

(No Model.)

E. THOMSON & E. W. RICE, Jr.
REACTIVE AND INDUCTION COIL.

No. 410,468.

Patented Sept. 3, 1889.

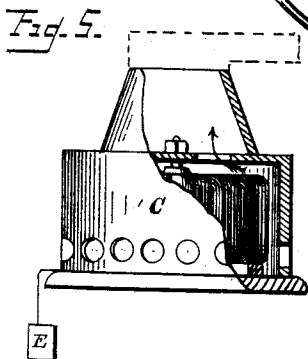
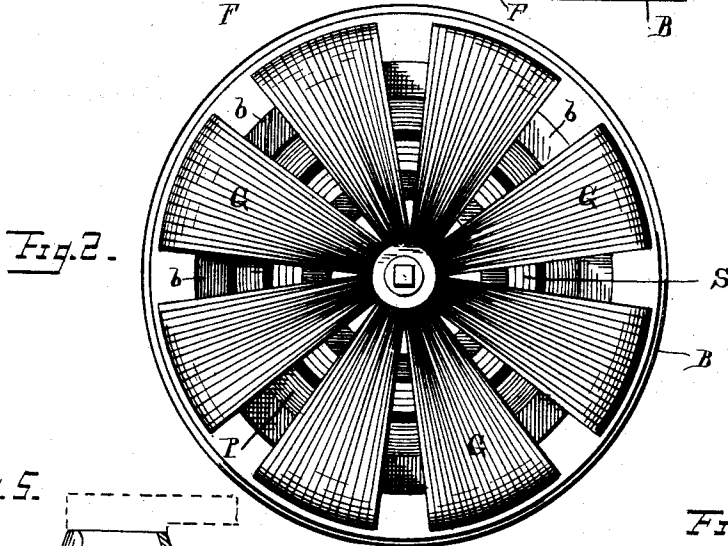
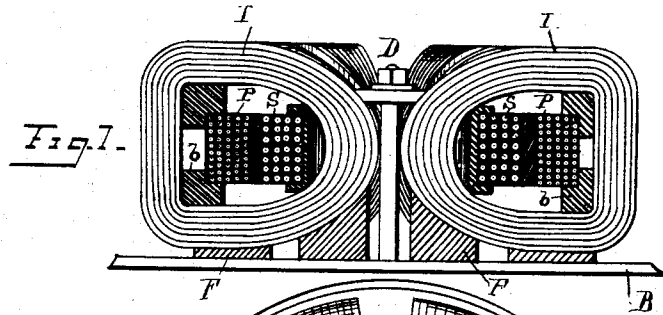


Fig. 4.

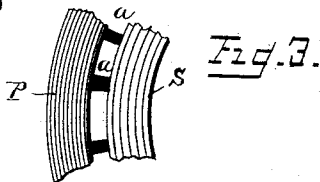
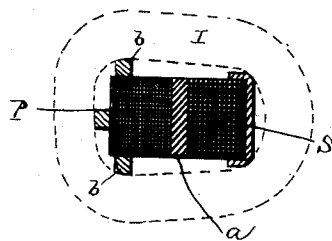


Fig. 3.

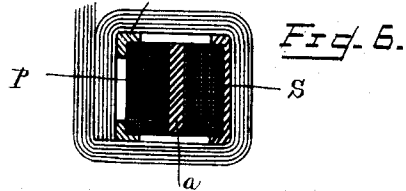


Fig. 5.

Witnesses
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UNITED STATES PATENT OFFICE.

ELIHU THOMSON AND EDWIN WILBUR RICE, JR., OF LYNN, MASSACHUSETTS.

REACTIVE AND INDUCTION COIL.

SPECIFICATION forming part of Letters Patent No. 410,468, dated September 3, 1889.

Application filed April 6, 1887. Serial No. 233,949. (No model.)

To all whom it may concern:

Be it known that we, ELIHU THOMSON and EDWIN WILBUR RICE, Jr., citizens of the United States, and residents of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Reactive and Induction Coils, of which the following is a specification.

Our invention relates to the construction of induction-coils, reactive electro-magnetic coils, and other electric coils with which an iron sheath or casing is employed for the purpose of heightening the electrical action or reactions when a coil or coils of the device are traversed by an alternating electric current or by a varying electric current of any other character. The iron sheath as ordinarily employed for this purpose encircles the linear axis of the bundle of wires laid together to make the coils. Large coils of this type are usually so compact that they accumulate heat and lose their insulation, and they are especially liable to this difficulty when traversed by heavy alternating currents. We aim to overcome this objection; and to this end our invention consists in constructing the iron-clad coil with an air-space between the coil and casing or sheath, and in also providing openings in the sheath, through which heated air may escape.

We have herein shown the application of our invention to an induction-coil; but the application of our invention to other devices in which a single coil only is used will be sufficiently obvious from the following description.

In the accompanying drawings, Figure 1 is a cross-section of a coil embodying our invention. Fig. 2 is a plan of the same. Fig. 3 is a view of a portion of the coil before the iron sheathing is applied. Fig. 4 is a cross-section of one side of a coil embodying a modification of our invention. Fig. 5 shows in side elevation a ventilated casing for holding the coil. Fig. 6 illustrates our improved method of applying the iron sheath or casing to the coil when such sheath is made up of iron wires.

Referring to Fig. 1, P S indicate, respectively, the primary and secondary conductors of an induction-coil for use on an alternating-current circuit.

I indicates an iron-wire casing or sheath

applied transversely to the circumferential axis of the coil by carrying the wire around the outside of the coil and through its center in obvious manner.

The two coils or sets of conductors P S are preferably separated from one another a short distance, as indicated, and held apart by blocks or strips *a a*, of any desired form, as shown in Figs. 3 and 4, applied at intervals, and consisting of wood, glass, porcelain, or other suitable material. The two coils may, however, lie close together if a layer of good insulator—as, for instance, paper or mica—be interposed.

The iron casing is separated from the coils, as indicated, by an air-space, and is held away from the same by strips or blocks *b b*, applied as shown in Fig. 1 or as in Fig. 4, and extending continuously or not, as desired, around the coil. The iron I covers the inside of the coil closely, but is divided into sections G at the outside, between which sections are air spaces or openings, permitting free ingress of external air to the space around coil P and in part around coil S and escape of any heated air, so that the coil and sheath are kept cool.

The whole structure may be fastened down to a base B by a bolt D, blocks or supports F F being preferably interposed, so that the under side of the apparatus will be exposed to the air.

The whole apparatus is preferably inclosed in an iron or other protective casing C, provided with ventilating-openings at opposite sides or ends, through which air or other cooling-fluid may pass.

The box may be grounded, as at E, to give safety from shocks in case of leakage from the high potential main supplying the primary conductor to the secondary or to other parts of the apparatus.

The improved method of applying the iron-wire sheath, which is illustrated in Fig. 6, consists in winding a number of the wires or strips together, instead of a single wire or strip. As many as eight to twelve wires may be applied in this way at once and the labor of making a sheathed coil greatly reduced.

What we claim as our invention is—

1. An electric coil provided with an iron sheath which covers the inner side thereof closely and is divided externally into sections,

between which are air-openings communicating with the space between the sheath and coil.

5 2. An electric coil provided with an iron-wire sheath divided into sections at the external portion of the coil and separated therefrom by an air-space, as and for the purpose described.

10 3. The combination, with an electric coil and its supporting-base, of the separating blocks or feet F F, whereby free access of air to the bottom of the coil may be permitted, as and for the purpose described.

15 4. The combination, with the primary or secondary conductors, of the interposed separating-blocks *a a*, as and for the purpose described.

5. The combination, with an electric coil, of an iron sheath separated from the coil by an air-space and having openings, as and for the purpose described. 20

6. The combination, with an electric coil, of an iron sheath wound densely at center and divided externally, so as to partly expose the coil to air. 25

Signed at Lynn, in the county of Essex and State of Massachusetts, this 2d day of April, A. D. 1887.

ELIHU THOMSON.
E. WILBUR RICE, JR.

Witnesses:

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