

(No Model.)

2 Sheets—Sheet 1.

J. T. BIRCH.
RHEOSTAT.

No. 514,301.

Patented Feb. 6, 1894.

FIG. 1.

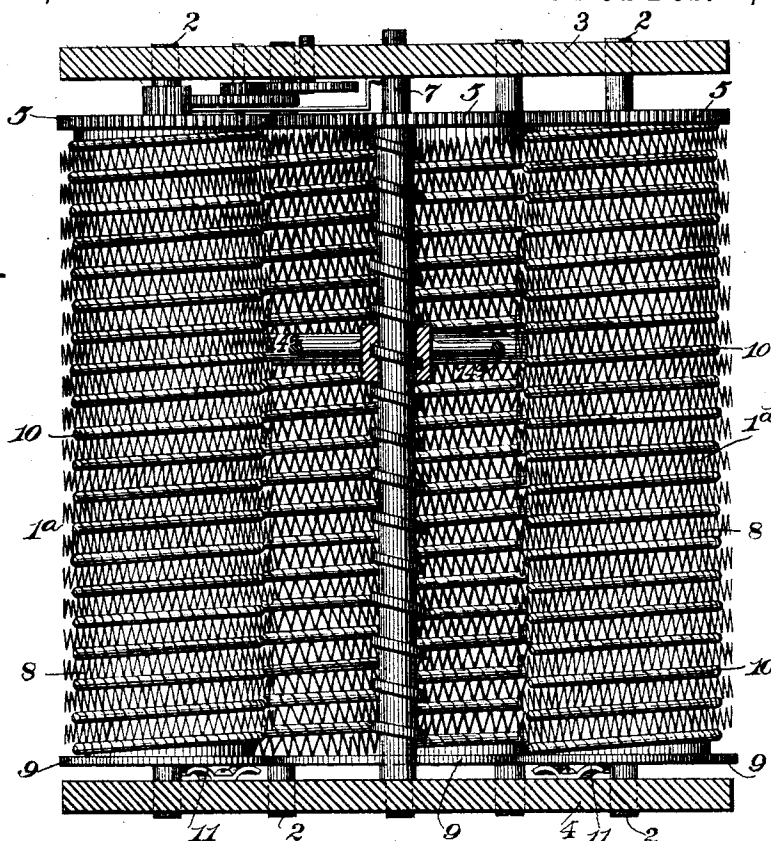
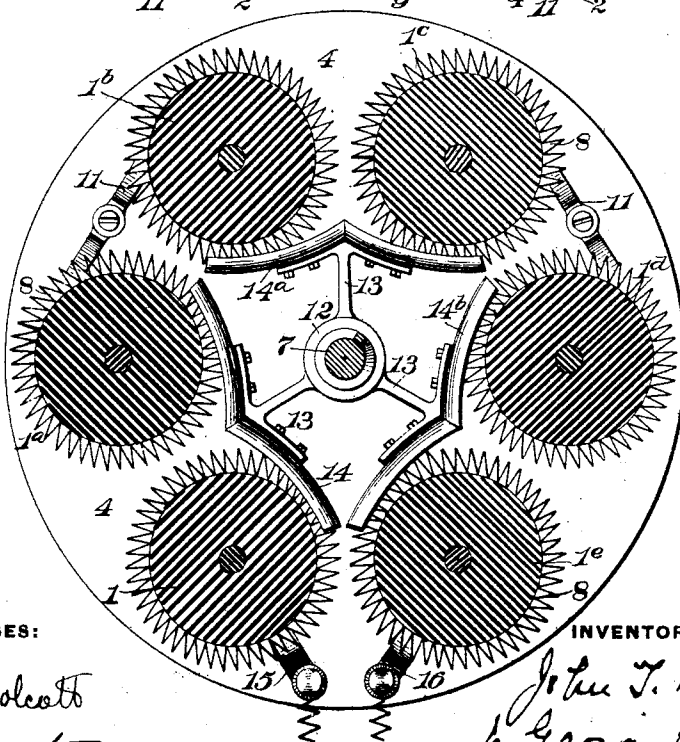


FIG. 2.



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John T. Birch
by George H. Christie
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FIG. 3.

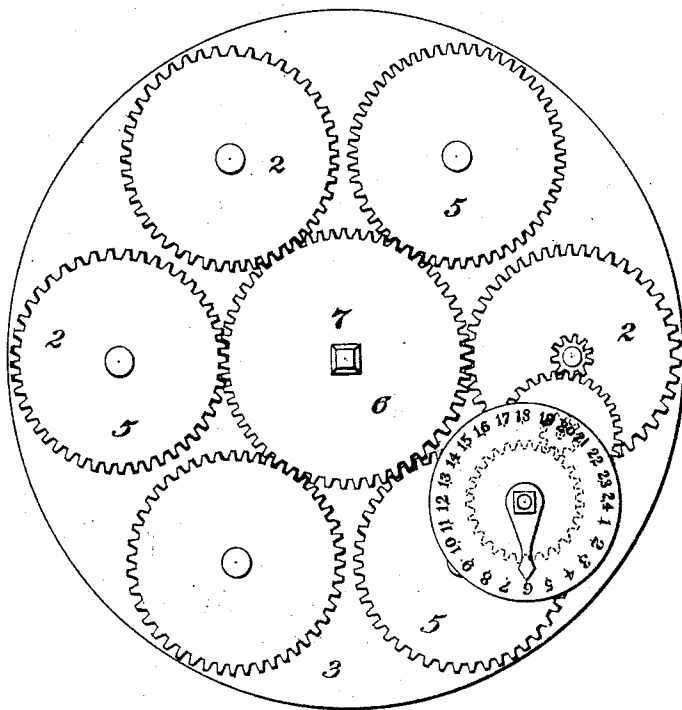
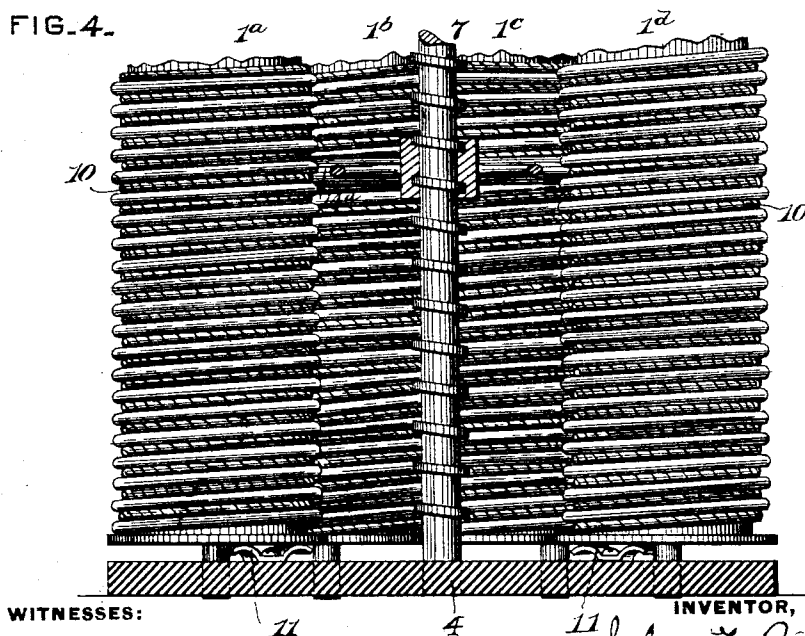


FIG. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN T. BIRCH, OF PITTSBURG, PENNSYLVANIA.

RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 514,801, dated February 6, 1894.

Application filed November 16, 1893. Serial No. 491,083. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. BIRCH, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Regulators for Electric Currents, of which improvements the following is a specification.

The invention described herein relates to certain improvements in mechanism for regulating the flow of currents from the generator to a motor or other translating device, and has for its object a construction whereby the amount of resistance to be introduced into the circuit between the generator and translating device may be quickly and closely adjusted to the requirements of the motor or translating device and at the same time permit of a large range of adjustment.

In general terms, the invention consists in the construction and combination substantially as hereinafter described and claimed.

In the accompanying drawings forming a part of this specification, Figure 1 is a view partly in section and partly in elevation, of my improved rheostat or resistance device. Fig. 2 is a horizontal section of the same, the plane of section being indicated by the line *x, x*, Fig. 1. Fig. 3 is a top plan view of the same, and Fig. 4 is a view in elevation of a modification of my invention.

In the practice of my invention, a series of rolls 1, 1^a, 1^b, &c., formed of non-conducting material, or having a covering of non-conducting material, and provided with spindles at their opposite ends, are arranged vertically between the top and bottom plates 3 and 4, the spindles or journals 2 of the rolls being mounted in suitable bearings in the top and bottom plates, so that they may rotate freely, as hereinafter described. On the upper journals of the rolls are secured gear wheels 5, adapted to intermesh with a gear wheel 6 on a central spindle 7, which is also mounted at its upper and lower ends in the top and bottom plates, and is provided at its upper end with an angular portion for the reception of an operating handle. A coiled wire 8 is helically wound around each of the rolls, one end of the coil being electrically connected to a metallic plate 9, on the lower ends of the rolls. The members of the helix of the coiled wire

on the rolls are insulated from each other by a cord 10 of insulating material, or in any other suitable manner. The helices formed by winding the coiled wire on the rolls extend to the upper end of the rolls where their ends are secured in any suitable manner.

In winding the coiled wire upon the rolls, care must be taken that the convolutions thereof do not come in contact with each other.

If desired, the rolls may be covered with a plastic non-conducting material which will subsequently harden, before winding the coiled wire thereon, so that the convolutions of the coiled wire will embed themselves therein to a greater or less extent dependent upon the depth of the plastic material on the rolls. Care should be taken to leave the outer surfaces of the convolutions of the coiled wire exposed so as to permit electrical contact of the contact plates therewith, as hereinafter described.

As shown in Fig. 2, the metallic plates 9, of the rolls 1 and 1^a, 1^b and 1^c are connected electrically by a metallic spring 11, bearing at its ends against these plates, and firmly secured to the bottom plate of the device in any suitable manner, so that said rolls may be constantly in electrical connection while being rotated.

As shown in Fig. 1, the central spindle 7 is threaded, and an internally threaded hub 12 provided with radial arms, is arranged on said spindle and is moved up and down thereon, by the rotation of the spindle and of the several rolls 1, as hereinafter described.

On the radial arms 13 are secured contact plates 14, insulated from the arms, and adapted to bear upon the convolutions of the coiled wire on the rolls 1, &c. These contact plates are preferably formed concave on that face bearing upon the convolutions, thereby obtaining a greater contactual surface. These contact plates are arranged to form electrical connection between the helices on the rolls 1 and 1^a, 1^b and 1^c, 1^d and 1^e. In this arrangement the current will enter the helix on the roll 1, through the medium of a spring plate 15 bearing upon the bottom plate 9 of said roll, thence by a contact plate 14, to roll 1^a, thence by contact spring 11 to roll 1^b, thence by contact plate 14^a to roll 1^c, thence by contact spring 11^a, to roll 1^d, and by contact plate 14^b to

roll 1⁶, whose helix is connected through the medium of a contact spring 16 to the other portion of the conducting circuit. It will be observed that the pitch of the members of the helices on the rolls and the pitch of the threads on the central spindle are the same, and that the spindle and rolls are rotated synchronously so that the contact plates 14 will move along the convolutions, and will not be shifted transversely from one convolution to another. It will be readily understood that, as the current passes along the coiled wire forming the convolution, and not from coil to coil, or from convolution to convolution, a movement of the contact plates 14 down the rollers, will lessen the resistance, while an upward movement will increase it.

While I prefer the construction shown in Fig. 1, the rheostat may be constructed by a single wire helically wound on each roller, as shown in Fig. 4. But this construction will not afford as great a delicacy and range of adjustment, as where the coiled wire is employed.

When the contact plates 14 are shaped to partially embrace the helices on the rolls, the central spindle may be made plain or unthreaded, so that the frame carrying the contact plates will move freely up and down the same, the frame being shifted by the helices on the rolls through the medium of the concave plates. In such a construction the central spindle will serve as a guide to hold the contact plates in proper relation to the helices on the rolls.

I claim herein as my invention—

1. A regulator for electric currents having in combination two rotatable wire helices, the

members or coils of the helices being insulated from each other, and a contact plate movable along the helices while in electrical contact therewith, substantially as set forth.

2. A regulator for electric currents having in combination two rotatable helices formed of wire coils, the members or coils of the helices and the convolutions of the coils being insulated from each other, and a contact plate movable along the helices while in electrical contact therewith, substantially as set forth.

3. A regulator for electric currents having in combination a series of four or more rotatable wire helices, the members or coils being insulated from each other, but electrically connected at one end in pairs and a contact plate electrically connecting a member of one pair with a member of another pair and movable along the helices while in contact therewith, substantially as set forth.

4. A regulator for electric currents having in combination two rotatable cylinders or rolls having their peripheral surfaces formed of non-conducting material, wires helically wound around the cylinders in such manner that the members or coils of the helices are not in electrical contact, a rotatable threaded spindle and a metallic plate bearing upon the helices and provided with an internally threaded hub surrounding the spindle and movable thereby, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOHN T. BIRCH.

Witnesses:

DARWIN S. WOLCOTT,
F. E. GAITHER.