from each end will be at different distances from the ends, a movable contact adapted to make contact with the contacts of the resistance body.

4. In a rheostat the combination of a pair of carbon rods electrically connected together at one end of each of said rods, a movable contact-piece, contacts supported on the said rods and arranged so that the said contact-piece will make contact with the contacts alternately on the rods as the contact-piece moves along the said contacts.

5. In a rheostat the combination with a pair of carbon rods, a movable contact-piece, contacts supported on the said rods and arranged so that the said contact-piece will make contact with a contact on one rod and then with a contact on the other rod before passing from the contact of the first-named rod and so alternately as the contact-piece moves over the said contacts.

6. In a rheostat the combination of a resistance body, a movable contact-piece having a pair of terminal contacts supported on the said resistance body and adapted to make contact with the said terminal contacts, an electromagnet for securing the said contact-piece, and means for deenergizing the said electromagnet.

7. In a rheostat the combination of a resistance body, a movable contact-piece having two terminal contacts, guides for the said contact-piece, contacts connected to the said resistance body and adapted to make connection with the said terminal contacts, an electromagnet for securing the said movable contact-piece, a switch for deenergizing the said electromagnet, and a spring for causing the said contact-piece to return to its normal position.

8. In a rheostat the combination of a resistance body, contacts supported on the said resistance body, a contact-piece consisting of an insulating-body, a pair of sleeves supported by the said insulating-body, plungers, springs for controlling the said plungers, contact-shoes hinged to the said plungers and adapted to make contact with two of the said contacts at any one time.

9. In a rheostat the combination of a resistance body, contacts supported on the said resistance body and consisting of a contact-piece and a non-corrosive piece and means for clamping the said pieces to the resistance body by a means passing on the outside of the resistance body, and a movable means for making contact with the said contacts.

10. In a rheostat the combination of a resistance body, composed of carbon, contacts carried by the said resistance body and consisting of a contact-piece and a non-corrosive piece for connecting the said contact-piece with the said resistance body and means for securing the said pieces to the resistance body by clamping the said piece around on the outside of the said resistance body, a movable means for making contact with the said contacts.

11. In a rheostat the combination of a resistance body, contacts located on the said resistance body, bolts and a clamping-piece for clamping the said contacts around on the outside of the said resistance body, a non-corrosive body located between the said clamping-piece and the said resistance body.

12. In a rheostat the combination of a resistance body consisting of a pair of rods composed of carbon, contacts located on the said rods, non-corrosive material located between the said contacts and the said carbon rods, a contact-piece composed of an insulating-body, a pair of spring-contacts, a pair of sleeves and plungers located in the said sleeves and connected to the said contacts for guiding the same.

Signed in the presence of two subscribing witnesses.

ROY W. BROWN.

Witnesses:

JOHN O. GEMPLER,
F. F. CRAMPTON.