No. 668,235.

Patented Feb. 19, 1901.

N. H. SUREN.

RHEOSTAT.

(Application filed June 29, 1899.)

(No Model.)

Fig. 1.

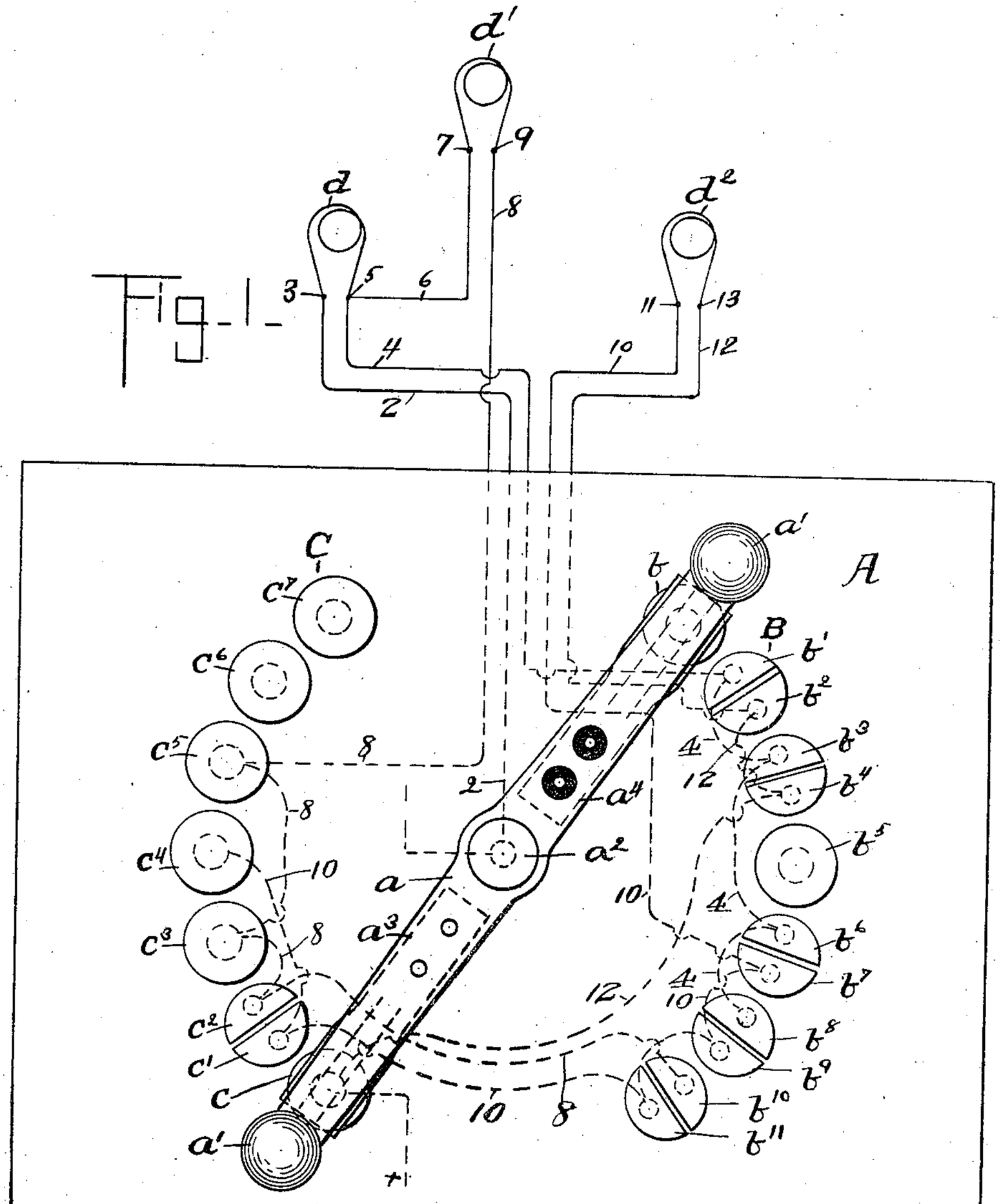
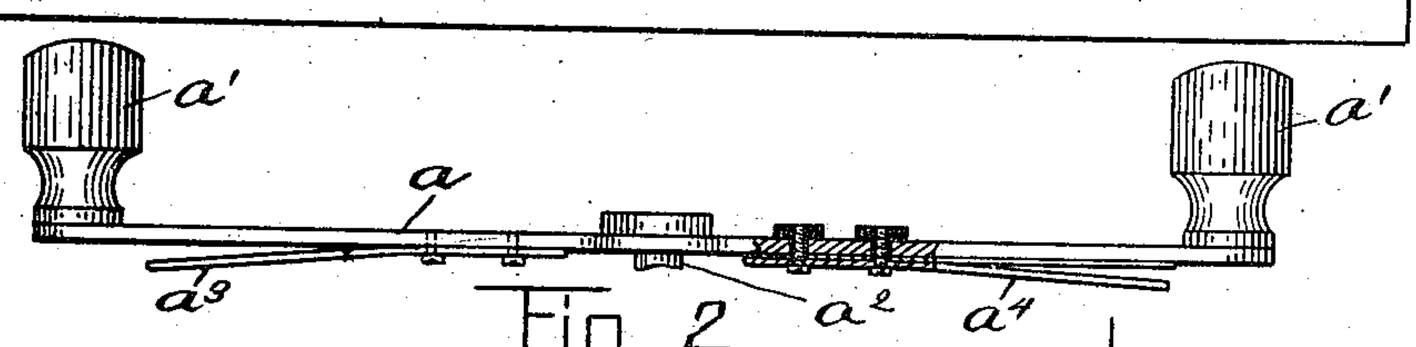


Fig. 2.



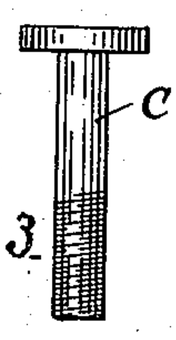
Witnesses:

H. B. Davis.

J. L. Hutchinson.

Fig. 4.

Fig. 3.



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UNITED STATES PATENT OFFICE.

NATHAN H. SUREN, OF NEEDHAM, MASSACHUSETTS.

RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 668,235, dated February 19, 1901.

Application filed June 29, 1899. Serial No. 722,343. (No model.)

To all whom it may concern:

Be it known that I, NATHAN H. SUREN, of Needham, county of Norfolk, and State of Massachusetts, have invented an Improvement in Rheostats, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to rheostats, and has for its object to construct a rheostat which may be of simple construction and adapted to be easily operated and understood even by unskilled persons and by which a number of known variations in resistance may be made.

The invention consists in a number of resistance-coils, two series or sets of contacts preferably arranged in circular form, and a movable switch, one arm of which is insulated from the other and is adapted to coöperate with one series of contacts, while the other arm coöperates with the other series of contacts, and circuit-wires connecting said contacts with the resistance-coils and with one of the arms of the switch.

Figure 1 shows in plan view a rheostat embodying this invention, the resistance-coils and circuit-wires being represented in diagram. Fig. 2 is a detail of the two-armed switch, one of the arms of which is insulated from the other. Fig. 3 is a detail showing one of the single contacts, and Fig. 4 is a detail showing one of the double contacts.

a represents the two-armed switch, which is made as a flat bar or strip of metal provided at each end with a knob a', by which it may be turned on its pivot a^2, and to the under side of said bar, at one side of the pivot a^2, a contact-spring a^3 is secured directly to the bar, which is in electrical connection with it, and at the opposite side of said pivot another contact-spring a^4 is secured to insulated bushings fitted into holes in the bar, so as to be insulated from the bar. Thus a two-armed switch is produced, one arm of which is insulated from the other. It is obvious that said two-armed switch may be made in many different ways; but the way herein shown is simple and not liable to get out of order and in practice is very efficient.

A number of contacts are arranged on the board A, preferably in circular form, as shown, they being disposed in two semicircular series or sets B C, and, as herein shown, some of said contacts are single contacts, as represented in Fig. 3, and some of them are double contacts, as represented in Fig. 4.

The two series or sets of contacts B C are arranged in reverse order, so that when the two-armed switch rests upon the uppermost contact of one series it will at the same time rest upon the lowermost contact of the other series. The series or set B comprises the following contacts, arranged in the order described: single contact b, double contact b' b', double contact b^3 b^4, single contact b^5, double contact b^6 b^7, double contact b^8 b^9, and double contact b^{10} b^{11}. The series or set C comprises the following contacts, arranged in the order described: single contact c, double contacts c' c^2, and single contacts c^3 c^4 c^5 c^6 c^7. One of the circuit-terminals is connected to the pivot-post a^2 of the switch and the other circuit-terminal is connected to the single contact c, and normally the arms of the switch rest upon the single contacts b and c, as shown in the drawings, and as no circuit-wire is connected to the contact b the current passes from the pivot-post a^2 through one of the switch-arms to the contact c, and all of the resistance-coils to be referred to will be short-circuited.

Three resistance-coils d d' d^2 are herein shown, each having a pair of terminals. 3 5 represent the terminals of the resistance-coil d, and 7 9 the terminals of the resistance-coil d', and 11 13 the terminals of the resistance-coil d^2. The circuit-wire 2 connects the pivot-post a^2 of the switch with the terminal 3 of the resistance-coil d. A wire 4 connects the other terminal 5 of said resistance-coil d with the contacts b' b^3 b^6 b^8.

A wire 6 connects the terminal 5 with the terminal 7 of the resistance-coil d', and a wire 8 connects the terminal 9 of said resistance-coil d' with the contacts c^5, c^3, c^2, and b^{10}. A wire 10 connects one of the terminals 11 of the resistance-coil d^2 with the contacts b^7, b^9, b^{11}, c', and c^4. A wire 12 connects the other terminal 13 of said resistance-coil d^2 with the contacts b^2, b^4, and c. The switch-arm normally rests upon the contacts b and c and is adapted to be moved into six different positions—first, onto the contacts b' b^2 and c' c^2; second, onto the contacts b^3 b^4 and contact

c^3; third, onto the contacts b^5 and contact c^4; fourth, onto the contacts b^6 b^7 and contact c^5; fifth, onto the contacts b^8, b^9, and c^6, and, sixth, onto the contacts b^{10} b^{11} and contact c^7. Thus the switch has in all seven different positions, although so far as my invention is concerned it may be arranged to have a greater or less number, according to the number of contacts provided.

By the arrangement of circuit-wires herein shown when the switch is in its first position, as shown in the drawings, all of the resistance-coils will be short-circuited, the path for the current being a^2, a, a^3, and c. When in its second position, with the switch-arm resting on the double contacts b' b^2 and c' c^2, all of the resistance-coils will be connected in parallel with each other, and, assuming each resistance-coil to be of the same known resistance, one-ninth of the total resistance will be cut in. In said second position of the switch-arm a three paths for the current will be established, one for each resistance-coil, as follows: a^2 2 d 4 b' a^4 b^2 12 c and a^2 a a^3 c' 10 d^2 12 c and a^2 a a^3 c^2 8 d' 6 4 b' a^4 b^2 12 c. When the switch-arm a is in its second position, it will be seen that both double contacts b' b^2 and c' c^2 are brought into use, and the former receives upon it the pen a^4, which rests upon both contacts, and the latter receives upon it the pen a^3, which also rests upon both contacts, said pens a^4 a^3 being made wide enough for the purpose. In the third position, with the switch-arm resting on the single contact c^3 and double contacts b^3 b^4, two of the resistance-coils d and d' will be connected in parallel with each other and one-sixth of the total resistance will be cut in. In said third position of the switch-arm a the paths for the current will be established as follows: a^2 2 d 4 b^3 a^4 b^4 12 c and a^2 a a^3 c^3 8 d' 6 4 b^3 a^4 b^4 12 c. In the fourth position, with the switch-arm resting on the contacts c^4 and b^5, one of the resistance-coils d^2 will be connected in circuit and one-third of the total resistance cut in, it being understood that no circuit-wire connects with the contact b^5. In said fourth position of the switch-arm a a single path for the current will be established as follows: a^2 a a^3 c^4 10 d^2 12 c. In the fifth position, with the switch-arm resting on the contacts c^5 and double contacts b^6 b^7, two of the resistance-coils d d' will be connected in parallel with each other and in series with the third resistance-coil d^2, and one-half of the total resistance will be cut in. In said fifth position of the switch-arm a the paths for the current will be as follows: a^2 2 d 4 b^6 a^4 b^7 10 d^2 12 c and a^2 a a^3 c^5 8 d' 6 to 4 and thence by b^6 a^4 b^7 10 d^2 12 to c. In the sixth position, with the switch-arm resting on the single contact c^6 and double contacts b^8 b^9, two of the resistance-coils d d^2 will be connected in series and two-thirds of the total resistance will be cut in, it being understood that no circuit-wire connects with the contact c^6. In said sixth position of the switch-arm a the path of the current will be established as follows: a^2 2 d 4 b^8 a^4 b^9 10 d^2 12 c. In the seventh position, with the switch-arm resting on the contacts c^7 and b^{10} b^{11}, all of the resistance-coils will be connected in series, and thereby the total resistance will be cut in, it being understood that no circuit-wire is connected to contact c^7. In said seventh position of the switch-arm a the path of the current will be established as follows: a^2 2 d 6 d' 8 b^{10} a^4 b^{11} 10 d^2 12 c. I do not, however, desire to limit my invention to this particular arrangement of circuit-wires.

As resistance-coils I have herein represented ordinary incandescent lamps of a known resistance; but in lieu thereof any other form or construction of resistance-coils may be employed.

By means of the rheostat the amperage of the current may be controlled.

The contacts herein shown to which no circuit-wires are connected are provided as rests for the switch-arm a.

I claim—

1. In a rheostat, a number of resistance-coils, two series of contacts, a movable two-armed switch, one arm of which is insulated from the other arm and coöperates with one series of contacts while the other arm coöperates with the other series of contacts, and circuit-wires connecting said contacts with the resistance-coils and with one of the arms of the switch, substantially as described.

2. In a rheostat, a number of resistance-coils, two series of contacts, some of which are single contacts and others double contacts, a movable two-armed switch, one arm of which is insulated from the other arm and coöperates with one series of contacts while the other arm coöperates with the other series of contacts, and circuit-wires connecting said contacts with the resistance-coils and with one of the arms of the switch, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NATHAN H. SUREN.

Witnesses:
B. J. NOYES,
J. L. HUTCHINSON