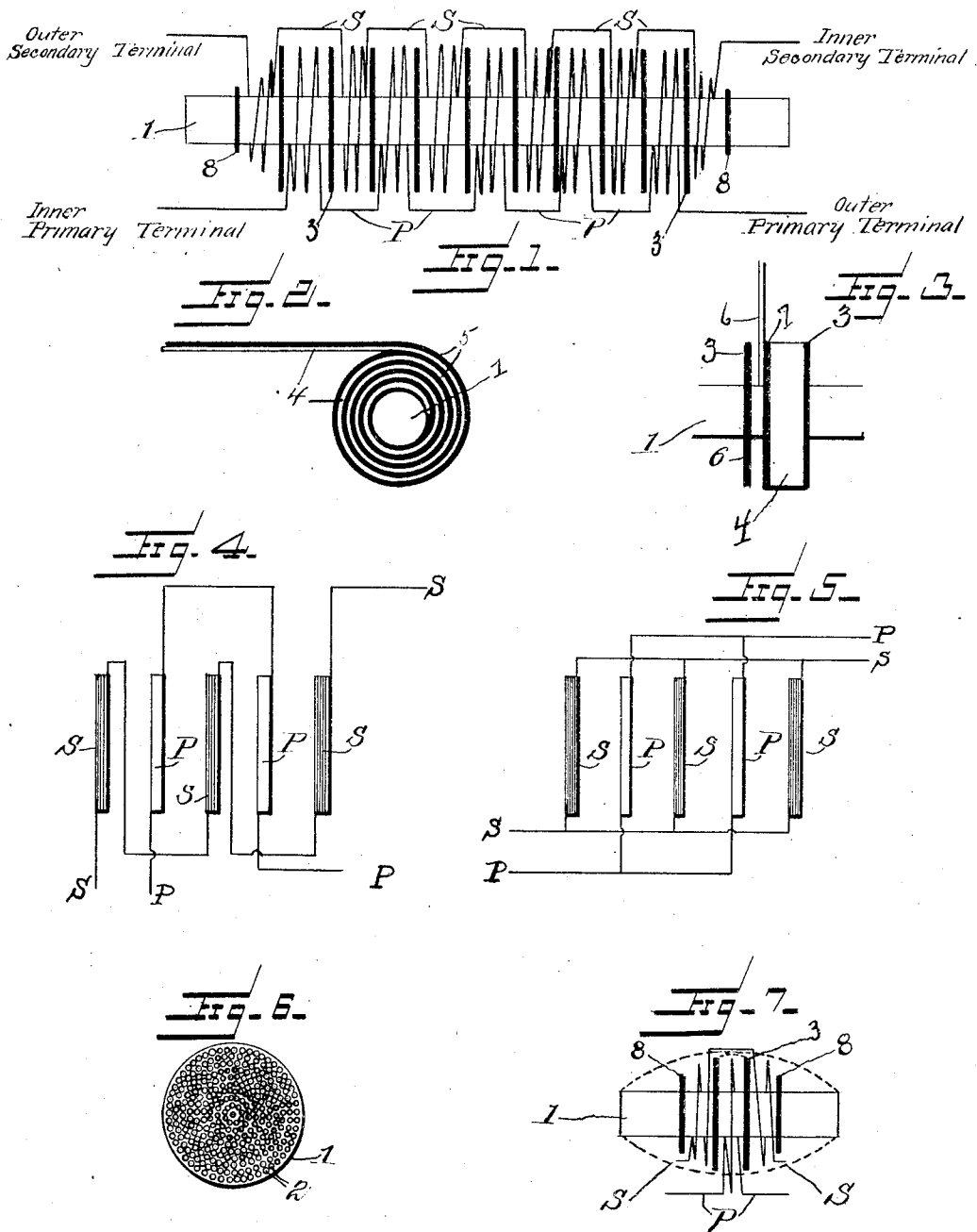


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J. A. BAKER.
INDUCTION COIL.

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WITNESSES:

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INDUCTION-COIL.

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To all whom it may concern:

Be it known that I, JOHN A. BAKER, a citizen of the United States, residing at Seguin, in the county of Guadalupe and State of Texas, have invented a certain new and useful Improvement in Induction-Coils, of which the following is a specification.

This invention relates to induction-coils, and has for its object to provide an improved device of this character wherein the dead or iractive sections of wire are reduced to a minimum.

It is furthermore designed to utilize all available lines of force, thus obtaining the highest possible inductive efficiency from a given primary current without correspondingly increasing the resistance.

It is well known that in induction-coils of the ordinary winding each additional layer of secondary wire intercepts lines of decreased force, while adding very greatly to the resistance of the secondary circuit. In coils designed to produce an induced current of very high potential so great is the resistance that a secondary current can only be induced by a positive make or break in the primary circuit. Where an interrupter can be used to make and break the primary circuit, this disadvantage is in some measure obviated. When, however, as in telephone construction, no make or break is possible, but where the secondary current must be induced solely by variations in the strength of the primary current, the production of a secondary current of very high potentiality has been heretofore found to be practically impossible, and the radius of telephonic communication is accordingly limited.

In the present invention the primary winding consists of a broad strip of metal of low resistance wound in successive convolutions upon a core with the respective convolutions insulated from each other by strips of insulating material. A primary circuit so wound forms a thick disk, with the core as an axis. Upon either side of this primary disk is placed an insulating-disk of approximately equal diameter. Upon either side of said insulating-disks is placed another similar insulat-

ing-disk, with a space between the first and second disks. Within the space so formed is wound the insulated secondary wire.

The number of coils of primary and secondary windings may be increased indefinitely; but the secondary circuit should preferably contain one more coil than the primary and occupy the ends of the completed coil.

It is well known that the field of maximum magnetic intensity produced by a primary coil is in the form of an ellipse, as shown by dotted lines in Fig. 7. That the secondary windings may occupy only such field of maximum force the coils occupying the two extremes are tapered and the end insulating-disks made correspondingly smaller than the intermediate disks. The core is extended beyond each end of the coil for the purpose of enabling the lines of force near the end of the ellipse to be utilized.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of my invention.

In the accompanying drawings, Figure 1 is a diagrammatic view of an induction-coil of the present invention, showing a plurality of both primary and secondary windings. Fig. 2 is an end view, and Fig. 3 is a side elevation, of the primary coil, illustrating the manner of winding and the manner of making connection with the inner terminal. Fig. 4 is a diagrammatic view illustrating the primary and secondary coils, each connected in series. Fig. 5 is a similar view illustrating the coils connected, respectively, in multiple. Fig. 6 is an enlarged detail end view of the core composed of a soft-iron casing filled with fine soft-iron wires. Fig. 7 is a diagrammatic view of an induction-coil of the simplest form embodying a single primary coil.

Like characters of reference designate corresponding parts throughout the various drawings.

In the preferred embodiment of the present invention a core is formed by wrapping a casing 1 of soft iron about a plurality of longitudinally-disposed fine soft-iron wires 2. Upon the core so formed are placed a plurality of disks 3, composed of mica or any suitable insulating material. The disks are properly spaced, and in the middle space is wound a strip 4 of material of low electrical resistance, approximating in width the distance between the insulating-disks. Between each of the several convolutions of the conductor 4 is disposed a strip of insulating material 5 and the winding of the conductor and insulator continued until the disk is formed, as shown in Fig. 2, approximating in size insulating-disks 3. The inner terminal of the conductor 4 is turned at the core at right angles thereto, as shown at 6, for the purpose of making connection with a source of electrical energy. Between the upstanding inner terminal 6 and the coil is disposed insulation 7. Within each alternate space between the disks 3 is wound a similar strip 4, which when electrically connected constitutes the primary winding. Within the spaces between the primary coils is wound the usual insulated wire used in secondary winding. The number of secondary coils exceeds the number of primary coils by one, thus occupying the extremes of the completed coil. The end insulating-disks 8 are made smaller in diameter than the disks 3, and the end secondary coils are tapered to correspond, thus being confined within the field of maximum magnetic intensity. The core 1 is extended at each end beyond the extreme secondary coils, thus intercepting the lines of magnetic force lying within the ends of the magnetic ellipse.

It is evident that both the primary and secondary coils may be connected in series, as shown at Fig. 4, or in multiple, as shown in Fig. 5; but as this coil is designed to produce induced currents of very high potential and as the resistance of the secondary circuit has been reduced to a minimum I prefer to connect them in series.

Having thus described my invention, what I claim as novel, and desire to secure by Letters Patent, is—

1. In an induction-coil, a primary winding composed of a broad strip of metal disposed with its plane parallel with the axis of the core and having a secondary winding upon each side thereof and adjacent thereto, the number of secondary windings exceeding the primary windings by one and occupying the extremes of the coil.

2. In an induction-coil, a primary winding composed of a broad strip of metal wound

about a core in successive convolutions, insulating material disposed between the convolutions and all disposed in the form of a disk with its axis parallel with the plane of the strip and having a secondary winding upon each side thereof and adjacent thereto, the number of secondary windings exceeding the primary windings by one and occupying each end of the completed coil.

3. An induction-coil comprising a core, insulating-disks disposed upon the core perpendicular thereto, a primary coil composed of a broad strip of metal wound in successive convolutions about the core filling the space between two insulating-disks and having its plane parallel with and presenting but a single winding longitudinal of the core, insulating material disposed between the convolutions, a secondary circuit composed of insulated wire wound about the core and filling the space between two insulating-disks upon each side of the primary coil and occupying the ends of the coil and means for electrically connecting the secondary winding.

4. An induction-coil having a core composed of fine soft-iron wires, incased within a soft-iron cylinder in combination with insulating-disks disposed upon the core with their planes perpendicular to the axis of said core, a primary coil composed of a broad strip of metal wound in successive convolutions filling the space between two insulating-disks and having its plane parallel with and presenting but a single winding longitudinal of the axis of the core, insulating material disposed between the convolutions, a secondary circuit composed of insulated wire wound and filling the space between two insulating-disks upon each side of and adjacent to the primary coil and electrically connected, the said core having its ends projected beyond each end of the coil.

5. An induction-coil comprising alternate primary and secondary windings divided into sections longitudinal of the core, separated by and filling the spaces between insulating-disks perpendicular to and embracing the core, and having the extreme secondary sections tapered at their outer ends.

6. An induction-coil comprising alternate primary and secondary windings divided into sections longitudinal of the core separated by and filling the spaces between insulating-disks perpendicular to and embracing the core, the number of sections of secondary windings exceeding the primary sections by one, the extreme secondary sections being tapered at their outer ends and a core composed of soft-iron wires projected beyond each end of the coil.

7. An induction-coil comprising insulating-disks disposed upon and embracing the core with their planes perpendicular to the axis thereof, a primary coil composed of a ribbon of metal with its plane parallel with and wound

in successive convolutions about the core filling the space between two insulating-disks and presenting but a single winding longitudinal thereof, insulating material disposed between the convolutions, a secondary circuit composed of insulated wire wound and filling the space between two insulating-disks upon each side of and adjacent to the primary coil and electrically connected and having the extreme secondary coils tapered at their outer ends.

8. An induction-coil comprising a metallic core, alternate primary and secondary windings longitudinal of said core, insulating-disks mounted upon and embracing the core and having their planes perpendicular to the axis thereof, the primary winding consisting of a metallic conductor wound in successive convolutions about the core and presenting but a single winding longitudinal thereof and filling the space between two insulating-disks, the secondary windings being wound about the core and disposed upon either side of and adjacent to the primary winding, means for supplying electric current, to the primary winding and means for electrically connecting the secondary windings adapted to conduct an induced current, the number of said secondary windings exceeding the primary windings by one and occupying the ends of the coil, the extreme secondary windings being tapered at their outer ends.

9. An induction-coil comprising a core composed of fine metallic wires primary and sec-

ondary windings alternating longitudinally of the core, insulating-disks mounted upon and embracing the core with their planes perpendicular to the axis thereof and each one separating a primary from a secondary winding, the primary winding consisting of a metallic ribbon wound in successive insulated convolutions about the core with its plane parallel with and presenting but a single winding longitudinal of the axis thereof and filling the space between two insulating-disks, the secondary winding being wound about the core and disposed upon either side of and adjacent to the primary windings and exceeding the number of primary windings by one, electric connections with each end of the metallic ribbon forming the primary winding and means for electrically connecting the secondary windings, the extreme secondary windings being tapered at their outer ends.

10. An induction-coil comprising alternate primary and secondary windings divided into sections longitudinal of the core, separated by and filling the spaces between insulating-disks perpendicular to and embracing the core, the number of sections of secondary windings exceeding the primary sections by one, the extreme secondary sections being tapered at their outer ends and a core projected beyond each end of the coil

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In presence of—

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