

1,251,700.

Fig. 1

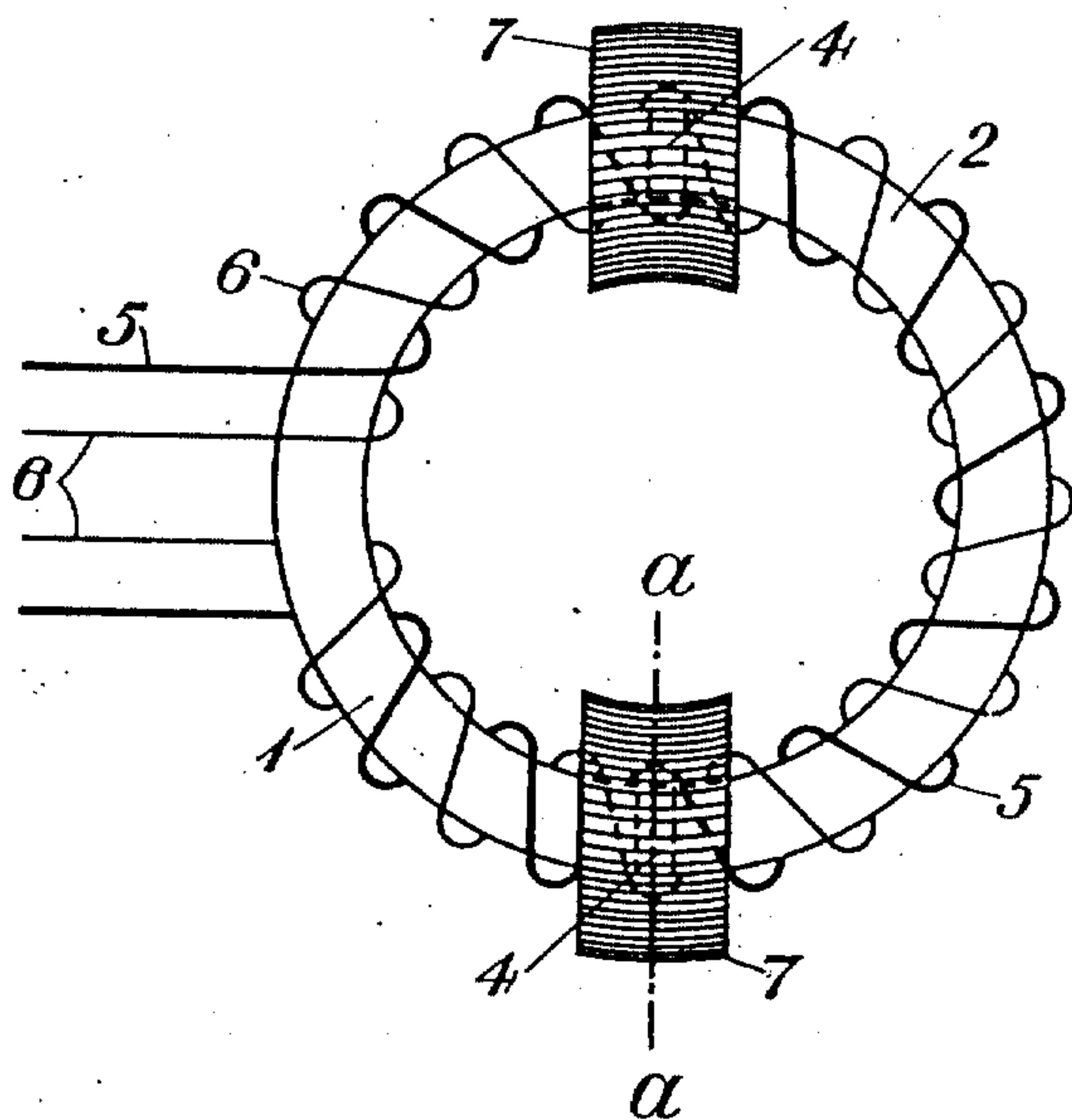


Fig. 2

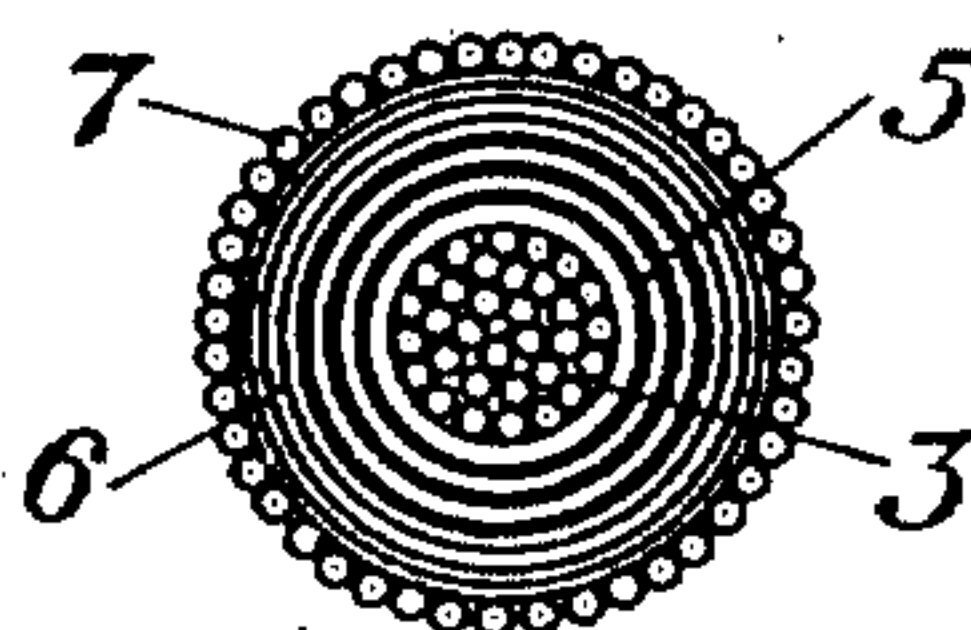


Fig. 3

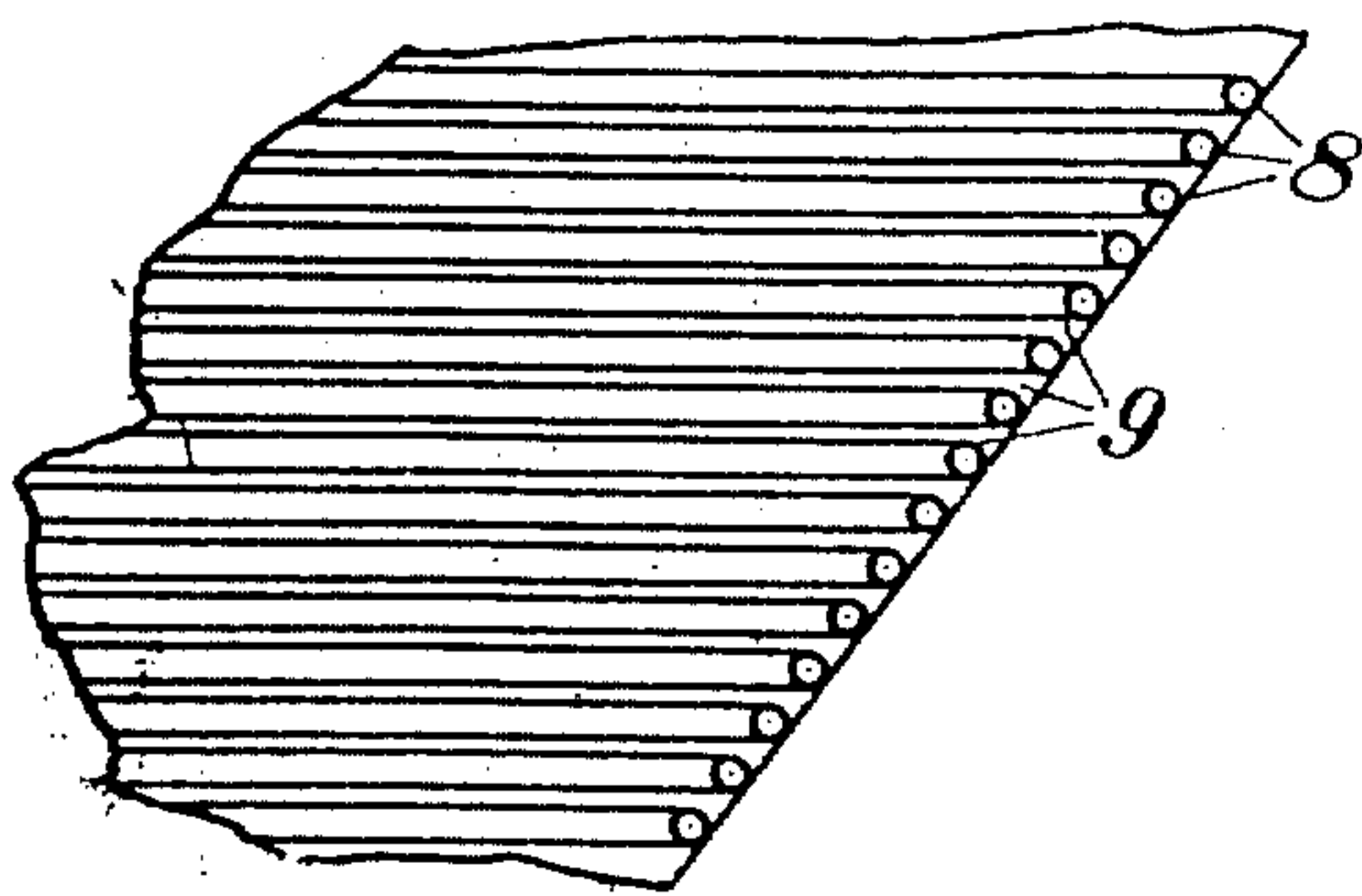
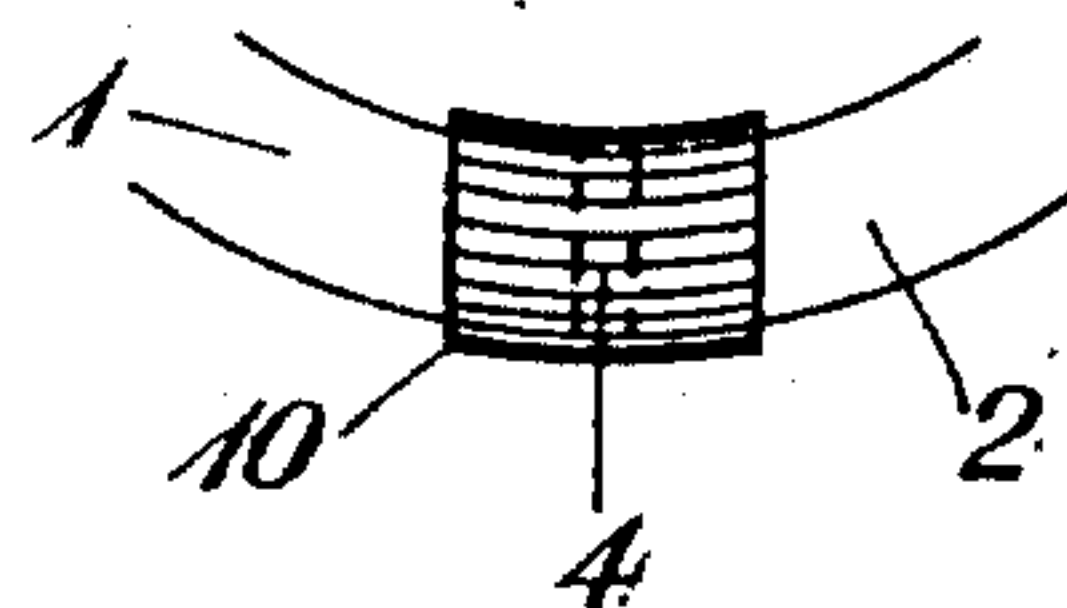


Fig.4



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UNITED STATES PATENT OFFICE.

THOMAS SHAW, OF HACKENSACK, NEW JERSEY, ASSIGNOR TO AMERICAN TELEPHONE
AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

SHIELD FOR MAGNETIC COILS.

1,251,700.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed September 17, 1917. Serial No. 191,776.

To all whom it may concern:

Be it known that I, THOMAS SHAW, residing at Hackensack, in the county of Bergen and State of New Jersey, have invented certain Improvements in Shields for Magnetic Coils, of which the following is a specification.

My invention relates to improvements in the construction of magnetic coils, more particularly coils of the ring type used in telephone work as loading coils and the like. Such coils are usually constructed with a core in the form of a magnetic ring made up of a bundle of wires or laminations upon which the coil is wound. In order that the coil shall be self restoring with respect to its impedance constants after being subjected to the effect of magnetizing currents, the core is made discontinuous by the provision of an air gap, whereby a demagnetizing action occurs at the core pole faces of the air gap, tending to restore the core to normal conditions.

Since coils of this character are usually mounted in containing cases of cast iron or other metal, the above construction results in material energy losses when the stray magnetic field of the air gap intersects the casing. It is the purpose of the present invention to reduce these losses by surrounding the coil, at least in the vicinity of the air gap, by a shield of finely laminated iron, the laminations extending parallel with the core. In order to reduce the losses as much as possible the iron material constituting the shield should have a high specific resistance and low permeability. Leakage losses due to hysteresis may be kept low by using a material which has low hysteresis under the saturation conditions produced by the leakage field from the air gaps. These and other objects of the invention may be attained by means of the construction illustrated in the accompanying drawing, Figure 1 of which is a diagrammatic representation of a coil constructed in accordance with the invention, Fig. 2 being a section taken on line *a-a* of Fig. 2, Fig. 3 being a broken view showing in more detail the construction of the magnetic shield, and Fig. 4 being a broken view of a modification.

Referring to Fig. 1 the coil is provided with a ring core formed of two sections 1 and 2, each section being made up of a bundle of wires or the like 3 in a manner

well known in the art. The ends of the sections are separated by air gaps 4, windings 5 and 6 being then applied to the core in such manner as to surround substantially the entire surface thereof, including the air gaps as shown. The winding 5 is shown heavier than winding 6 in the diagrams merely to readily distinguish between the turns of the two windings, it being understood that the windings may be of the same or different kinds of wire and of varying number of turns, depending upon the design of the particular coil. In order to reduce the leakage losses due to stray magnetic fields intersecting the containing casing (not shown) of the coil a magnetic shield 7 is provided, said shield being arranged so as to surround the exterior of the coil winding at least in the vicinity of the air gaps as shown in Fig. 1. Said shield may if desired be constructed as indicated in greater detail in Fig. 3, by applying a plurality of parallel core wires 8 to a strip or sheet of fabric 9 such as heavy paper, cloth or the like by means of a binding material such as shellac. The strip is then wound about the exterior of the coil in such manner that the parallel wires of the shield thus formed lie parallel to the core wires. If desired the shield may be arranged upon the interior of the coil, and upon the outer surface of the core, adjacent to the air gaps as shown at 10 in Fig. 4.

By the above described constructions the air gap is bridged by elements of laminated magnetic material, thereby decreasing the losses due to stray magnetic fields in the vicinity of the air gaps. Other constructions than those illustrated may be utilized to accomplish the desired results without departing from the spirit of the invention and it will therefore be understood that all such structures as fall within the scope of the appended claims are to be considered as within the purview of the invention.

What is claimed is:

1. A magnetic coil, having a discontinuous core, and means for bridging the discontinuities thereof comprising a shield of magnetic material.

2. A magnetic coil having a discontinuous core, and means for bridging the discontinuities thereof comprising a shield formed of laminated magnetic material.

3. A magnetic coil having a discontinuous core, and means for bridging the discon-

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tinuities thereof comprising a shield formed of magnetic elements separated by non-magnetic spaces.

4. A magnetic coil having a discontinuous core, and means for bridging discontinuous portions thereof comprising a shield formed of laminated strips extending in a direction parallel to the core.

5. A magnetic coil having a discontinuous core, and means for bridging the gaps or discontinuities therein comprising a shield arranged externally of the coil and consisting at least in part of magnetic material.

6. A magnetic coil having a discontinuous core, and means for bridging the gaps constituting the discontinuities thereof comprising a shield, said shield being formed of parallel laminations and surrounding the

core in such manner that the laminations extend in a direction parallel to the core.

7. A magnetic coil having a core of magnetic material, a gap in said core to render said core self-demagnetizing so that the impedance constants of the coil will readily return to their normal value after the coil has been subjected to the effect of magnetizing current, and means to reduce the reluctance of the gap without materially reducing the self-demagnetizing effect of the core comprising a shield formed at least in part of magnetic material and arranged about the core.

In testimony whereof, I have signed my name to this specification this eleventh day of September 1917.

THOMAS SHAW.