T. E. MURRAY & P. TORCHIO.

REACTANCE COIL.

APPLICATION FILED MAY 10, 1911.

1,017,348. Patented Feb. 13, 1912.

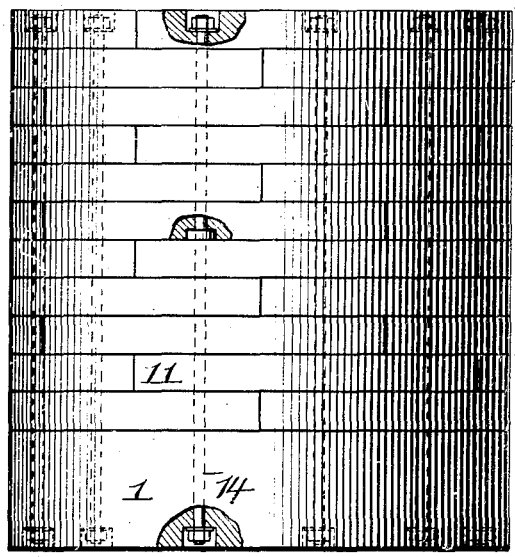

Fig. 1

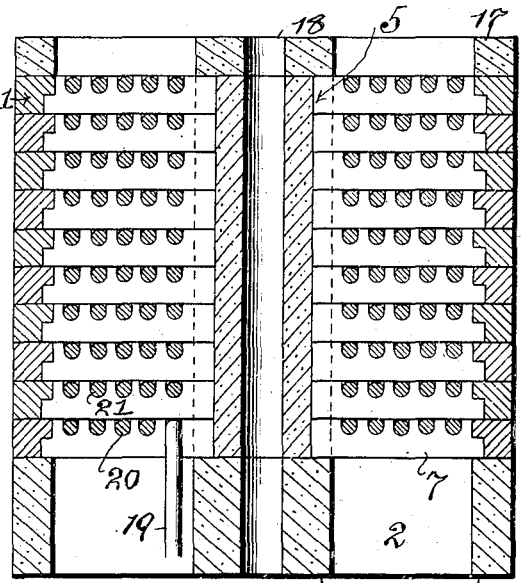

Fig. 2

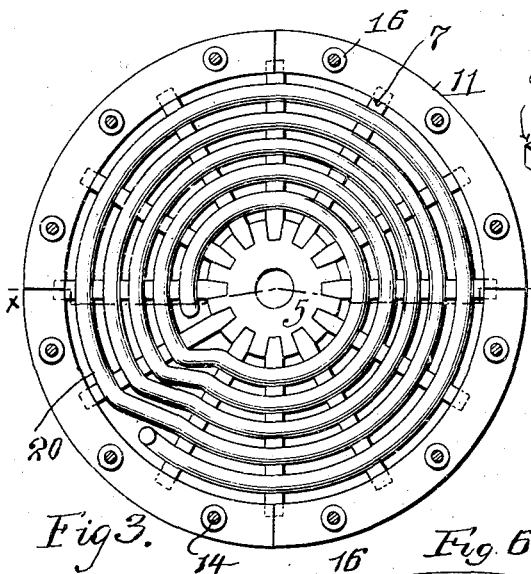

Fig. 3.

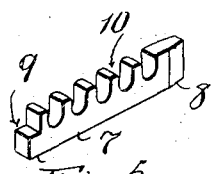

Fig. 5.

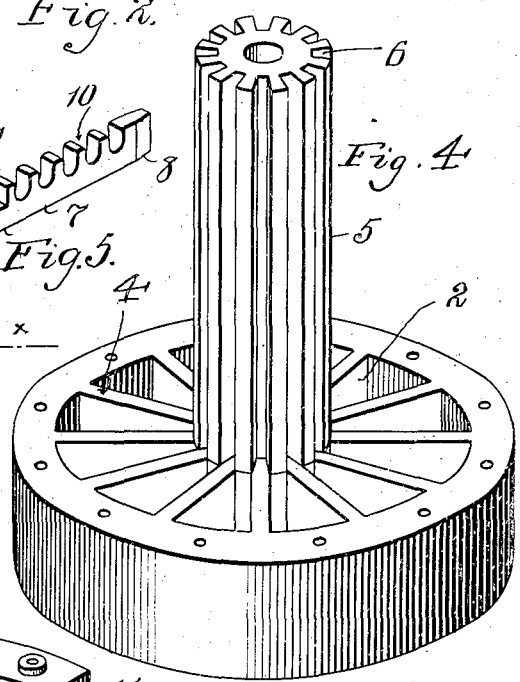

Fig. 4.

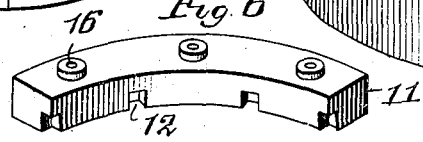

Fig. 6

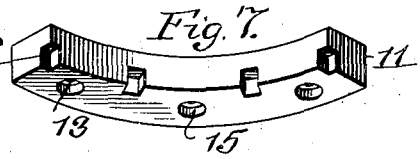

Fig. 7.

WITNESSES

Gertrude T. Potter

Mary T. McGarry

INVENTORS

Philip Torchio

Thomas E. Murray

BY

Laub Reeseman

Their ATTORNEY

UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY AND PHILIP TORCHIO, OF NEW YORK, N. Y.

REACTANCE-COIL.

1,017,348. Specification of Letters Patent. Patented Feb. 13, 1912.

Application filed May 19, 1911. Serial No. 628,266.

To all whom it may concern:

Be it known that we, THOMAS E. MURRAY, a citizen of the United States, and PHILIP TORCHIO, a subject of the King of Italy, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Reactance-Coils, of which the following is a specification.

The invention is an improvement in flat spiral reactance coils for high tension voltage. Such coils are commonly used in series with high speed alternating current generators to limit the instantaneous inrush of current under short circuit conditions. This relieves the generator winding from abnormal stresses and facilitates the parallel operation of other generators and synchronous apparatus in the system.

The invention consists, first, in the construction of the reactance coil which may be formed of a plurality of units, each unit being a flat spiral of wire having its turns disposed in a plane passing through the longitudinal axis of the wire; second, in the combination of such coil with a casing of insulating refractory material; and third, in the sectional construction of said casing, as hereinafter more particularly set forth.

In the accompanying drawings—Figure 1 is an elevation of the casing and a coil of flat parallel spirals therein. Fig. 2 is a vertical section on the line x, x of Fig. 3. Fig. 3 is a top view, with the cover plate removed. Fig. 4 shows the standard and bottom plate, Fig. 5, one of the recessed radial arms or supports, Fig. 6, a top view of one of the wall sections, and Fig. 7, a bottom view of same; Figs. 4, 5, 6 and 7 being in perspective.

Similar numbers of reference indicate like parts.

The casing is cylindrical in form, and is to be made of insulating refractory material, such as porcelain. The bottom plate 1 is formed with air openings 2, preferably produced by molding said plate with a central tubular portion 3, and partitions 4 radiating therefrom to the rim. The central tubular standard 5 is seated upon the portion 3 of the bottom plate, or, if desired, may be formed integral therewith. In the outer periphery of said standard are equidistantly spaced radiating grooves 6. The body portion of the casing is built up of similar arms 7, Fig. 6. Each arm is suitably formed at its inner end 8 to fit in the grooves 6, and at its outer end is provided with a shoulder 9. In the upper side of each arm are formed recesses 10. The wall is built up of similar arc-shaped sections 11, Figs. 6 and 7, in which are notches 12 to receive the shouldered outer ends 9 of arms 7. Through said sections are made openings 13 to receive the brass bolts 14. On the under side of each section the openings are countersunk, as shown at 15, and on the upper side are circular projections 16 surrounding each opening. The cover plate 17 is provided with a central opening 18.

The casing is assembled and the spirals are disposed therein in the following manner. The standard 5, if made separate from the bottom plate 1, is placed upon the central portion of said plate, so that the grooves 6 come directly over the radial partitions 4. Upon each partition is laid a recessed supporting arm 7, the inner ends 8 of said arms being inserted in the grooves 6 of said standard, and upon the upper side of the rim of the bottom plate, a sufficient number of wall sections 11 are laid to complete the circle; the shouldered notches 12 in said sections then receiving the shouldered outer ends 9 of the arms. The wire 19, which forms the coil, is carried upward through one of the openings 2 of the bottom plate, and is then laid as a flat spiral, as shown at 20, Fig. 3, in the recesses 10, until said recesses are filled. A second series of arms 7 is then placed upon the first series, and a second series of wall sections is placed upon the first series of wall sections, the projections 16 on the lower series of sections entering the countersinks 15 in the upper series, and the ends of the arms being received, as before, in the grooves and recesses. A second flat spiral 21 of wire is laid from out-in in the recesses of the arms just placed in position. More arms and wall sections are then added in the same way, and the wire of the flat spirals is embedded between said arms, until as many spirals as are required are in place, when the cover plate is applied, the end of the wire being brought out through a suitable opening in said plate. The bolt openings 13 in the wall sections register with corresponding openings in the cover and bottom plates. The fastening bolts 14 are inserted through all of said openings and secured by nuts entering counter-sinks in said plates: see Fig. 1.

The coil formed of a series of superposed flat or "pan cake" spirals is an especially advantageous construction, since for equal factor of safety in design, it gives for the same number of turns greater reactance than a helical or concentric winding, besides allowing interchangeability and uniformity of design for different sizes and values of coils. The construction of the casing in sections permits of any desired number of flat spirals being employed to form the coil, and by varying the number of recesses in the arms, the number of turns in each spiral may be increased or diminished.

In practice, we have found it desirable to make the cover and bottom plates and standard of soapstone, and the arms and wall sections of porcelain. Insulating refractory material offers many advantages, such as safety to life and protection against damage by magnetic bodies being drawn into the coil by its strong field: fireproof qualities at very high temperature: high heat radiating capacity: great dielectric strength: and being non-hygroscopic, it preserves its insulating qualities under all conditions. The glazed surface of porcelain and the like prevents the deposit of dust, and so keeps the insulation between the windings of the wire—which may be bare—free therefrom. The casing is preferably to be placed so that a cooling air current may be directed through the openings in the cover and bottom plates, and between the supporting arms.

We claim:

1. An electric coil of flat parallel spirals, a central standard, a plurality of superposed supports thereon having recesses for embedding the wire of said spirals, and a wall surrounding and detachably secured to said supports.

2. An electric coil of flat parallel spirals, a central standard, a plurality of superposed supports thereon having recesses for embedding the wire of said spirals, and a wall formed in detachably connected sections surrounding and detachably secured to said supports.

3. An electric coil of flat parallel spirals, a central standard, a plurality of superposed supports thereon provided with registering openings, each support having recesses for embedding the wire of a spiral, and a wall surrounding and detachably secured to said supports.

4. An electric coil of flat parallel spirals and a casing therefor comprising inner and outer concentric tubular walls, and partitions in the space between said walls and separating said spirals: the said walls and partitions being of insulating refractory material.

5. An electric coil of flat parallel spirals and a casing therefor comprising inner and outer concentric tubular walls, and partitions in the space between said walls and separating said spirals: the said walls and partitions being of insulating refractory material, and the said outer wall and partitions being formed in detachable sections.

6. An electric coil of flat parallel spirals, a central standard, an inclosing wall, and partitions for separating said spirals: the said partitions, standard and wall being formed of insulating refractory material.

7. An electric coil of flat parallel spirals, a central standard, an inclosing wall, and partitions for separating said spirals: the said partitions, standard and wall being formed of insulating refractory material and detachably secured together.

8. An electric coil of flat parallel spirals, a central standard, an inclosing wall, and partitions for separating said spirals: the said partitions, standard and wall being formed of insulating refractory material and detachably secured together, and each of said partitions having recesses for embedding the wire of one of said spirals.

9. A flat spiral electric coil, a central standard, and arms radiating therefrom, each arm having a plurality of recesses in one edge for receiving the wire of said coil.

10. An electric coil of flat parallel spirals, a central standard, a series of arms radiating therefrom, each arm having a plurality of recesses in one edge for receiving the wire of one of said spirals, and a second series of similar radiating recessed arms registering with said first series and closing the recesses therein.

11. A flat spiral electric coil, a central standard having longitudinal grooves in its periphery, and radial arms entering said grooves and having recesses in one edge for embedding the wire of said coil.

12. A flat spiral electric coil, a central standard having longitudinal grooves in its periphery, radial arms entering said grooves and having recesses in one edge for embedding the wire of said spiral, and a rim secured to said arms.

13. An electric coil of flat parallel spirals, a central standard, a plurality of series of superposed radiating arms detachably secured thereto, each arm having recesses in one edge embedding the wire of a spiral, the arms of one series closing the recesses of the next adjacent series, rims formed in arc-shaped sections detachably secured to the ends of said arms, a base plate, and means for detachably securing said rims together and to said base plate.

14. An electric coil of flat parallel spirals, a central standard, a plurality of series of superposed radiating arms detachably secured thereto, each arm having recesses in one edge embedding the wire of a spiral, the arms of one series closing the recesses of

the next adjacent series, rims formed in arc-shaped sections detachably secured to the ends of said arms, a base plate, a cover plate, and means for detachably securing said rims together and to said base plate and said cover plate.

15. A flat spiral electric coil, a central standard having longitudinal grooves in its periphery, radial arms having recesses in their edges for receiving the wire of said coil, and a rim having internal grooves parallel to the grooves in said standard, the said arms being received at their ends in the grooves in said standard and rim.

16. A flat spiral electric coil, a central standard having longitudinal grooves in its periphery, radial arms having recesses in their edges for receiving the wire of said coil, and a rim formed of arc-shaped sections having internal grooves parallel to the grooves in said standard; the said arms being received at their ends in the grooves in said standard and rim.

17. An electric coil of flat parallel spirals, a central standard, a series of arms detachably secured thereto radiating therefrom and having recesses in one edge, a second series of similar detachable notched radiating arms registering with and closing the recesses in said first series of arms, and a rim formed in arc-shaped sections detachably secured to said arms.

In testimony whereof we have affixed our signatures in presence of two witnesses.

THOMAS E. MURRAY.
PHILIP TORCHIO.

Witnesses:
GERTRUDE T. PORTER,
MAY T. MCGARRY.