(No Model.)

S. S. WHEELER.

ELECTRICAL SPOOL.

No. 480,681. Patented Aug. 9, 1892.

Fig. 1.

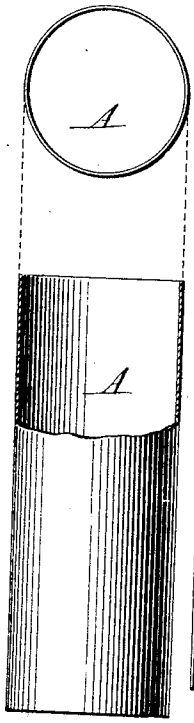


Fig. 2.

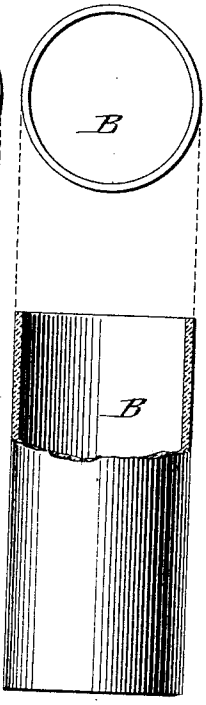


Fig. 3.

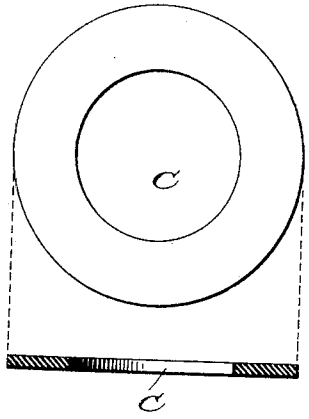


Fig. 4.

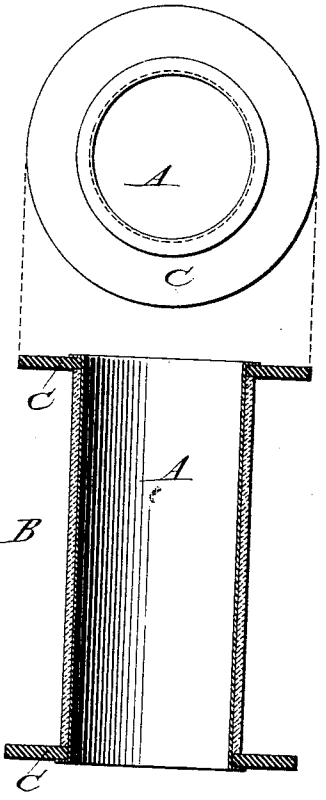


Fig. 5.

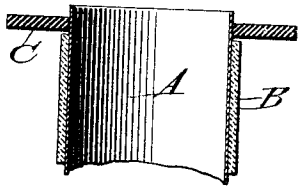


Fig. 6.

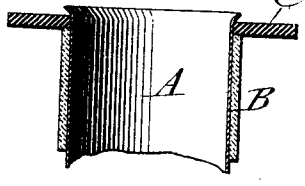


Fig. 7.

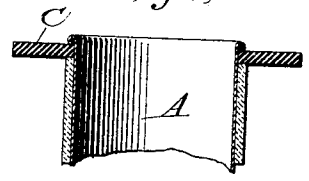


Fig. 8.

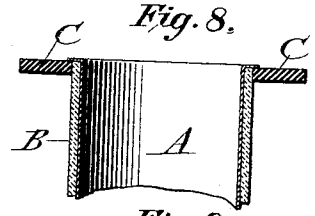


Fig. 9.

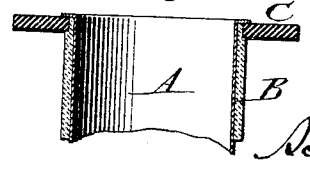
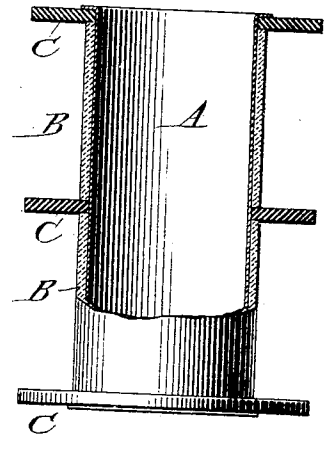


Fig. 10.



Witnesses:
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F. B. Crocker.

Inventor:
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UNITED STATES PATENT OFFICE.

SCHUYLER S. WHEELER, OF NEW YORK, N. Y., ASSIGNOR TO THE CROCKER-WHEELER ELECTRIC COMPANY, OF SAME PLACE.

ELECTRICAL SPOOL.

SPECIFICATION forming part of Letters Patent No. 480,681, dated August 9, 1892.

Application filed December 30, 1891. Serial No. 416,531. (No model.)

To all whom it may concern:

Be it known that I, SCHUYLER S. WHEELER, a citizen of the United States, residing at New York, in the county and State of New York, have made a new and useful Improvement in Spools for Electro-Magnets, of which the following is a specification.

My invention is directed particularly to the sleeve or spool portion of an electro-magnet which surrounds the core thereof and maintains or secures the windings of the coil in position; and its objects are, first, to produce such a sleeve or spool as will be simple, cheap, and quickly or easily made; second, to devise a sleeve or spool which shall effectually insulate all of the windings of the energizing-wire from the core of the electro-magnet, and, third, to devise such a sleeve or spool as will for all duplicate sizes hold or secure an equal number of ampère-turns. I accomplish these objects with the sleeve or spool hereinafter described, and particularly pointed out in the claims at the end of this specification.

In order that my invention may be fully understood, constructed, and used by those skilled in the art, reference is had to the following specification, taken in connection with the accompanying drawings, in which—

Figure 1 represents in broken side and end elevational views a metallic cylinder or sleeve, and Fig. 2 in similar views a non-metallic cylinder or sleeve of slightly-greater diameter and shorter length than the metallic sleeve shown in Fig. 1. Fig. 3 represents an elevational and a cross-sectional view of a washer made of insulating material, the inner diameter of which is the same as the outer diameter of the metallic sleeve or cylinder shown in Fig. 1. Fig. 4 represents in sectional and end elevational views my completed sleeve or spool. Fig. 5 illustrates in broken sectional view the parts as put together previous to the final steps in the method of making the completed sleeve or spool; and Fig. 6 represents a similar view showing the method in a still further advanced stage of completion, while Fig. 7 illustrates in a like view the completed article, Figs. 8 and 9 being similar views of modified forms of the sleeve or spool; and Fig. 10 a side elevational view, partly in section, of a sleeve or spool of similar construction with a middle or intermediate washer.

Referring now to the drawings in detail, in all of which like letters of reference indicate like parts, A is a metallic cylinder or tube having the same internal diameter as the diameter of the magnet-core which it is to surround. B is a similar cylinder or tube of insulating material having an inner diameter equal to the external diameter of the metallic cylinder or tube A and of slightly-shorter length. C is a washer, also of non-conducting material. These parts are put together in the manner shown in Fig. 5, with one washer C on each end of the tube A, said washers resting securely against the ends of the surrounding insulating cylinder or tube B, these washers and the tube B being of vegetable fiber or any analogous insulating material capable of withstanding great heat, the tube or cylinder A being either of sheet-iron, brass, copper, or analogous metal. After the parts are put together in the manner shown in Fig. 5 the ends of the tube or cylinder A are turned down in the manner shown in Fig. 6 and afterward clinched or brought securely to bear upon the outer faces of the washers C at the opposite ends of the spool, in the manner shown in Figs. 4, 7, 8, 9, and 10. In this way I am enabled to build up a spool for an electro-magnet, such as the field-magnet of a dynamo-electric machine or electric motor, in which the end rings C shall have their inner faces lying in absolutely parallel planes, the ends of the cylinder B having first been turned in a lathe to corresponding parallelism. I am therefore enabled to construct or build up in this manner a spool which will hold absolutely concentric and substantially parallel planes of wire-winding—a feature of great importance where it is required to place a given number of ampère-turns upon a series of spools or sleeves of like dimensions.

In the modified form shown in Fig. 8 the washers C are of the same internal diameter as the exterior diameter of the exterior or insulating cylinder B, and both the washers and the cylinders are held in place by the flanged rim of the metal tube A, as before. This is also true of the form shown in Fig. 9, except

that the ends of the cylinder or tube B are turned off in a lathe and the diameter of the washers C is slightly less than that of the cylinder B.

With the modified forms shown in Figs. 7 and 8 there is no possibility of a single winding of the magnet-wire working its way through and into contact with the metallic or conducting tube A—a feature not altogether impossible with the constructions shown in Figs. 4, 5, 6, 7, and 10.

In Fig. 10 I have shown an intermediate washer or head C with two cylinders B resting thereon from opposite sides, the construction of this form being otherwise the same as that shown in Fig. 4.

I am aware that a spool has heretofore been constructed for an electro-magnet by striking up or spinning beads on the opposite ends of metallic tubes and then fitting non-conducting washers or heads over the ends of the tube, and finally turning down the outer ends of the tube against these non-conducting washers, whereby they are held in place; but with such a structure it is not possible to preserve absolute parallelism of the inner faces of the non-conducting washers, nor is the insulated wire of the electro-magnet protected from electric connection with the metallic sleeve—two very important features which result from my improved spool.

I am also aware that a spool for winding wire has heretofore been constructed by surrounding a metallic tube with a sleeve of slightly-shorter length than the tube and then fitting metallic flanges over the ends of the tube and securing them in place with additional or auxiliary disks by clamping or riveting the parts firmly together. Such a structure, however, is designed for an entirely non-analogous purpose and does not possess the features of advantage attributable to my spool, for the purpose described and claimed.

I do not limit myself to the use of an inner metallic tube in the structure hereinafter claimed, as I may use a tube made of any material which will possess the necessary binding or securing qualifications for holding the washers against the ends of the non-conducting cylinder or tube.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A sleeve or spool for an electro-magnet, consisting of a tube of insulating material having its ends dressed or trimmed to absolute parallelism, a pair of insulating-washers resting thereon, and an interior tube the outer ends of which are secured to the washers, whereby said parts are held firmly together, substantially as described.

2. A sleeve or spool for an electro-magnet, consisting of a metallic cylinder or tube surrounded by a non-conducting cylinder or tube held in place by a pair of non-conducting washers, the ends of the inner tube being turned down against the outer faces of the washers, substantially as described.

3. A sleeve or spool for an electro-magnet, consisting of a metallic cylinder or tube, a surrounding non-conducting cylinder or tube having its opposite ends cut or trimmed to absolute parallelism, and a pair of non-conducting washers resting one on each end of said non-conducting sleeve and held in place by the turned-down ends or edges of the inner sleeve, substantially as described.

4. A spool for an electro-magnet, consisting of a pair of concentric sleeves or tubes, the inner tube being of metal and the outer of non-conducting material, but of less length, a pair of insulating washers or heads resting on opposite ends of the outer sleeve and held in place by the turned-down ends of the inner sleeve, substantially as described.

5. A spool for an electro-magnet, consisting of a non-conducting cylinder or tube having its opposite ends cut or trimmed to absolute parallelism, a pair of non-conducting washers or heads resting one on each end of said tube and held firmly in place by an internal metallic tube having its opposite ends turned down or riveted, substantially as described.

6. A spool for an electro-magnet, consisting of two or more non-conducting tubes having their ends cut or trimmed to absolute parallelism, in combination with three or more heads or washers of insulating material and an internal metallic tube having its opposite ends riveted or turned down against the outer faces of the end washers, so as to hold all of the parts together, substantially as described.

7. A spool for an electro-magnet, consisting of two concentric tubes, the inner tube being of metal and the outer of non-conducting material, but slightly shorter, in combination with a pair of non-conducting heads or washers resting on the ends of the non-conducting tube and held in place by the end-flanged or outwardly-curved edges of the inner tube, substantially as described.

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Witnesses:
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