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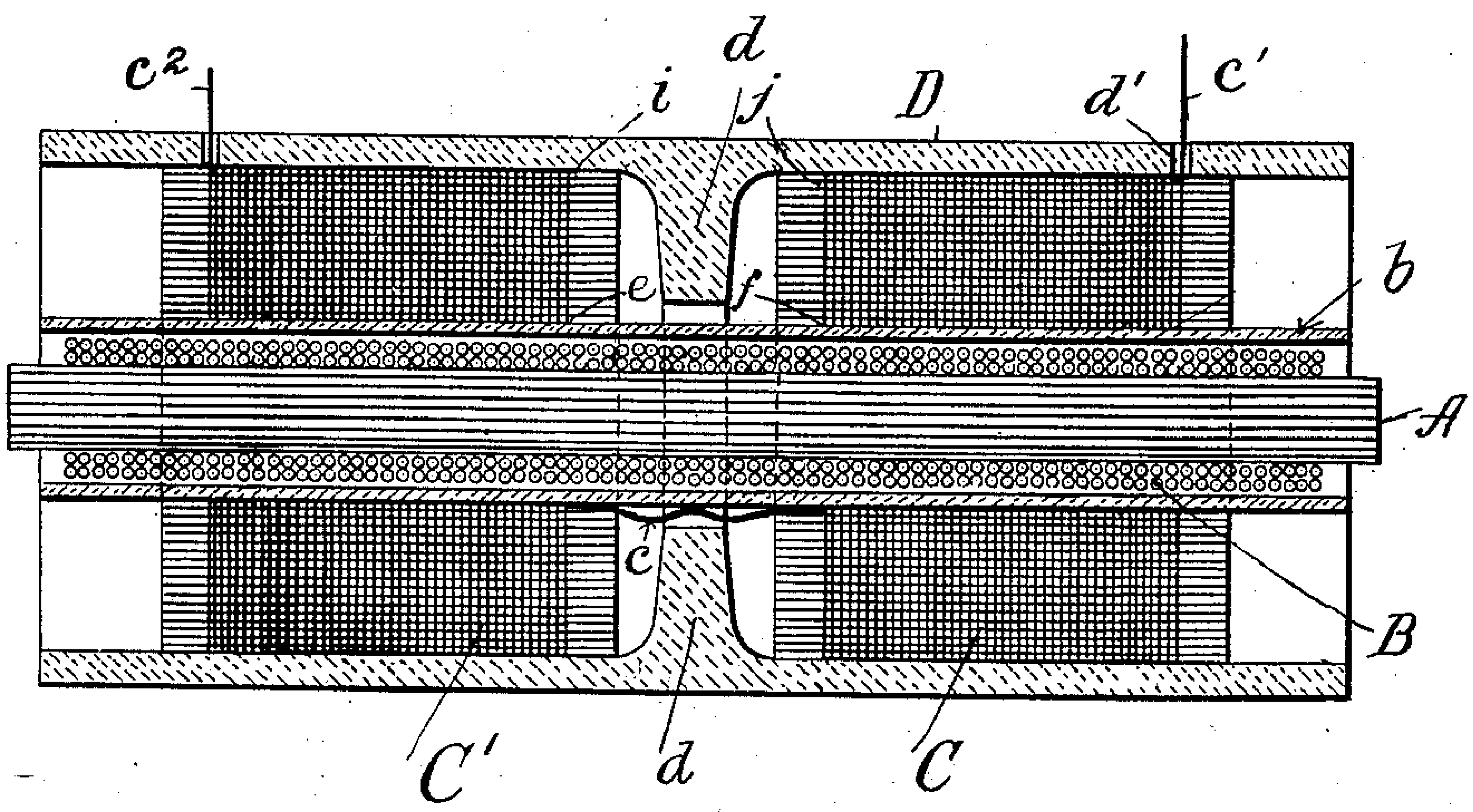
R. VARLEY.

INDUCTION COIL.

APPLICATION FILED DEC. 14, 1903.

NO MODEL.



Witnesses
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No. 757,523. Patented April 19, 1904.

UNITED STATES PATENT OFFICE.

RICHARD VARLEY, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO VARLEY DUPLEX MAGNET COMPANY, A CORPORATION OF NEW JERSEY.

INDUCTION-COIL.

SPECIFICATION forming part of Letters Patent No. 757,523, dated April 19, 1904.

Application filed December 14, 1903. Serial No. 185,027. (No model.)

To all whom it may concern:

Be it known that I, RICHARD VARLEY, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Induction-Coils, of which the following is a full, clear, and exact description.

This invention relates to induction-coils, and has special reference to the construction of spark-coils, wherein high differences of potential are induced between the different portions of the secondary winding.

The object of the invention is to provide a construction wherein the sectional winding of the secondary coil is effectively insulated to the end that striking or discharging between portions of the winding having the greater differences of potential is prevented.

The most approved method of winding secondary coils wherein high potentials are produced is to divide said coils into sections, each insulated from the other, to thereby divide up the total difference of potential between the terminals into fractional parts thereof. These sections are commonly connected together in series, the inner end of one section being connected to the inner end of the next and then isolating the adjoining sections from each other by a disk of insulating material, which thus prevents the potential between opposite layers in each section from jumping across the space between them, such tendency existing to the greatest extent between the two convolutions adjacent to each other on the two outer layers of the sections. The difference of potential between the outer turns of two adjacent sections is so great that the separating-disk often has to be extended considerably beyond the diameter of the sections, so that the distance from section to section around the edge of the disk will be greater than the striking distance of the potential difference between the two sections. To thus increase the diameter of the disks makes a cumbersome structure, since the total size of the coil with its casing necessarily becomes much larger. Furthermore, the open space around the outer edge of the disk is liable to be bridged accidentally or unintentionally while the coil is in use, which results in the disablement of the coil at once.

The object of my invention is to retain the same style of sectional winding of the secondary and the same method of connecting the sections together in series, while at the same time providing for the insulation and separation of the outer turns of the sections by a barrier which cannot by any possibility be circumvented or bridged by any difference of potential that may be induced between the sections. In accomplishing this object I surround the sections of the secondary winding by a sleeve or cylinder of insulating material, such as porcelain or glass, said cylinder or sleeve having an inwardly-projecting flange which enters the space between adjacent sections of the winding, penetrating the same as far as the inner diameter of the sections. Thus there is no space through the air over which the potential between the outer turns of the sections can discharge, except the space which leads inward and around the inner edge of said flange, which distance is too great to be spanned by such differences of potential as may be induced between the sections. Owing to the interior location of this space, its conductivity cannot so readily be modified by extraneous elements or accidents. Furthermore, by directing the air-space inward instead of outward the total size of the structure is much less.

A construction embodying my invention is illustrated in the accompanying drawing, in which the figure is a longitudinal section of an induction-coil with the supporting-heads omitted.

A is the core of the coil, consisting, as usual, of a cylindrical bunch of iron wire.

B is the primary winding, consisting of a few layers of coarse wire wound upon the core.

b is an insulating-tube of glass, porcelain, fiber, or other suitable material closely embracing the primary winding.

C and C′ indicate the secondary winding of fine wire divided into two sections. The inside ends of these two sections are directly connected together, as indicated by the conductor c, which lies directly against the tube b.

D indicates a sleeve or cylinder, preferably of porcelain, although it may be made of glass or other suitable insulating material. The internal diameter of this sleeve is substantially equal to the external diameter of the sections of the secondary winding, and it fits closely around both of them with its ends projecting well over the outer ends of the secondary winding. This sleeve or cylinder is provided with an integral inwardly-projecting flange d, which enters the space between the sections C and C′ from the outside, projecting therein to a distance about equal to the internal diameter of the sections, the flange being, in effect, a disk integral with the sleeve and having a central opening of slightly-greater diameter than and adapted to receive the tube b.

The outer ends c' and c^2 of the secondary winding leave the sections at their extreme outer edges, thus separating to the greatest possible extent the two portions of the secondary winding between which the greatest possible difference of potential exists. To properly support these terminals, I run them through holes d' in the sleeve D, from which they lead to the binding-posts of the apparatus in the usual manner, but always well separated. It will now be seen that the point where the least difference of potential exists is between the two adjacent inner turns of the sections or between e and f. From this point the potential difference increases between the successive layers of the sections to the outer layers between i and j, where the extreme difference of potential exists. The flange d is thus interposed at all points between the adjacent turns of the sections, and as the potential difference increases between the successive layers the distance through the air around the inner edge of the flange correspondingly increases, and for any potential difference between adjacent turns this distance is always greater than its striking or discharging distance. It will thus be seen that I have obtained effective insulation between the sections of the secondary winding without extending the separating-disks to an objectionable extent beyond the outer diameter of the sectional winding.

In conformance with the best practice I have shown the secondary coils wound with sheets of paper g interposed between the layers of wire, with the edges of the paper projecting.

Having described my invention, I claim—

1. In an induction-coil, the combination of a secondary winding divided into sections and a single concentric sleeve or cylinder of insulating material surrounding a plurality of sections of said winding and having an inwardly-projecting flange extending between two adjacent sections of said secondary winding.

2. In an induction-coil, the combination of a secondary winding divided into sections, the inside ends of which are electrically connected, and a sleeve of insulating material surrounding said sections and having a flange extending between them, for the purpose set forth.

In witness whereof I subscribe my signature in presence of two witnesses.

RICHARD VARLEY.

Witnesses:

M. M. CROSWELL,

WILLETT CHADWICK.