No. 729,308. PATENTED MAY 26, 1903.

A. R. EVEREST.

CURRENT TRANSFORMER FOR HIGH VOLTAGE CIRCUITS.

APPLICATION FILED MAR. 21, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

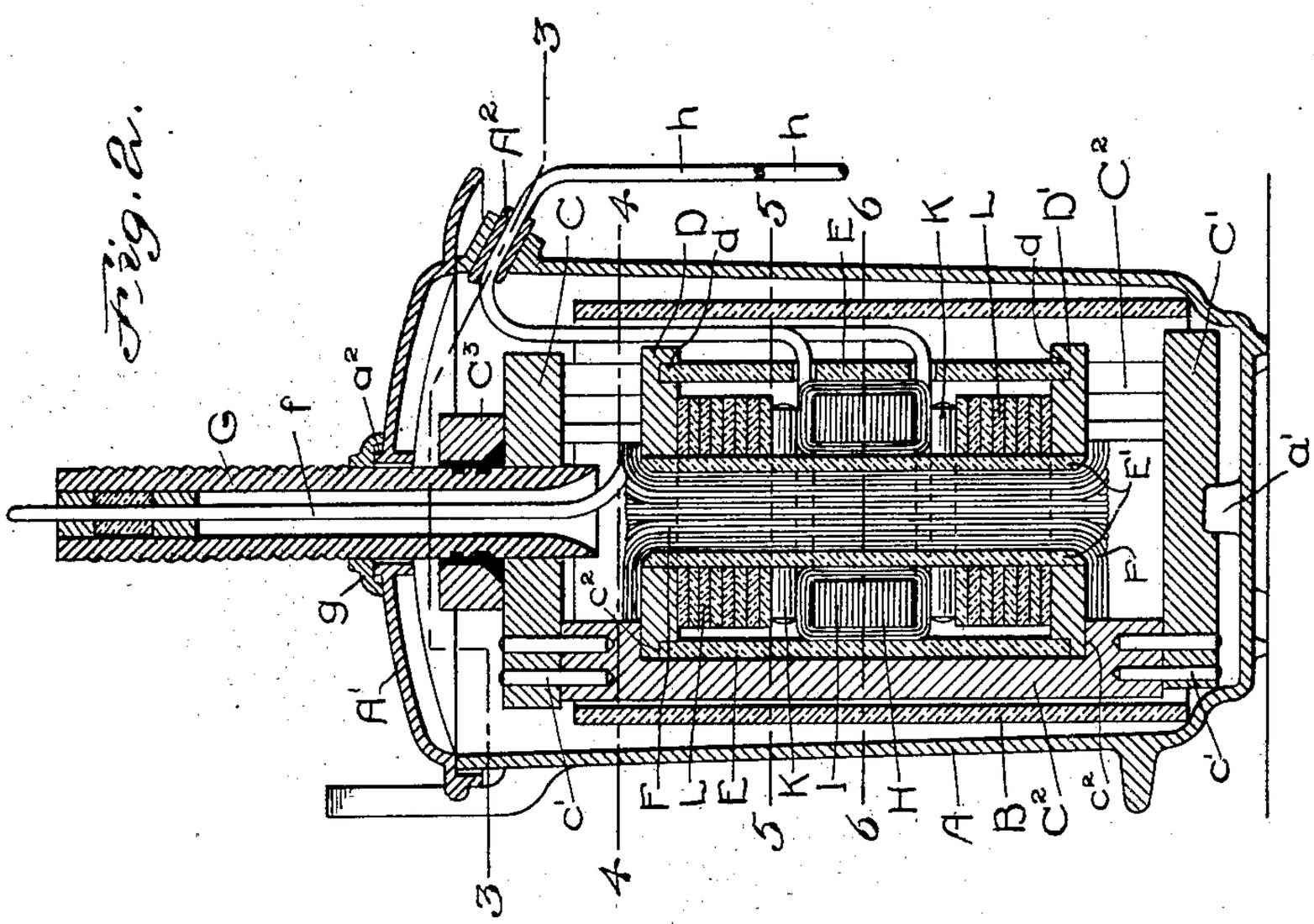

Fig. 2.

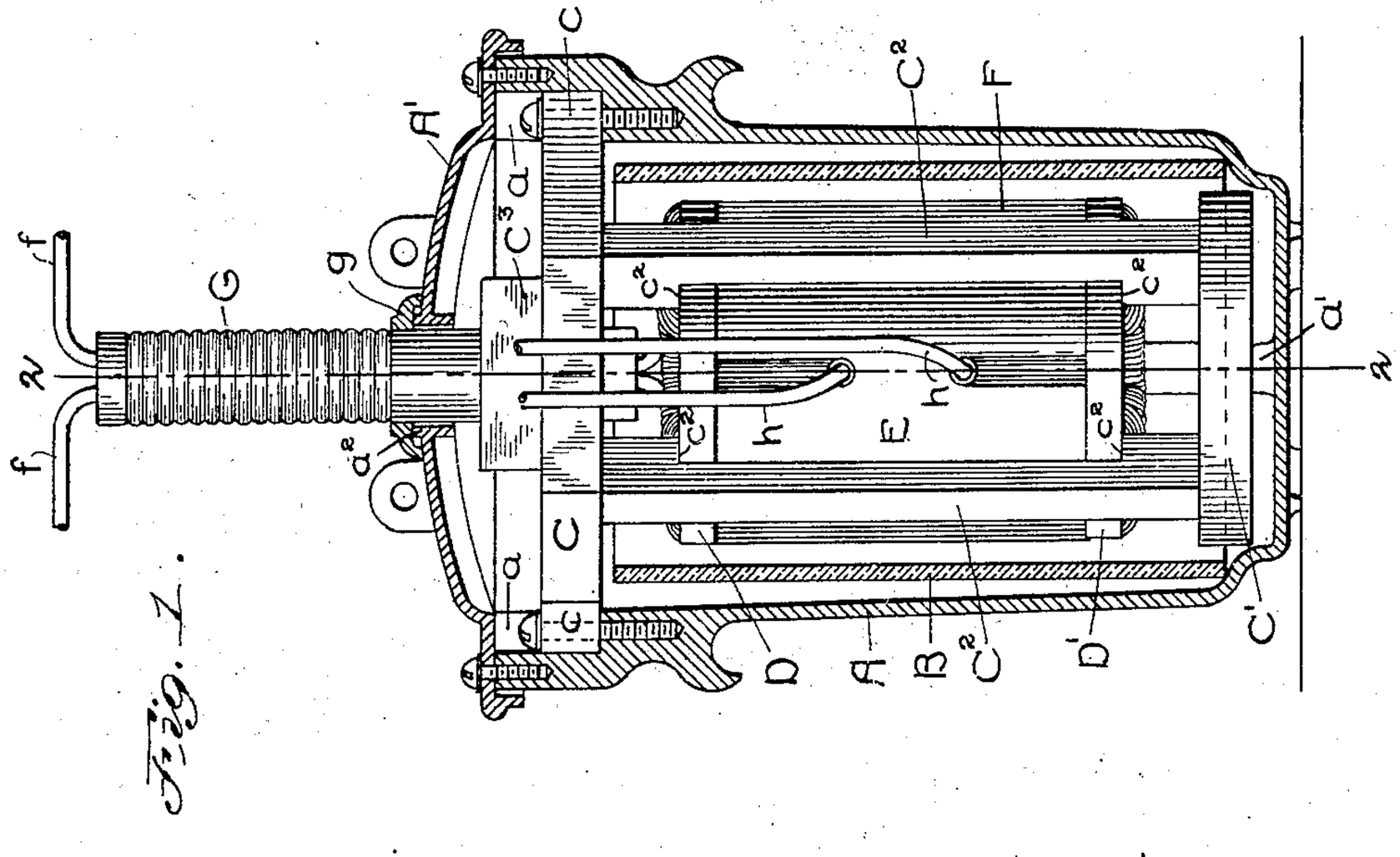

Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

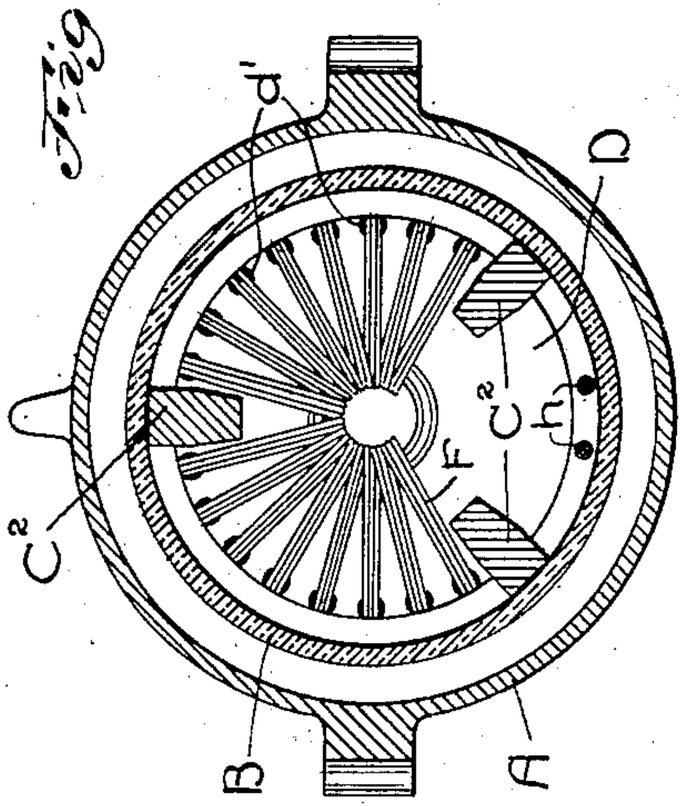


Fig. 6.

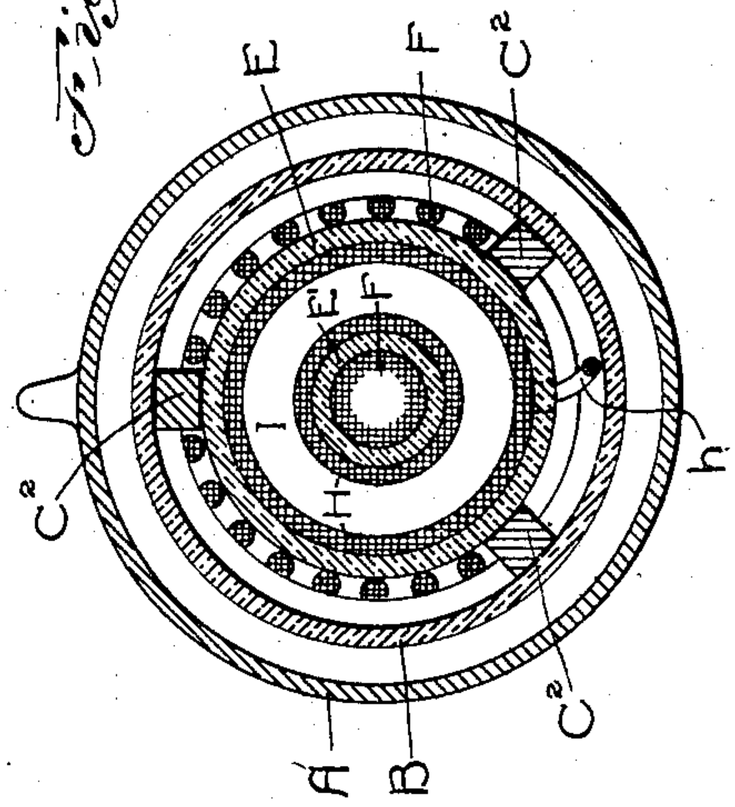
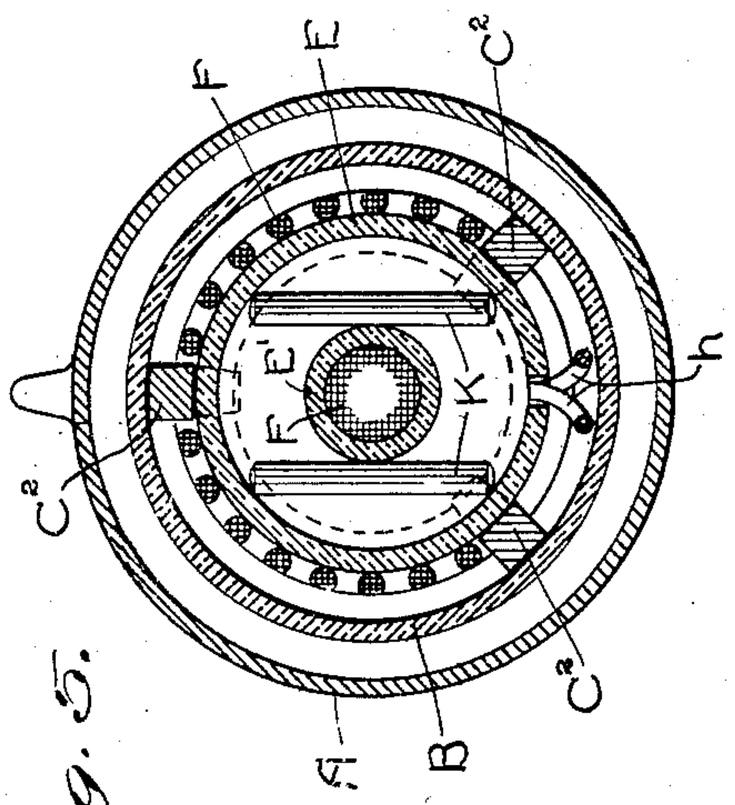


Fig. 5.

Fig. 5.



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No. 729,308. Patented May 26, 1903.

UNITED STATES PATENT OFFICE.

AUGUSTINE R. EVEREST, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

CURRENT-TRANSFORMER FOR HIGH-VOLTAGE CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 729,308, dated May 26, 1903.

Application filed March 21, 1902. Serial No. 99,301. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTINE R. EVEREST, a subject of the King of Great Britain, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Current-Transformers for High-Voltage Circuits, of which the following is a spectification.

This invention relates to static transformers; and its object is to improve the details of construction and arrangement so as to provide an apparatus for safely handling currents of unusually high voltage. Its characteristic features consist of an insulated ring-core overwound with the secondary winding, insulating tubes both inside and outside the secondary, which support end pieces on which the primary winding is wound, and space-blocks and ample oil-spaces between the ends of the secondary and primary windings and between the secondary leads and the primary winding, besides other details which are fully set forth hereinafter.

In the accompanying drawings, Figure 1 is an elvation of my improved transformer, the casing and its insulating-lining being in section. Fig. 2 is an axial section of the transformer. Fig. 3 is a top plan sectional view with the cover removed, taken on the line 3 3, Fig. 2; and Figs. 4, 5, and 6 are cross-sections on the lines 4 4, 5 5, and 6 6, respectively.

The casing A is a tubular cylindrical vessel with integral bottom and removable lid A′. It is provided with a loose lining B, consisting of a cylindrical tube of insulation. In the inside of the casing, at the top, are recesses *a* to receive the lugs *c* on a heavy head C, which forms the upper end of a wooden frame in which the coils are supported. The other head C′ of this frame rests on a stud *a*′, rising from the bottom of the casing, and is connected with the head C by upright posts C^2, secured to the heads, as by dowels *c*′, at or near the outer edges of the heads.

Inside the posts is an annular spool or reel for supporting the windings. It is composed of end disks or plates D D′, of wood or other other insulation, spaced apart by outer and inner tubes E E′, of insulation. The spool is rigidly maintained in position inside the wooden frame, preferably by shoulders c^2 on the inside of the posts near each end thereof, which receive the disks D D′, as shown. The outer tube E is preferably fitted into annular grooves *d* in the disks, while the inner tube E′ fits central holes in said disks. In the edge of each disk are radial notches *d*′, occupying the greater portion of its circumference. In the drawings about three-fourths of the periphery of each disk is notched. The primary winding F is threaded through the inner tube E′, carried radially across the disks, laid in the notches, and carried down outside of the outer tube E, very similar to the winding on a ring-armature. The primary leads *f* are led up through a tubular pillar G, of insulation, centrally erected in the head C and passing up through a hole in the lid A′. A petticoat *g* on the pillar covers a flange a^2 on the lid to prevent the accidental entrance of water into the casing. The pillar may be steadied by a block C^3, secured on top of the head C around the pillar.

The secondary winding H is wound on an annular core I and is housed in the annular chamber between the outer and inner tubes E E′. It is located about midway between the disks D D′ and is supported by space-blocks K and insulating-washers L above and below it. The secondary leads *h* are led out through the outer tube E into the segmental annular space between two posts C^2 and the lining B on that side where there is no primary winding and are carried up to and through insulating-bushings A^2 in the side of the casing A. The casing is filled with oil, which occupies all the spaces and increases the insulation of the coils and leads, besides assisting in conducting away the heat.

By the employment of insulating-cylinders instead of oil-spaces between the primary and secondary windings the diameter of the iron core is reduced to a minimum and the magnetic regulation is maintained at a high degree. Moreover, the outer diameter is reduced to a minimum, thus saving in copper and in the size and weight of the casing. The insulating-lining B also enables a reduction in the diameter of the casing.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A transformer for high-voltage circuits,

comprising an annular secondary core and winding, tubes of insulation inside and outside of said secondary, and a primary winding passing through said inner tube and outside of the outer tube.

2. A transformer for high-voltage circuits, comprising an annular secondary core and winding, tubes of insulation inside and outside of said secondary, disks fitting against the ends of said tubes, and a primary winding wound lengthwise of the tubes and radially of said disks.

3. A transformer for high-voltage circuits, comprising an annular secondary core and winding, tubes of insulation inside and outside of said secondary, disks fitting against the ends of said tubes, and provided with notches in their peripheries, and a primary winding wound lengthwise of the tubes and radially of said disks and laid in said notches.

4. A transformer for high-voltage circuits, comprising an annular secondary core and winding, and a primary winding wound over only a portion of the secondary.

5. A transformer for high-voltage circuits, comprising an annular secondary core and winding, tubes of insulation inside and outside of said secondary, disks at the ends of said tubes having peripheral notches only part way around their circumference, and a primary winding passing lengthwise of the tubes and laid in said notches.

6. A transformer for high-voltage circuits, comprising an annular secondary core and winding, a partially-annular primary winding over the secondary, insulating-tubes between the sides of said windings and insulating oil-filled spaces between their ends.

7. A transformer for high-voltage circuits, comprising an annular core overwound with a secondary winding, and a primary winding lying close to the sides of said secondary but extending considerably beyond the same at each end.

8. A transformer for high-voltage circuits, comprising an annular secondary core and winding, tubes of insulation inside and outside of said secondary, spacing-blocks at each end of said secondary, disks at the ends of said tubes, a primary winding extending lengthwise of the tubes and radially of the disks, and a wooden frame surrounding and supporting said windings.

9. A transformer for high-voltage circuits, comprising an annular spool of insulating material, an annular secondary core and winding housed in said spool, a primary winding partially enveloping the spool, and a wooden frame comprising heads and posts inclosing and supporting said spool.

In witness whereof I have hereunto set my hand this 18th day of March, 1902.

AUGUSTINE R. EVEREST.

Witnesses:

DUGALD MCK. MCKILLOP,

JOHN A. MCMANUS.