

No. 755,800.

PATENTED MAR. 29, 1904.

L. M. SCHMIDT.  
TRANSFORMER.

APPLICATION FILED SEPT. 19, 1902.

NO MODEL.

FIG. 1.

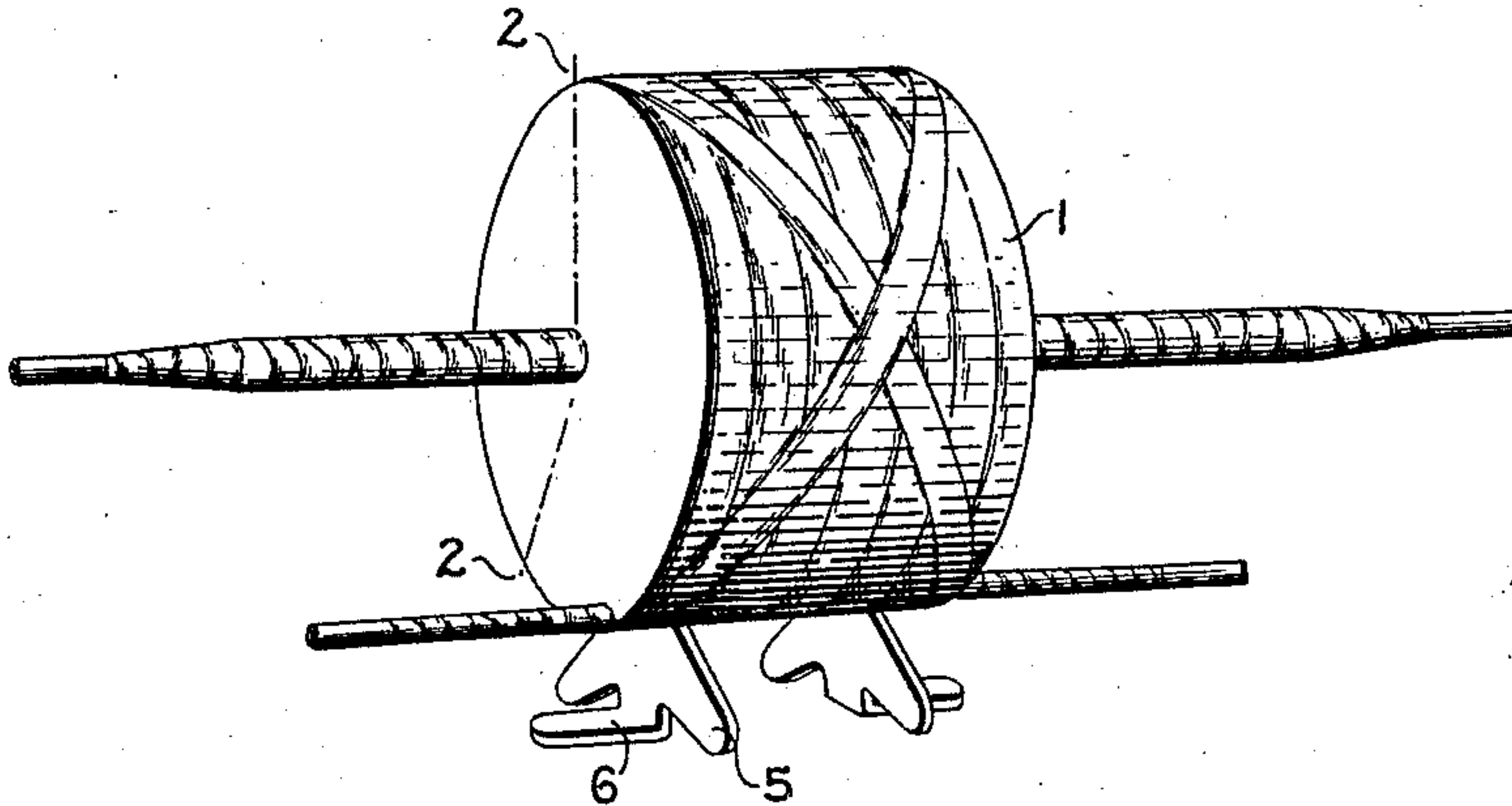


FIG. 2.

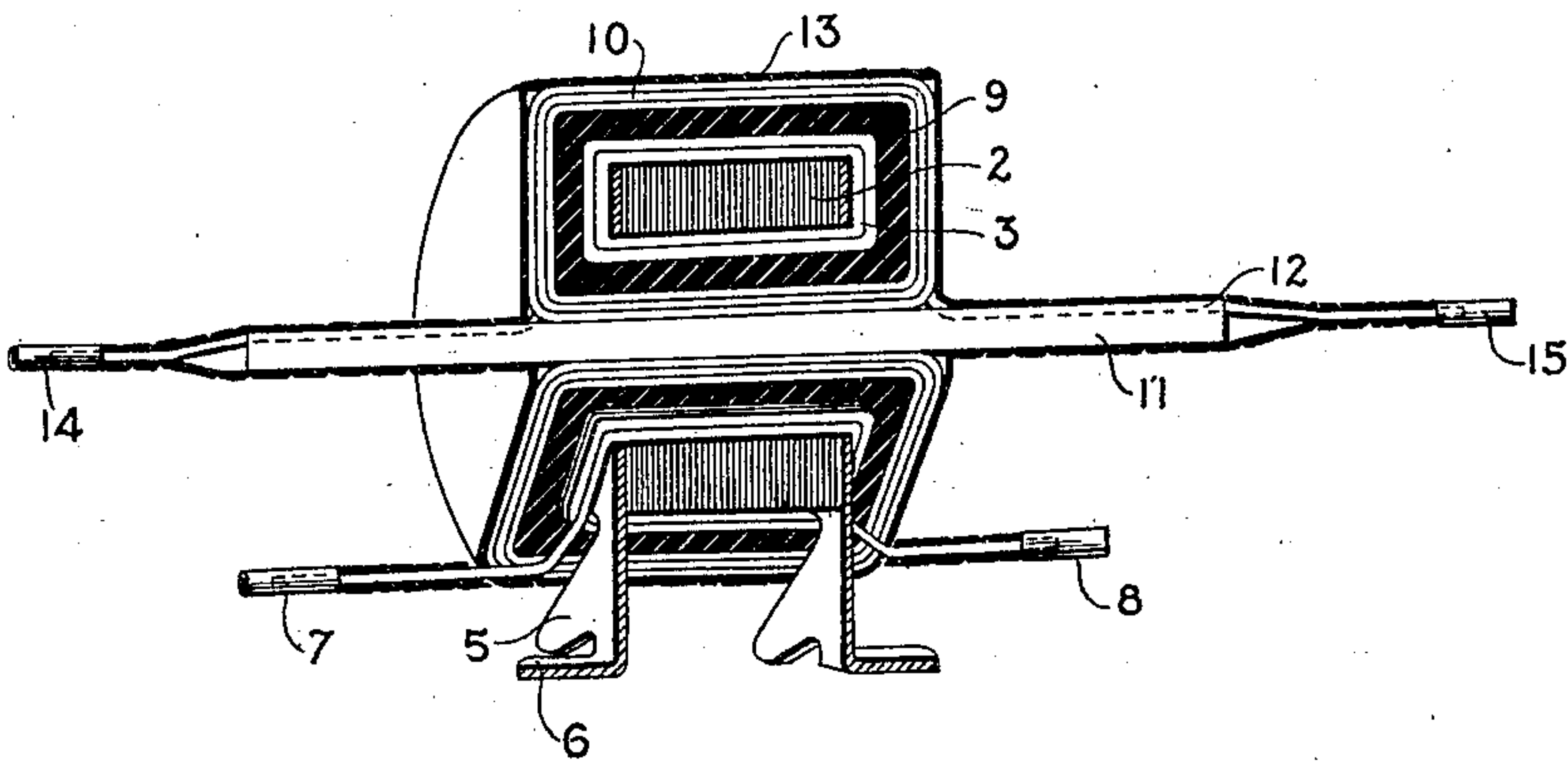
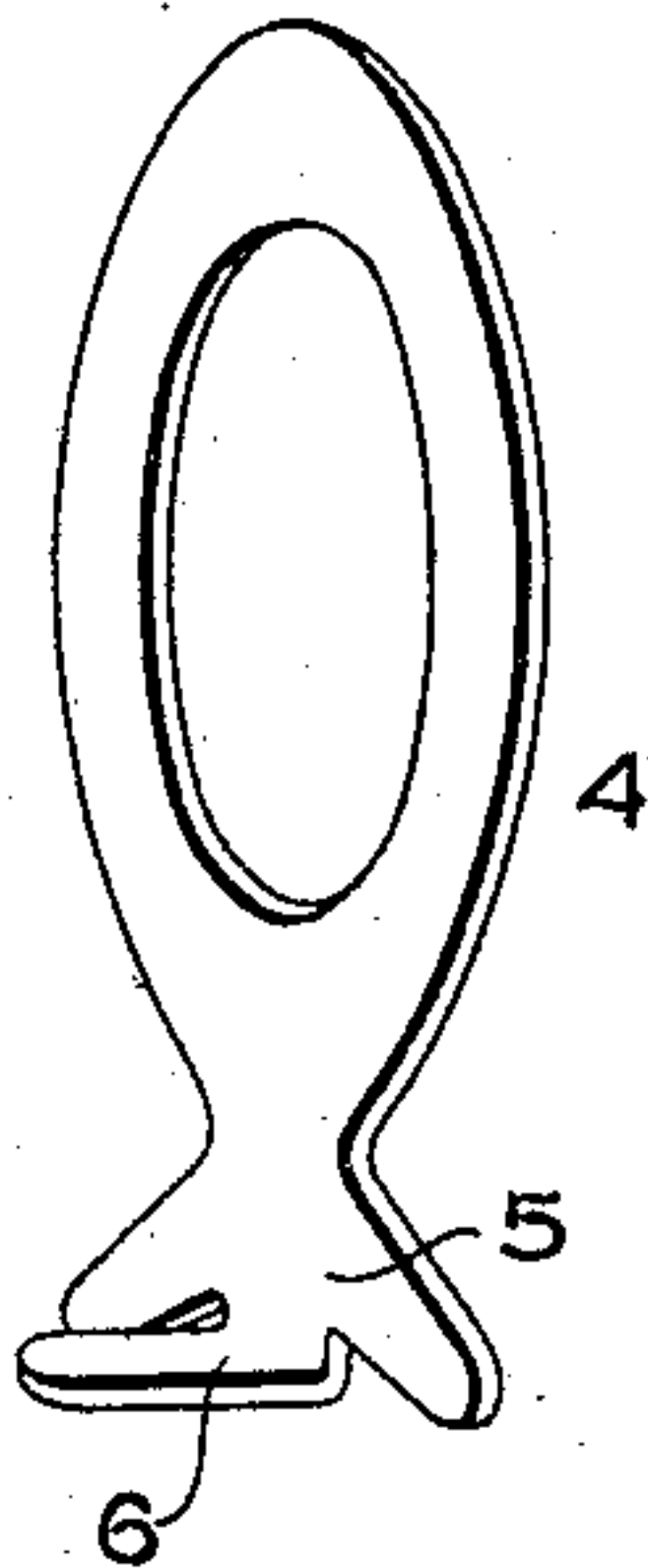


FIG. 3.



WITNESSES:

*Harry H. Tilden,*  
*Benjamin B. Hume.*

INVENTOR:

Louis M. Schmidt.  
by *Alfred H. Dan*  
att'y:

# UNITED STATES PATENT OFFICE.

LOUIS M. SCHMIDT, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## TRANSFORMER.

SPECIFICATION forming part of Letters Patent No. 755,800, dated March 29, 1904.

Application filed September 19, 1902. Serial No. 124,070. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS M. SCHMIDT, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have  
 5 invented certain new and useful Improvements in Transformers, of which the following is a specification.

My invention relates to improvements in the construction of transformers, especially of  
 10 that type called "current-transformers," which are designed for use in connection with meters or other instruments. With transformers of this character it is frequently desirable that the usual metallic inclosing casing be omitted,  
 15 and hence the necessity arises for some suitable means of support for the transformer.

The object of my invention is the production of a transformer without a casing and provided with suitable means by which it can be  
 20 supported and handled.

In the drawings, Figure 1 is a perspective view of one form in which my invention may be embodied. Fig. 2 is a sectional view taken  
 25 on line 2 2 of Fig. 1. Fig. 3 is a perspective view showing one of the supporting end pieces.

The transformer 1 is substantially cylindrical in form, the core 2 of the transformer being formed of laminations of sheet metal of annular form. The secondary winding 3 is  
 30 wound around this core, forming a coil of substantially rectangular shape, the long sides of the rectangle being parallel with the axis of the core. These windings are separated from the core by a suitable layer of insulating material. At each end of the cylindrical  
 35 core and forming part thereof end pieces 4 are provided. The end pieces 4 are made out of the same material or out of heavier stock than the other lamination and have an upper  
 40 portion which is substantially annular in form and similar to the other laminations of the core. The lower portions of these end pieces are provided with extensions 5, a portion of which, 6, is turned at right angles to the main  
 45 portion 5. This lower portion 5 and offset portion 6 form a supporting-foot for sustaining the transformer.

The winding 3 does not extend entirely around the cylindrical shell of the transformer-

core, a portion of the cylinder corresponding  
 50 to the width of the extension 5 being left unwound. The terminals 7 and 8 of the secondary winding are brought out at the lower part of the transformer and about midway of this  
 55 unwound portion of the transformer-core. The winding 3 is surrounded by a substantially cylindrical shell of insulating material 9, and about this shell of insulating material a primary  
 60 winding 10 is passed in a manner similar to that in which the secondary winding 3 surrounds the core of the transformer.

Through the axis of the transformer a bar  
 65 11 of wood or other suitable insulating and non-magnetic material is passed and extends beyond the ends of the transformer some little distance. Grooves 12 are provided in this  
 70 bar 11, extending from the end of the transformer proper to the end of the bar. In these grooves the ends of the primary winding 10 are laid. The transformer-body and the extending  
 75 ends of the bar 11 are surrounded by a suitable shell of insulating material 13. Metal terminal pieces 14 and 15 are provided at the ends of the primary winding adjacent  
 80 to the ends of the bar 11.

A slightly-larger portion of the core of the  
 85 transformer is left unwound by the primary winding than by the secondary. By this construction the insulation between the primary winding and the secondary terminal is as great  
 90 or greater than that between the primary winding and the body of the secondary winding. By the use of the bar 11 the primary terminals are stiffened and held in an extending  
 95 position, and in the construction shown the secondary windings are so located that they cannot come in contact with the primary terminals. The ends of this bar also form convenient handles for moving the transformer.

While I have illustrated and described the best form of embodiment of my invention which is now known to me, yet I do not intend to be limited to the exact construction shown and described.

Various modifications of the construction shown and described may be employed without departing from the spirit of my inven-



tion. For instance, the center bar 11 need not necessarily be made out of insulating material, and instead of passing entirely through the core of the transformer it might extend out at the ends only or in some cases be dispensed with entirely.

The supporting members need not necessarily be made out of magnetic material; but they may be made out of insulating material, if desired. While I have shown a pair of such supports, it is obvious, of course, that a greater number of supports might be employed or that one support having flange portions outturned in both directions would be sufficient in some cases.

Instead of using an annular core other shapes may be used, the essential feature being that the supports engage the core-plates and are surrounded by the winding and insulation.

Among the advantages of my construction are the ease of insulation permitted, the small amount of space occupied, the small liability of cracking the insulation of the primary leads, the ease of making connections, and the cheapness of the construction.

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

1. In combination, a core in the form of a cylindrical shell formed of laminations, the end portions of the shell being extended beyond the body of the transformer proper to form supporting-feet, and a winding surrounding said shell, except adjacent the supporting-feet, the terminals of said winding being brought out in the unwound space adjacent the feet.

2. A transformer having portions of its core extended beyond the body of the transformer to form supporting-feet, and a winding surrounding said core except adjacent the supporting-feet, the terminals of said winding being brought out in the unwound space adjacent the feet.

3. A transformer having an annular core, the primary and secondary being wound around the core and portions of the core being extended beyond the transformer to form supports.

4. A core comprising a body portion formed of annular-shaped laminations, and end por-

tions having supporting extensions formed integrally with an annular portion corresponding to the laminations forming the body portion, and a winding surrounding both the body and end portion of the core.

5. In combination, a core in the form of an annulus and a bar formed of non-conducting material passing through the axis of the annulus, the bar being secured in fixed relation to the shell with its ends extending beyond the body of the core.

6. In a transformer, a core in the form of a hollow cylinder, a secondary wound about said core, a primary also wound about said core and separated from said secondary by a layer of insulation, the portion of the core at which the secondary terminals are brought out being left unwound.

7. In a transformer, a core in the form of a hollow cylinder, a secondary wound about said core, a shell of insulating material surrounding said secondary winding and inclosed core, and a primary wound about said insulating-shell, secondary, and core, the primary winding covering only a portion of the shell thus formed so that the secondary terminals will be separated from the primary winding by a distance as great as the distance between the primary and the main portion of the secondary.

8. A transformer having an annular core, a winding on said core having terminals, and a bar of non-conducting material passing axially through said core, the said bar being provided with longitudinal grooves to receive said terminals.

9. In combination, a core, a support therefor, which engages the core, and a winding which covers the major portion of the core and support.

10. A transformer having a hollow core, a winding on said core, and a bar passing through said core and supporting the ends of said winding.

In witness whereof I have hereunto set my hand this 17th day of September, 1902.

LOUIS M. SCHMIDT.

Witnesses:

DUGALD McK. McKILLOP,  
JOHN A. McMANUS.