No. 654,390. Patented July 24, 1900.

R. A. FESSENDEN.

INDUCTION COIL.

(Application filed Dec. 1, 1899.)

(No Model.) 3 Sheets—Sheet 1.

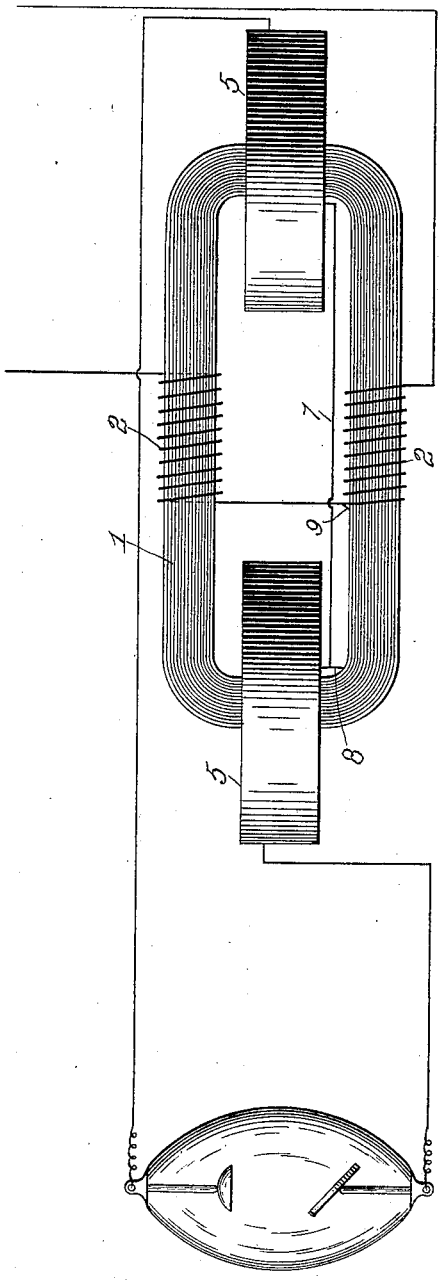

FIG. 1.

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FIG. 2.

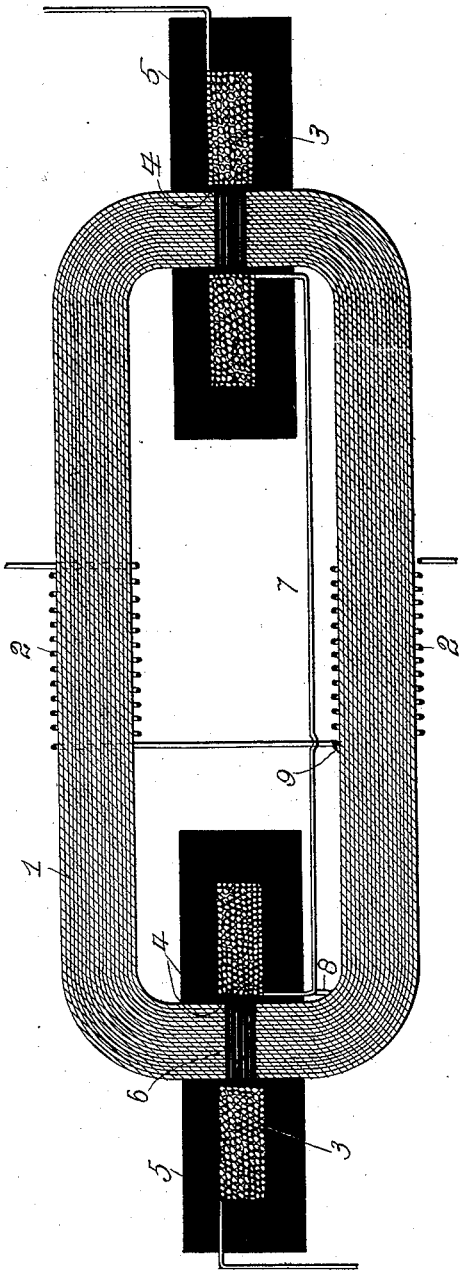

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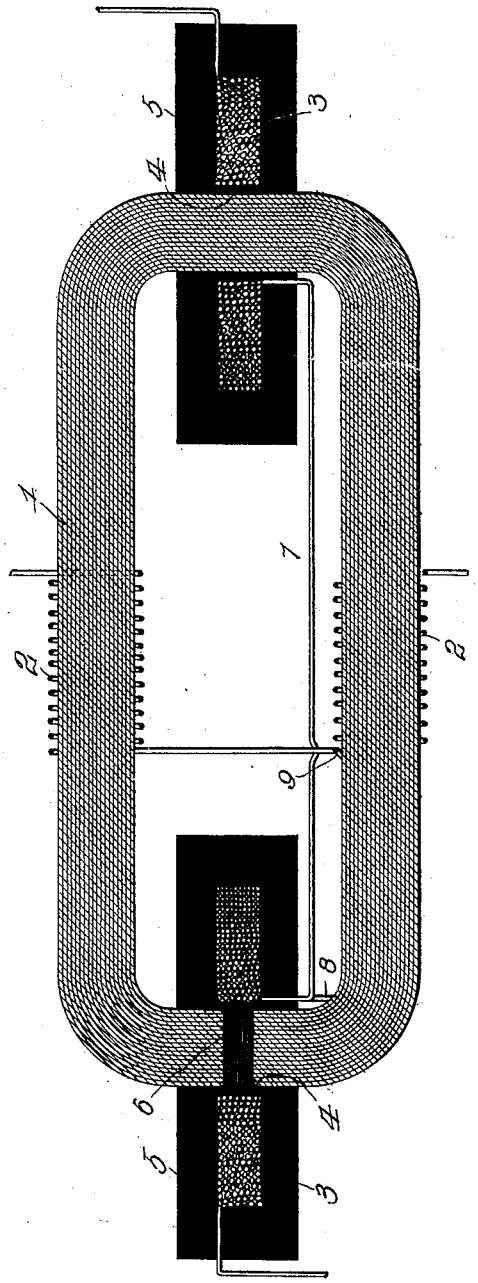
FIG. 3.



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UNITED STATES PATENT OFFICE.

REGINALD A. FESSENDEN, OF ALLEGHENY, PENNSYLVANIA.

INDUCTION-COIL.

SPECIFICATION forming part of Letters Patent No. 654,390, dated July 24, 1900.

Application filed December 1, 1899. Serial No. 738,847. (No model.)

To all whom it may concern:

Be it known that I, REGINALD A. FESSENDEN, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Induction-Coils, of which improvements the following is a specification.

The invention described herein relates to certain improvements in the construction of induction-coils; and the invention has for one object a construction whereby the ends of the core may be brought into close proximity to each other, thus rendering it possible to reduce the primary winding without any reduction in the efficiency of the coil.

It is a further object of the invention to provide for the adjustment of the air-gap between the ends of the core.

It is also an object of the invention to so locate the primary and secondary coils that the latter will not inclose or surround the primary coil, thereby permitting a free radiation of heat from the latter.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view in elevation of my improved coil shown connected in circuit for an X-ray apparatus. Fig. 2 is a sectional view of the coil, and Fig. 3 is a similar view of a modified construction.

In the practice of my invention the core 1 is formed by wrapping iron wire around a suitable former, which may be of suitable shape or contour. The former, with the wire thereon, is then boiled in paraffin or other suitable cementing material, whereby the strands of wire may be cemented into a solid mass. As soon as the cementing material has hardened the annulus (which is not necessarily circular, but may be oblong, square, or of any desired contour) is divided transversely in one, two, or more places, as desired, and the divided annulus or the sections of the annulus are removed from the former. A sufficient number of windings or turns of insulated wire are made around the arms or sections of the divided annulus or core, the windings being connected in series or parallel and forming the primary coil 2. The primary coil or coils do not extend along the entire length of the arms or sections of the core.

The secondary coils 3 are formed, as is customary, by winding fine insulated wire on a suitable spool 4, formed of insulating material, and inclosing the coils in a case or shell 5, of insulating material. While the secondary coils may be arranged at any desired point or points on the core, it is preferred that the ends of the core arms or sections be forced into central openings through the spools and shell of the secondary coils. The ends of core arms or sections within the secondary coils are held the proper distance apart by any suitable means—as, for example, by a block 6, which is preferably made of thin disks of insulating material, so that by insertion or removal of one or more of these disks the distance between the ends of the core arms or sections may be regulated.

While I have shown the core as divided at one or two points, it will be understood by those skilled in the art that it may be divided into one or two sections, if desired, and one or two primary and secondary coils may be used. Where two primary or two secondary coils are used, they are connected in series, as shown at 7.

In order to prevent arcing between the primary and secondary coils, it is preferred to ground such coils on the core, as shown at 8 and 9.

It is characteristic of my improvement that by arranging the ends of the core in comparatively-close proximity to each other there is less resistance in the magnetic circuit, and hence fewer windings are required for the primary circuit for a given efficiency of the induction-coil. By constructing the core in the form of a divided or sectional annulus the adjacent ends of the core may be moved toward and from each other to obtain the highest efficiency.

It will be observed that the primary coils are outside of the secondary coils, permitting free ventilation, and thereby avoiding liability of excessive heating of the primary coil.

My improved induction-coil is especially applicable for use in X-ray apparatus, the bulb 9 of such apparatus being connected in series with the secondary coils 3 and the ter-

minals of the primary coils being connected, as is customary, with an electric generator and an interrupter.

The term "annulus" as applied herein to the core is not limited to a circular or ring-like contour, but includes any shape or contour whereby the ends of the divided or core sections may be brought into proximity to each other.

I claim herein as my invention—

1. An induction-coil having in combination a divided annular core, and primary and secondary coils surrounding the core and so arranged that at least a part of each coil surrounds the core on both sides of the gap between the ends of the core, substantially as set forth.

2. An induction-coil having in combination a divided annular core, a primary coil and a secondary coil, said coils surrounding the core in different planes at right angles to the axis of the core and so arranged that at least a part of each coil surrounds the core on both sides of the gap between the ends of the core, substantially as set forth.

3. An induction-coil, having in combination a divided annular core, primary coils surrounding core on opposite sides of the gap between the ends of the core and secondary coils arranged intermediate of the primary coils, substantially as set forth.

4. An induction-coil having in combination a sectional annular core, primary coils surrounding the core intermediate of the gaps at the ends of the sections and secondary coils inclosing the ends of the core-sections, substantially as set forth.

In testimony whereof I have hereunto set my hand.

REGINALD A. FESSENDEN.

Witnesses:
DARWIN S. WOLCOTT,
F. E. GAITHER.