No. 615,419. Patented Dec. 6, 1898.

C. WIRT.

RHEOSTAT.

(Application filed July 26, 1897.)

(No Model.) 3 Sheets—Sheet 1.

FIG. 1.

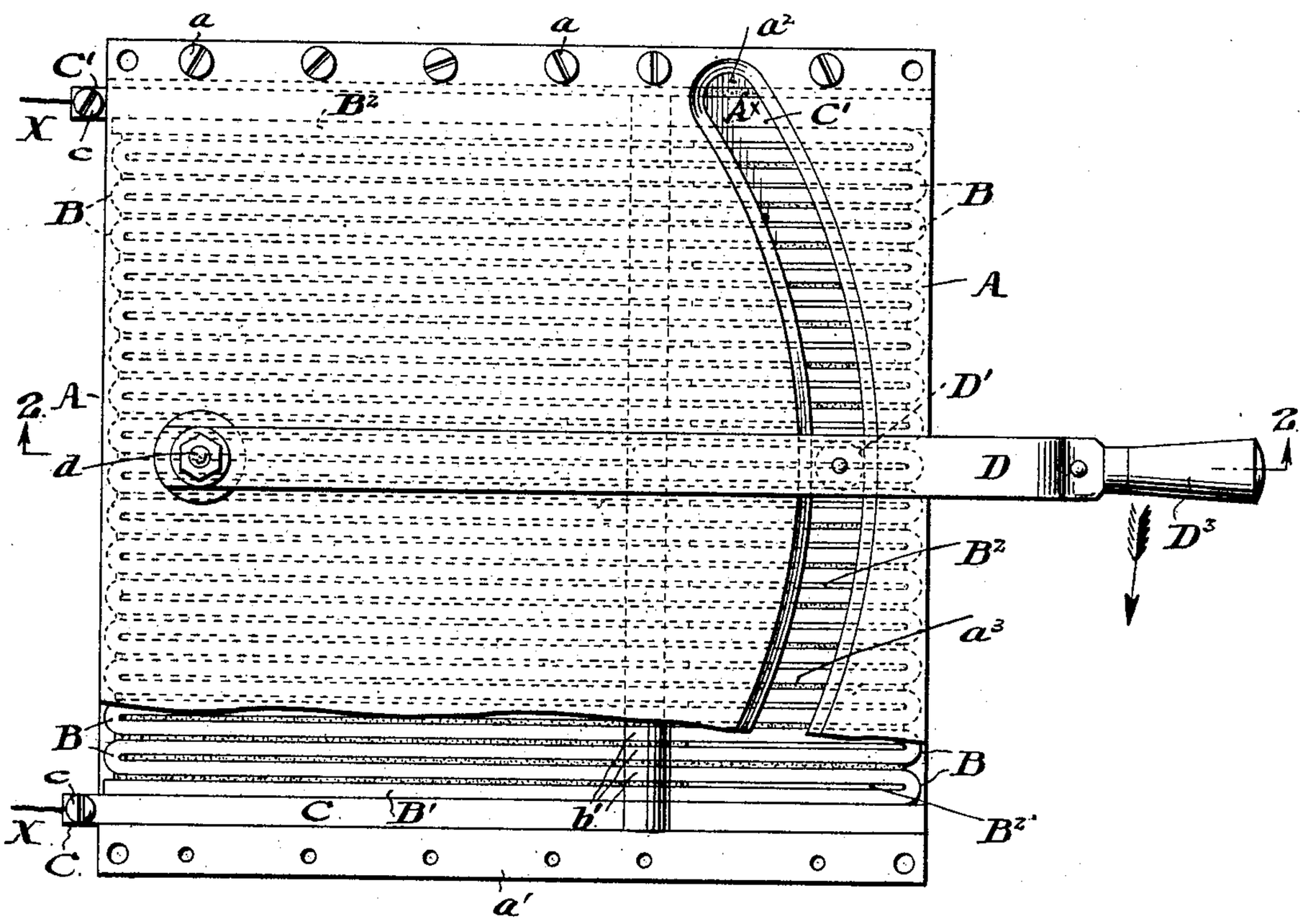


FIG. 2.

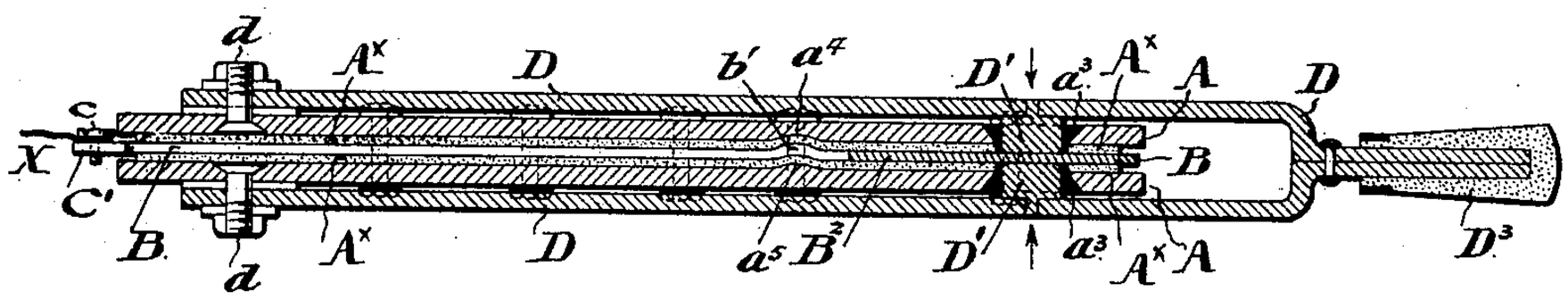
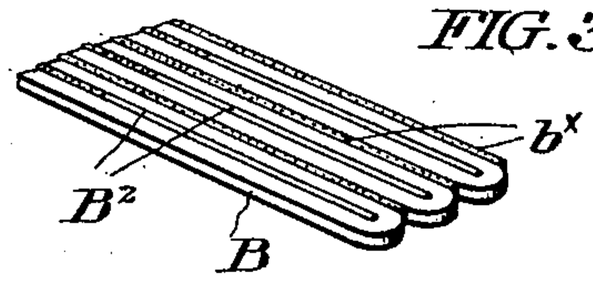


FIG. 3.



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(No Model.) 3 Sheets—Sheet 2.

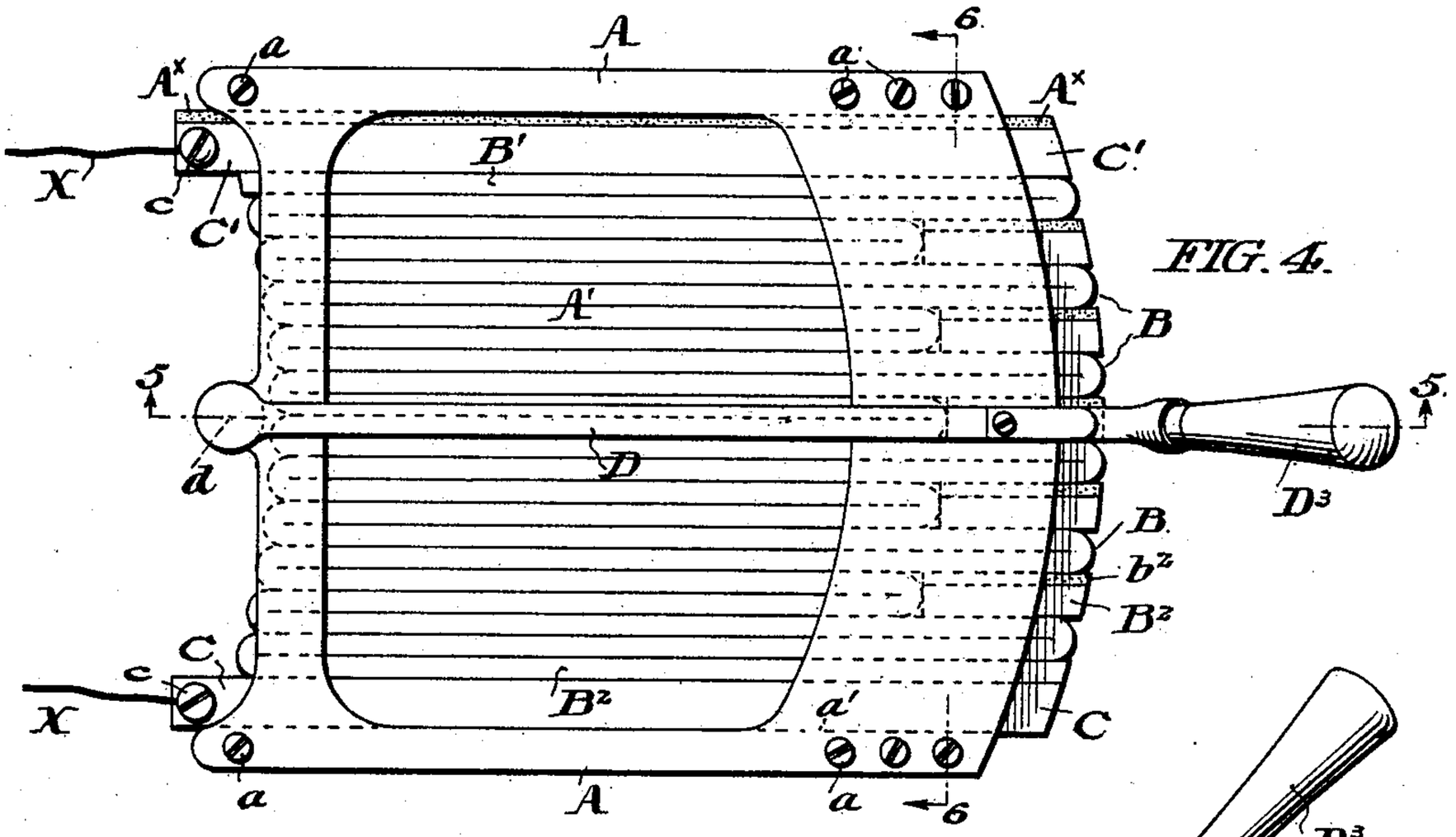


FIG. 4.

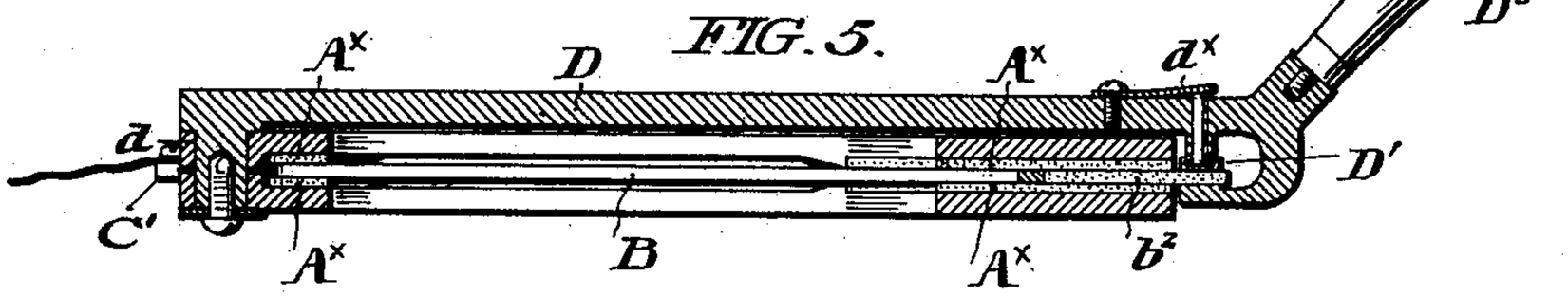


FIG. 5.

FIG. 6.

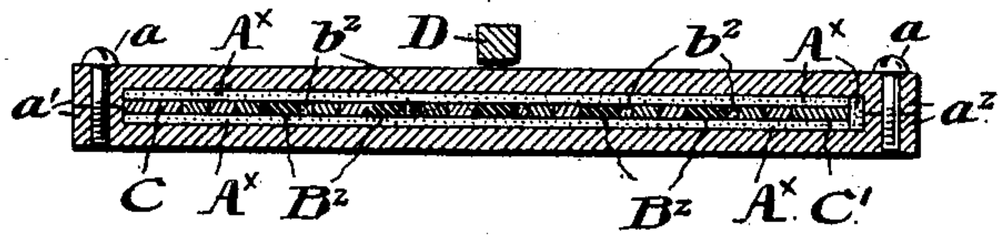
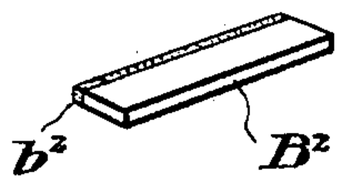


FIG. 7.



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No. 615,419. Patented Dec. 6, 1898.

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RHEOSTAT.

(Application filed July 26, 1897.)

(No Model.) 3 Sheets—Sheet 3.

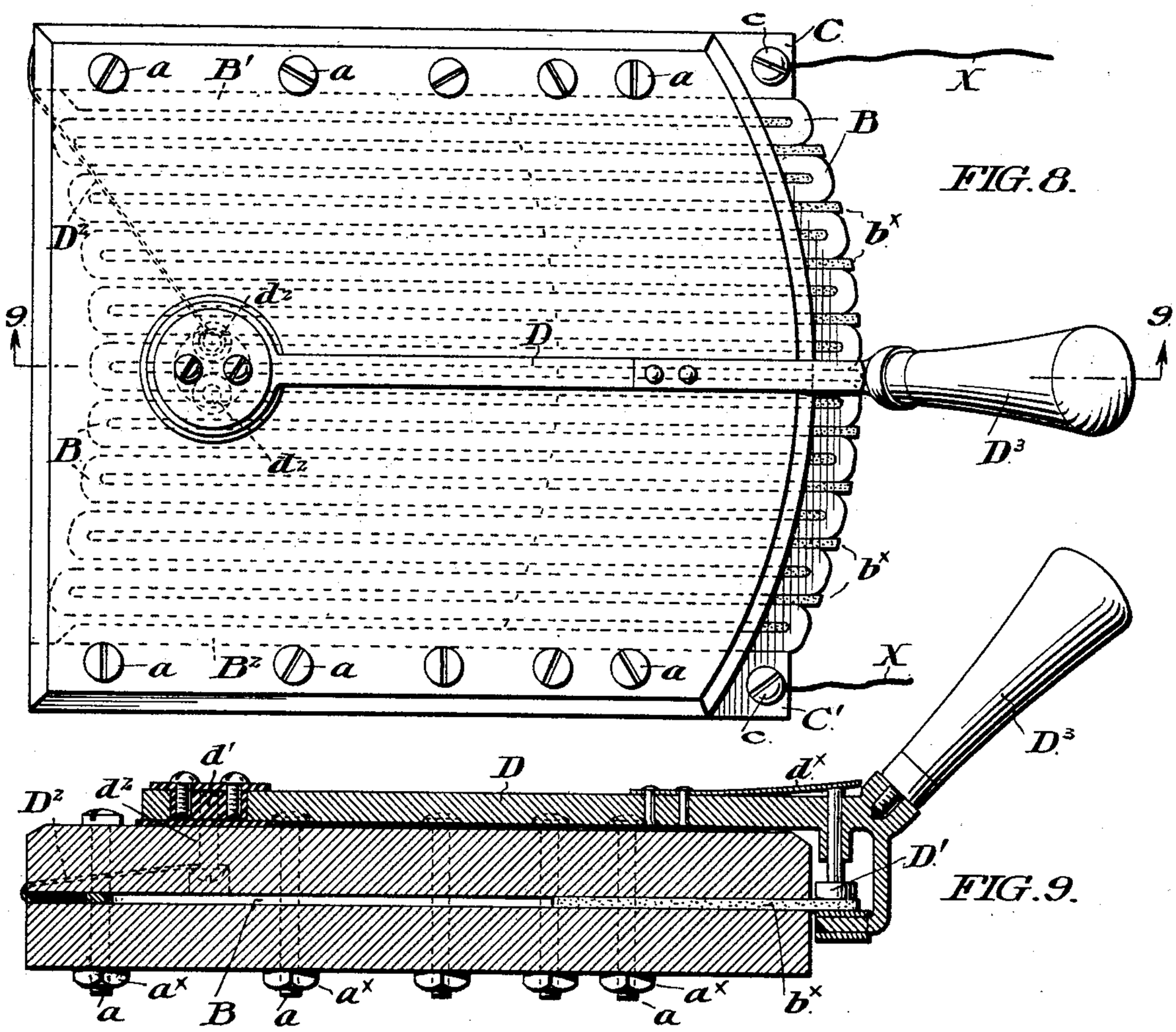


FIG. 8.

FIG. 9.

FIG. 10.

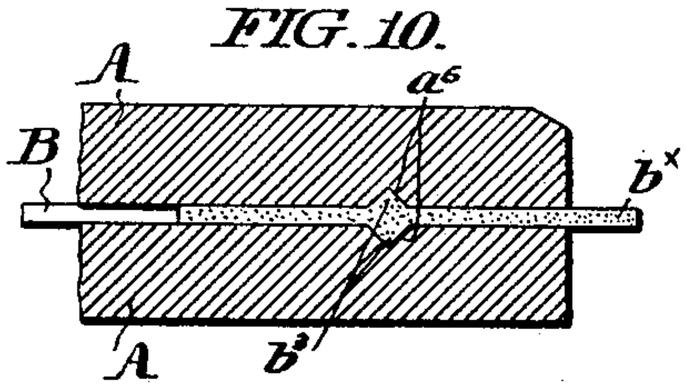


FIG. 12.

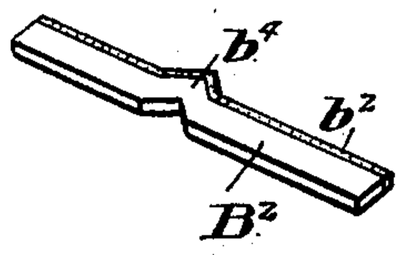


FIG. 11.

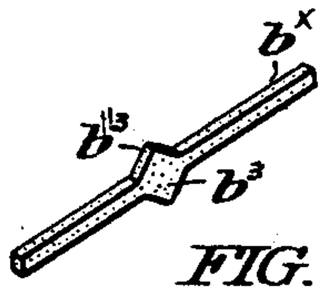
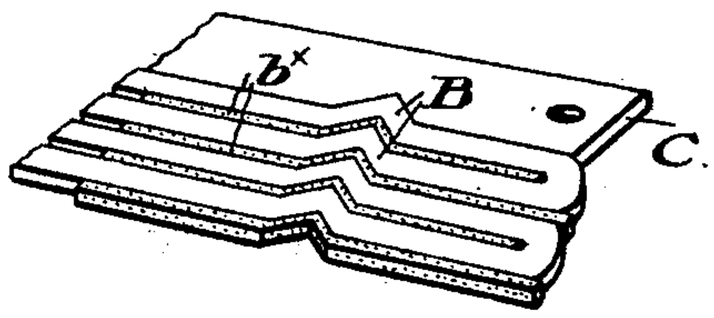


FIG. 13.



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RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 615,419, dated December 6, 1898.

Application filed July 26, 1897. Serial No. 646,037. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WIRT, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Rheostats, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to rheostats adapted for the control of currents of large amperage and to that class of such devices wherein a conductor consisting of a strip of material folded upon itself and suitably insulated comprises the path of electrical resistance. As ordinarily constructed said folded conductor is separate from the commutating device by which the effective resistance of the rheostat is changed, said conductor being subdivided and placed in circuit with the commutating device by means of wiring connections.

It is the object of my present invention, first, to lessen the cost of construction of a rheostat by dispensing with a commutator, and, second, to use a single continuous conductor for the path of electrical resistance, dispensing with wire connections and joints.

Aside from the consequent lessening of the cost of construction, the second feature above mentioned is valuable for the reason that failures in the ordinary forms of rheostats often occur at said joints.

Broadly speaking, my invention comprises a casing adapted to resist a high temperature, a continuous strip of conducting material folded and fixed within said casing, a movable contact member mounted upon said casing, and means to shift said contact member in direct electrical contact with the successive folds of said conductor. The various parts enumerated are so arranged that said contact member serves to short-circuit or otherwise cut out a part of said conductor, and thus alter the effective resistance of the device as a whole.

My invention also comprises certain novel features of construction, such as means to prevent creeping of the folded conductor within the casing, means for keeping down the temperature of that portion of the conductor traversed by the movable contact, and means for obtaining a double contact upon opposite sides of said conductor, as hereinafter described.

In the drawings, Figure 1 is a plan view of a convenient form of my invention. Fig. 2 is a central section of the device shown in Fig. 1, section being taken on the line 2 2 of said figure. Fig. 3 is a fragmentary perspective detail of a portion of the folded conductor and its insulation. Fig. 4 is a plan view of a modified form of my invention. Fig. 5 is a sectional view of the device shown in Fig. 4, section being taken on the line 5 5 in said figure. Fig. 6 is a sectional view of the device shown in Figs. 4 and 5, section being taken on the line 6 6 in Fig. 4. Fig. 7 is a perspective view of a detail of the device shown in Figs. 4, 5, and 6. Fig. 8 is a plan view of a modified form of my invention. Fig. 9 is a sectional view of the device shown in Fig. 8, section being taken on the line 9 9 in said figure. Figs. 10, 11, 12, and 13 show modifications in the details of construction.

Similar letters indicate corresponding parts in the several figures.

Referring to the form of my invention shown in Figs. 1, 2, and 3, A A are plates of metal connected by screws a, provided with nuts $a^{\times}$, said screws being passed through side pieces a' a^2. Said plates and side pieces form a casing for the folded conductor B.

The conductor B consists of a continuous length of metallic ribbon folded upon itself, as indicated in Fig. 1, the terminal folds B′ B² of said conductor being respectively in electrical contact with the terminal pieces C C′.

The conductor B, which forms the path of electrical resistance aforesaid, is mounted in the casing, so as to be separated therefrom by a layer of insulating material A$^{\times}$, except at its extremity B², the terminal piece C in contact with said extremity being also in contact with the side piece a'. The terminal piece C being thus in electrical connection with the casing, a shunt connection is made from the end B′ of the conductor B through said terminal piece C and the casing-plate A to a contact-lever D, pivotally mounted upon the casing-plates A A, as indicated at d d. The forward end of said lever D is conveniently provided with an insulating-handle D³.

Slots a^3 a^3, concentric with the pivot of the lever D, extend through the opposed plates A A and through the layers of insulating ma-

terial $A^{\times}$ to the opposite surfaces of the folded conductor B. In this form the lever D is composed of resilient material and is provided with contact members D′ D′, which are entered in said slots a^3 a^3, pressing directly upon the opposite surfaces of the folded conductor B, as indicated by the arrows in Fig. 2.

Certain portions of the conductor B extending beneath the slots a^3 a^3 are provided with contact-pieces B^2, which are inserted between alternate adjoining folds, as indicated in Fig. 3. Said contact-pieces insure a good surface of contact for the spring contact members D′ D′, reducing the local resistance, thus preventing undue heating of the conductor-folds at the portions traversed by said members. The bights of the conductor B which inclose said contact-pieces B^2 are separated from each other by the insulating material $b^{\times}$.

It is obvious that if the device above described is connected in the circuit x x by means of the terminal screws c c a minimum resistance will be offered to the passage of a current through the said circuit when the contact-lever D is swung to the extremity of the slots a^3 into direct contact with the terminal piece C′, (see Fig. 1,) for the reason that in said position the lever D, being in shunt connection, as above described, serves to short-circuit the current from one to the other of said terminal pieces C C′. It is also obvious that as said contact-lever is shifted in the direction of the arrow upon Fig. 1 said lever D short-circuits a successively-lessening number of said folds until in its extreme movement in said direction it is brought into contact with the terminal piece C, and the current in the circuit X is compelled to follow the entire length of the folded conductor B.

The form of my invention just described may be advantageously used in exposed positions; but for cheapness of construction the form illustrated in Figs. 4, 5, 6, and 7 is preferable. In the latter form the lever D is rigid, and the contact member D′, being provided with a spring $d^{\times}$, bears upon the folds of the conductor B which protrude beyond the edge of the casing-plates A A.

As indicated in Fig. 4, the alternate bights of the conductor B at the contact ends of the folds are formed some distance within the casing-plates A A, and in the space thus provided contact-pieces B^2 and insulating-pieces b^2 are inserted for the purpose above set forth. In this form of my device the side pieces a', which serve to confine the conductor B, are made integral with the plates A A, as indicated in Fig. 6.

In the form shown in Figs. 8 and 9 the plates A A of the casing consist of slabs of insulating material, such as slate, so that the insulating material $A^{\times}$ is dispensed with. In the latter form the terminal pieces C C′ form the sides of the casing and serve to confine the folded conductor B, the screws a a, passing directly through the terminal pieces C C′, being secured by nuts $a^{\times}$ upon their lower extremities.

As indicated in Fig. 9, the lever D is pivoted upon a stud d', secured to the upper plate A by means of screws d^2 passing through the latter. The lever D is electrically connected with the terminal piece C, as indicated at D^2.

A convenient construction to prevent creeping of the conductor B during its contraction and expansion is illustrated in Fig. 2. In said form the folded conductor B is struck up in a line across its plane, and the humps b' upon the individual folds of said conductor are engaged by a corresponding groove a^4 and a ridge a^5 upon the upper and lower plates A A, respectively.

In the forms shown in Figs. 10 and 11 the folded conductor B is not struck up, as above described, but the insulating-pieces $b^{\times}$ are provided with lugs b^8, which are entered in grooves a^6 in the respective plates A A. In said form the insulating-pieces $b^{\times}$ serve to retain the folded conductor B in proper position by frictional contact with the latter, the lugs b^8 b^8 being of course in fixed relation with the casing-plates A A.

As indicated in Fig. 12, the contact-pieces B^2 and insulating-pieces b^2, described in connection with the form illustrated in Figs. 4, 5, and 6, may be bent laterally, as indicated at b^4 in Fig. 12, the engagement of said lateral bends with similar bends in conductor B serving to prevent the aforesaid creeping action of the conductor B.

As indicated in Fig. 13, the conductor may be thus bent laterally together with the insulating-pieces $b^{\times}$, the interlocking engagement of the bends in the respective folds serving the same end.

I prefer to construct my invention, as above described, with the lever D in shunt connection with one extremity of the folded conductor B. It is, however, obvious that said shunt connection may be omitted and the lever D directly connected with the exterior circuit X.

It is obvious that various modifications may be made in the details of construction of my invention without departing from its essential features. I therefore do not desire to limit myself to the precise embodiment thereof which I have shown and described.

I claim—

1. In a rheostat the combination with a casing, of a continuous electrical conductor folded within said casing, fixed contact-pieces intermediate of said folds, a movable contact member mounted upon said casing, and means to shift said member in direct contact with the successive folds of said conductor, substantially as set forth.

2. In a rheostat the combination with a casing, of an electrical conductor folded within said casing, fixed contact-pieces intermediate of the folds of said conductor, means to insulate the folds of said conductor, a mov-

able contact member mounted upon said casing, and means to shift said member in direct contact with the portions of the successive folds of said conductor, provided with the said intermediate fixed contact-pieces, substantially as set forth.

3. In a rheostat the combination with a casing, of a continuous strip of electrical conducting material, folded within said casing, a contact-lever pivoted upon said casing, a slot in said casing concentric with the pivot of said lever, a contact member upon said lever entered in said slot, in direct contact with the strip of conducting material, and means to shift said member in direct contact with the successive folds of said conductor, substantially as set forth.

4. In a rheostat the combination with a casing, of successive folds of electrical conducting material in series circuit within said casing, detents to secure said conducting material in fixed relation with said casing, a movable contact member, mounted upon said casing, and means to shift said member in direct contact with the successive folds of said conductor, substantially as set forth.

CHARLES WIRT.

Witnesses:
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