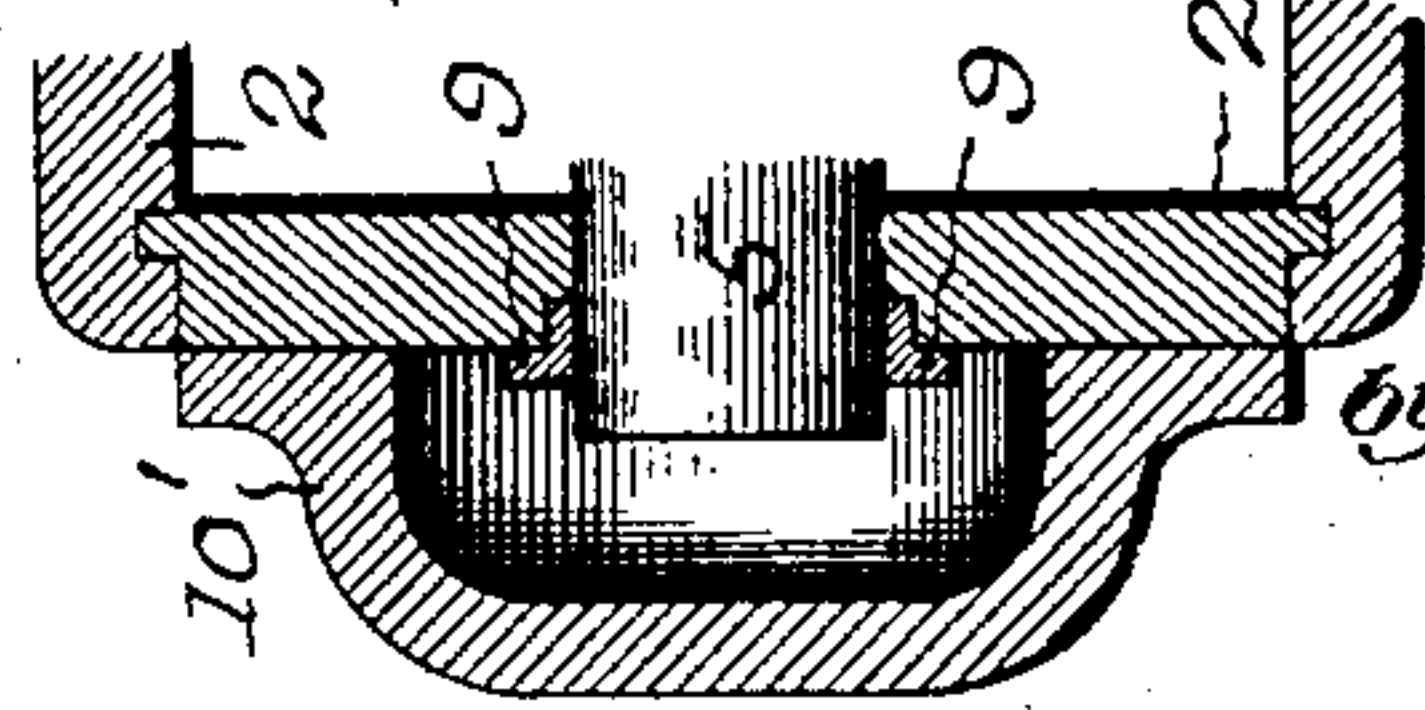
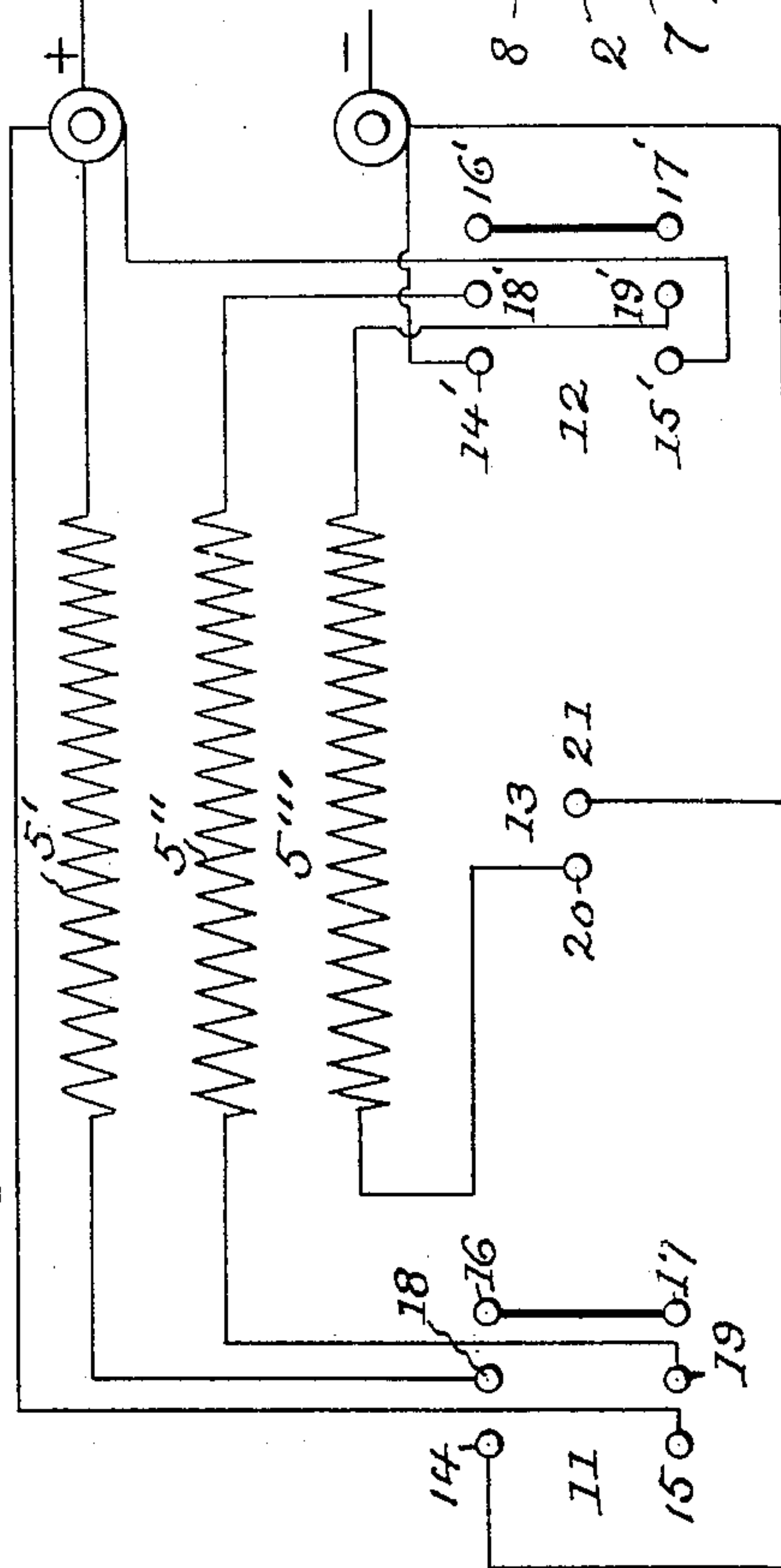
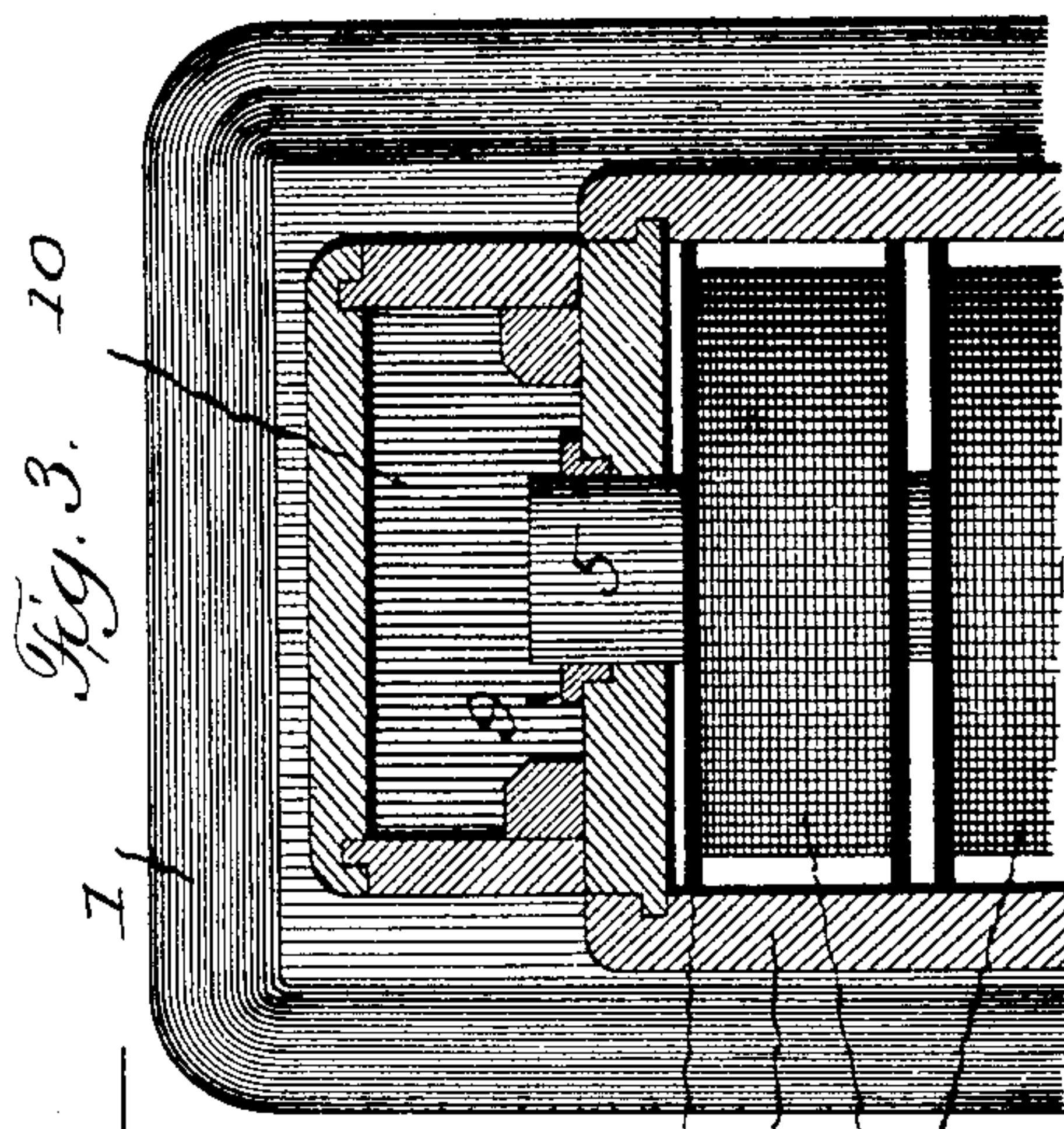
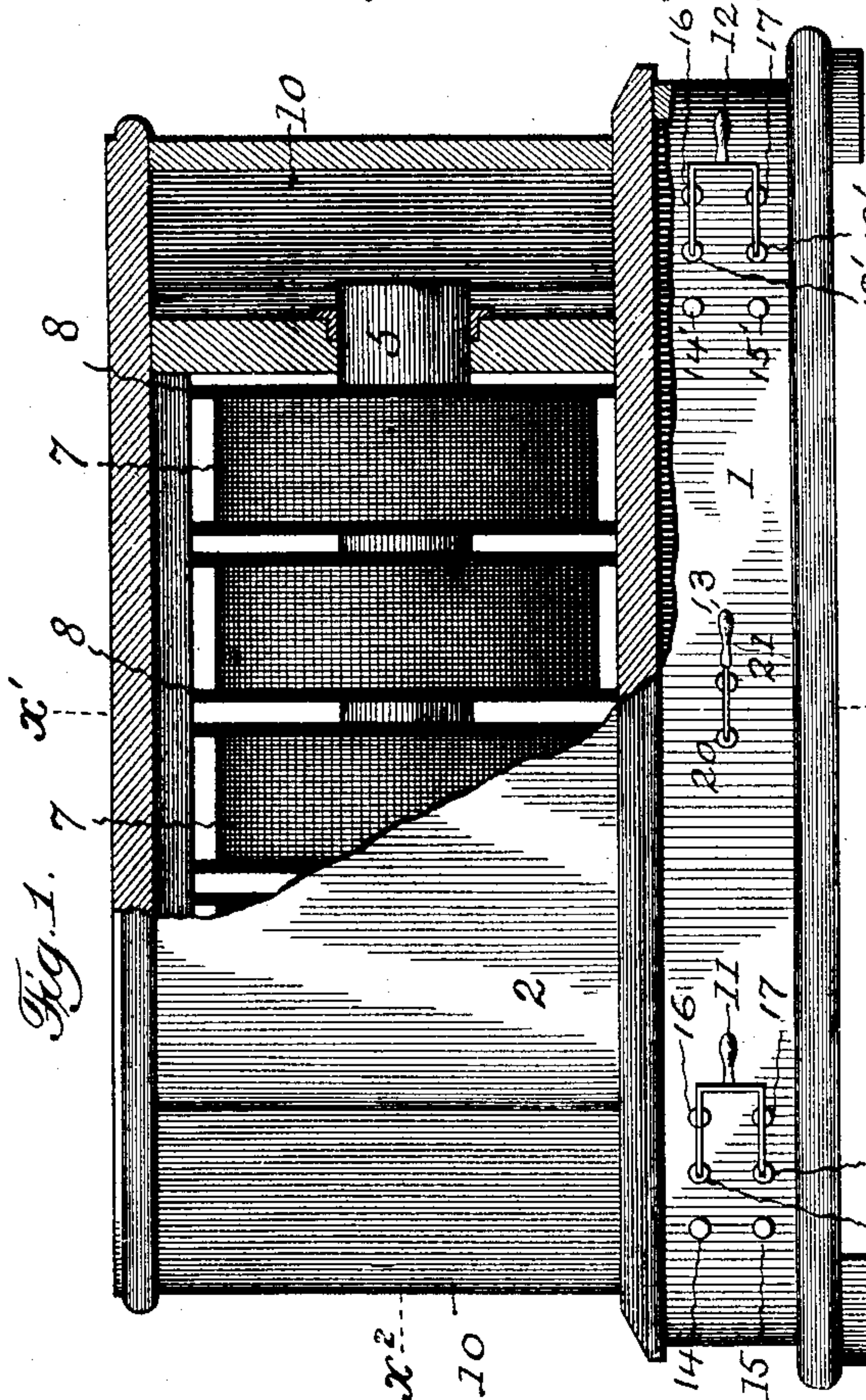
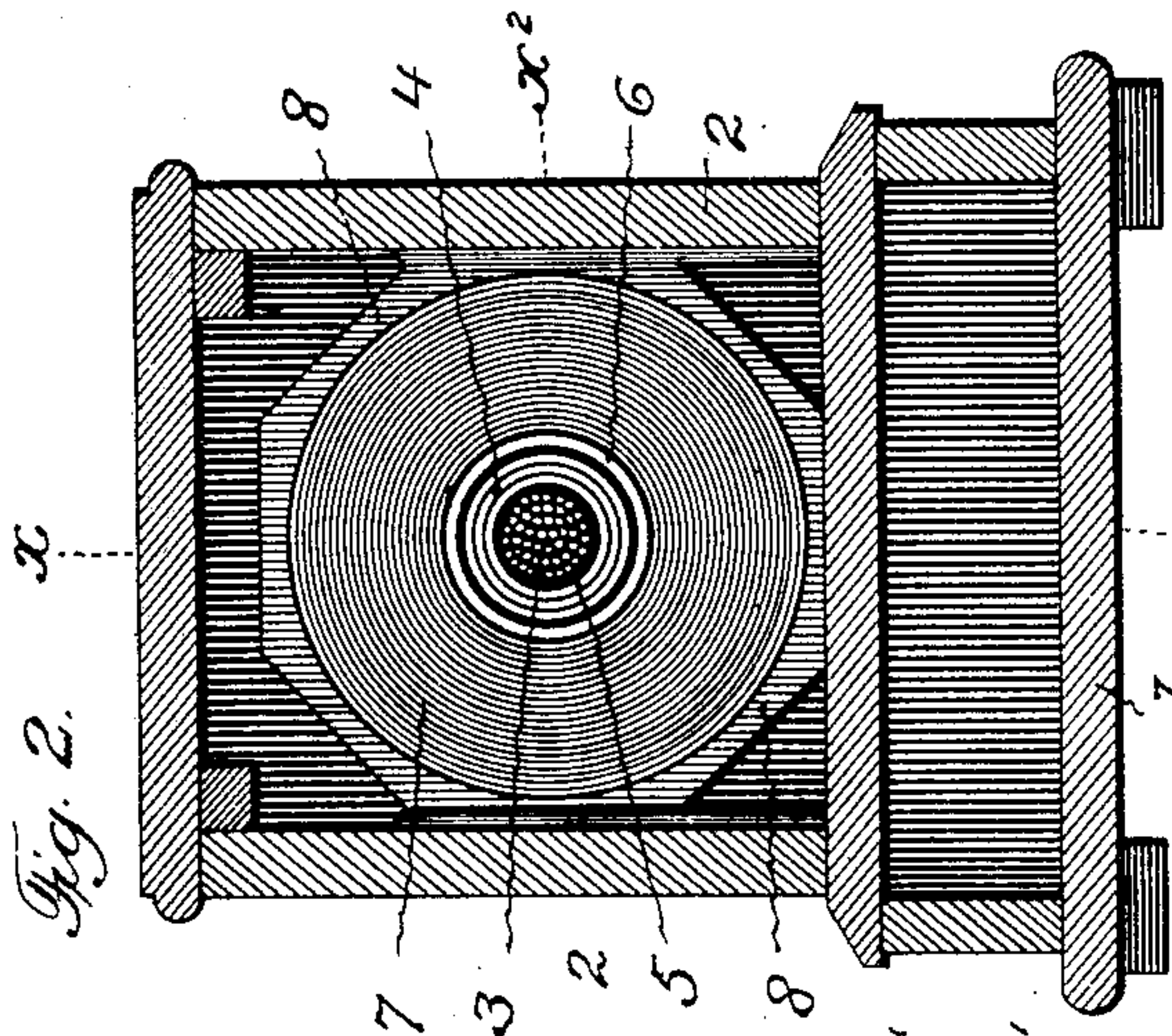


W. SCHEIDEL.
INDUCTION APPARATUS.

(Application filed Jan. 23, 1902.)

(No Model.)



Attest:
John Enders Jr.
Henry A. Kott

Fig. 5.

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UNITED STATES PATENT OFFICE.

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INDUCTION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 702,032, dated June 10, 1902.

Application filed January 23, 1902. Serial No. 90,883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SCHEIDEL, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Induction Apparatus, of which the following is a specification.

The present invention relates to induction-coils for use in the production of Roentgen rays and other like high-tension discharges; and the objects of the present improvement are to provide a simple, durable, and efficient construction of parts with which a ready disassemblage and reassemblage of the parts can be conveniently attained for the purpose of repair, replacement, and the like, all as will hereinafter more fully appear, and be more particularly pointed out in the claims. I attain such objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation, partly in longitudinal section at line $x x$, Fig. 2, of an induction apparatus embodying the present invention; Fig. 2, a transverse section at line $x' x'$, Fig. 1; Fig. 3, a fragmentary horizontal section at line $x^2 x^2$, Figs. 1 and 2; Fig. 4, a diagrammatic view showing the windings of the primary coils and the switches for coupling the same in various combinations, as required. Fig. 5 is a detail longitudinal vertical section illustrating a modification of the construction shown in Figs. 1 and 3.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 represents a chambered base, in which the condenser, as well as the wiring or circuits of the apparatus, is arranged as hereinafter described.

2 is a closed box or chamber superimposed on the base 1 and formed of any usual insulating material.

3 is the usual core of soft-iron wires, arranged in parallel relation to form a cylindrical body.

4 is the primary coil, wound outside of the soft-iron core 3 and upon the insulating-tube 5, which incloses such core. Such primary coil will in the present invention consist of a number of separate and independent wind-

ings, usually three in number, and which are connected to the series of controlling-switches, as hereinafter more fully described.

6 is a tube of high-insulating material surrounding the primary coil and separating the same from the secondary coil of the apparatus.

7 is the secondary coil, preferably in the form of a series of separate bobbins connected in series and arranged to encircle the primary coil and its inclosing tube, as shown in Fig. 2 of the drawings.

Both coils and their accessories, as above described, are arranged within the closed box or chamber 2, and the spaces left unoccupied within the chamber are filled with a liquid or semiliquid mass of insulation for a better maintenance of the insulation of the different parts of the coils.

The present invention involves an arrangement of the primary and secondary coils in which the respective coils are supported entirely separate and independent of each other in order to permit of a ready and convenient dismemberment of the coils for the purpose of removal, repair, and replacement of any particular part which may become accidentally disabled. This I attain in a very simple and effective manner by supporting in an independent manner the series of bobbins comprising the secondary coil of the apparatus upon the bottom and against the sides of the main casing 2 by means of the insulating end plates 8 of such bobbins resting upon and against the bottom and sides of the casing 2, as illustrated in Fig. 2, and by supporting in a like independent manner the primary coil of the apparatus on or in the end walls of the main casing 2 by means of suitable supports formed in or secured to said end walls. In Figs. 1 and 3 of the drawings I have shown openings or orifices of the required diameter in the end walls for receiving and supporting the respective ends of such primary coil, and this construction is preferred, in that it affords a ready means for the removal and subsequent replacement of such primary coil in an endwise manner from the interior of the series of bobbins which compose the secondary coil, and with such removal of the primary coil a ready and convenient removal

and replacement of one or more of such secondary bobbins can be effected for purposes of repair and the like.

9 represents annular packing-rings surrounding the ends of the primary coil and fitting a counterbore of the openings in the end walls of the casing to prevent leakage of the fluid or semifluid insulation in the main casing at such points.

10 represents end housings or auxiliary casings detachably secured to the ends of the main housing and adapted to inclose the projecting ends of the primary coils. Such housings may be of any required shape or dimensions as the judgment or taste of the designer may dictate. In Fig. 5 I show a circular cup-shaped piece 10' for inclosing an end of the primary coil, while in Figs. 1 and 3 I show a box-shaped housing extending the full height of the casing and adapted to constitute a conduit for the different wires or conductors from the primary coil to the series of controlling circuits and switches in and on the base portion of the apparatus.

25 The apparatus illustrated in the drawings illustrates a system of current-control for the series of independent windings of the primary coil of the apparatus and with which such windings can be connected and controlled to operate either with a single winding in circuit or with two or more windings in circuit and arranged either in series or parallel, as desired, and with such range of control enable the apparatus to be used on various types of electric currents, which may be found convenient for use in energizing the apparatus.

In the construction shown in the diagram view Fig. 5 of the drawings as illustrative of this part of the present invention a construction is shown involving three sets of primary windings composing the primary coil of the apparatus and a corresponding number of controlling-switches. The scope of the present invention, however, is not limited to such number of constituent elements of the system, but may be increased at will with a corresponding increase in the parts, as will be readily apparent to those skilled in the present art. Referring to such diagram view, 5' 5'' 5''' are the series of windings of the primary coil of the apparatus and 11, 12, and 13 the series of handles or levers of the controlling-switches. Of such switches the pair to the right and left will be of the double-pole and double-throw type, while the center switch will be of the single-pole single-throw type. 14, 15, 16, and 17 are the side contacts or terminals of the switch shown to the left in Fig. 5, and 18 and 19 are the central terminals of said switch, to which the double-throw switch-lever 11 has pivotal and electrical connection. 14', 15', 16', and 17' are the side contacts or terminals of the switch shown to the right in Fig. 5, and 18' and 19' are the central terminals of said switch, to which the double-throw switch-lever 12 has pivotal and electrical con-

nection. 20 is the side contact or terminal of the central switch, and 21 the companion terminal thereof and to which the single-throw switch-lever 13 has pivotal and electrical connection.

The connections of the series of primary windings with the aforesaid terminals and with the feed and return-line wires are as follows: The feed-wire connects directly with one end of the primary winding 5', by branch connection with the terminal 15 of the left-hand switch, and by similar branch connection with the terminal 15' of the right-hand switch. The return-wire connects by branch connections with the terminal 14 of the left-hand switch and with the terminal 14' of the right-hand switch. The primary winding 5' has one end connected directly with the feed-wire, as before described, while the other end has a line connection with the terminal 18 of the left-hand switch. The primary winding 5'' has one end connected by line connection with the terminal 19 of the left-hand switch, while the other end has line connection with the terminal 18' of the right-hand switch. The primary winding 5''' has one end connected by line connection with the terminal 20 of the central switch, while the other end has line connection with the terminal 19' of the right-hand switch.

As so connected the operation is as follows: To place the single primary winding 5' in the working circuit, the left-hand switch-lever 11 is moved to the left to contact with the terminals 14 and 15, the other switches being left open. To place the primary windings 5' and 5'' in the working circuit and in series therein, the left-hand switch-lever 11 is moved to the right to contact with the connected terminals 16 and 17, the right-hand switch-lever 12 is moved to the left to contact with the terminals 14' 15', and the central switch is left open. To place the primary windings 5' and 5'' in the working circuit and in parallel therein, the left-hand switch-lever 11 is moved to the left to contact with the terminals 14 15, the right-hand switch is moved to the right to contact with the connected terminals 16' 17', and the central switch is left open. To place the three primary windings 5', 5'', and 5''' in the working circuit and in series therein, the left-hand switch-lever 11 is moved to the right to contact with the connected terminals 16 and 17, the right-hand switch-lever 12 is moved to the right to contact with the connected terminals 16' 17', and the central switch-lever 13 is moved to the left to contact with the terminal 20. To place the three primary windings 5', 5'', and 5''' in the working circuit and in parallel therein, the left-hand switch-lever 11 is moved to the left to contact with the terminals 14 15, the right-hand switch-lever 12 is moved to the left to contact with the terminals 14' 15', and the central switch-lever is moved to the left to contact with the terminal 20.

Having thus fully described my said inven-

tion, what I claim as new, and desire to secure by Letters Patent, is—

1. In an induction apparatus, the combination of an inclosing casing, a secondary coil composed of a series of bobbins supported independently in the interior of said casing, and a primary coil arranged centrally within the secondary coil and supported at its ends independently of the secondary coil, substantially as set forth.

2. In an induction apparatus, the combination of an inclosing casing, a secondary coil composed of a series of bobbins supported independently in the interior of said casing, and a primary coil arranged centrally within the secondary coil and supported at its ends independently of the secondary coil by means of orifices formed in the end walls of the main casing, substantially as set forth.

3. In an induction apparatus, the combination of an inclosing casing, a secondary coil composed of a series of bobbins supported independently in the interior of said casing, a primary coil arranged centrally within the secondary coil and supported at its ends independently of the secondary coil, and end housings secured to the main casing and inclosing the ends of the primary coil, substantially as set forth.

4. In an induction apparatus, the combination of an inclosing casing, a secondary coil composed of a series of bobbins supported independently in the interior of said casing, a primary coil arranged centrally within the secondary coil and supported at its ends independently of the secondary coil, and end

housings extending the height of the main casing and adapted to inclose the ends of the primary coil and form conduits for the wire connections, substantially as set forth.

5. In an induction apparatus, the combination of an inclosing casing, a secondary coil composed of a series of bobbins supported independently in the interior of said casing, a primary coil arranged centrally within the secondary coil and supported at its ends independently of the secondary coil, the said primary coil comprising a series of independent windings, and a series of switches and connections for coupling more or less of said windings in series or in parallel, substantially as set forth.

6. In an induction apparatus, the combination of an inclosing casing, a secondary coil composed of a series of bobbins supported independently in the interior of said casing, a primary coil arranged centrally within the secondary coil and supported at its ends independently of the secondary coil, the said primary coil comprising a series of independent windings, end housings secured to main casing and inclosing the ends of the primary coil, and a series of switches and connections for coupling more or less of said primary windings in series or in parallel, substantially as set forth.

Signed at Chicago, Illinois, this 20th day of January, 1902.

WILLIAM SCHEIDEL.

Witnesses:

ROBERT BURNS,
HENRY A. NOTT.