(No Model.)

W. A. LEGGO.

ELECTRO MAGNET.

No. 307,777. Patented Nov. 11, 1884.

Fig. 1.

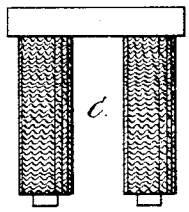


Fig. 2.



Fig. 3.



Fig. 7.

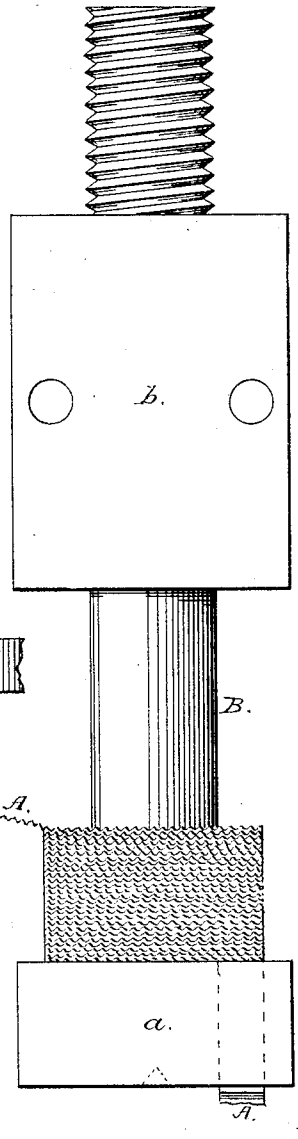


Fig. 4.

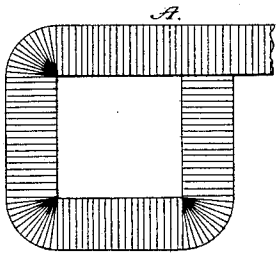


Fig. 5.

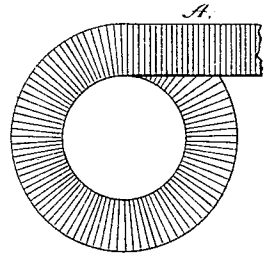


Fig. 6.

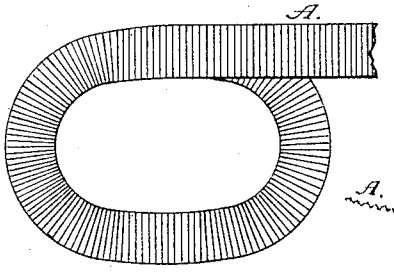
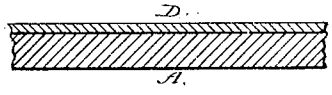


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM A. LEGGO, OF NEW YORK, N. Y.

ELECTRO-MAGNET.

SPECIFICATION forming part of Letters Patent No. 307,777, dated November 11, 1884.

Application filed August 20, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. LEGGO, of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Electro-Magnets; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object I have in view is to produce a method and means for winding metal ribbon on edge for the helices of electro-magnets, in order to make said magnets more effective than when their cores are wound with wire, and, further, to provide a cheap and simple method of insulating metal ribbon used for this purpose, which method is also applicable to ribbon wound flat.

In the drawings, Figure 1 is a view of an electro-magnet having helices formed of metal ribbon wound on edge in accordance with my invention; Figs. 2 and 3, an edge view and plan, respectively, of the crimped ribbon; Figs. 4, 5, and 6, views showing ribbon wound on edge around mandrels of different forms; Fig. 7, a view of the mandrel upon which the ribbon is wound; Fig. 8, a section of the ribbon before being crimped, showing insulation upon one side thereof.

Like letters denote corresponding parts in all the figures.

The ribbon A, which is cut of proper width, preferably from a thin sheet of copper, is passed through crimping or corrugating rollers, which crimp or corrugate it as shown in the drawings. This crimped ribbon is then wound edgewise around a mandrel of the form and size of the magnet-cores. If the mandrel is round, the crimps will arrange themselves symmetrically, as shown in Fig. 5—that is, all the crimps will be compressed at the inner edge of the ribbon and spread out at the outer edge. If the mandrel is rectangular in cross-section, this arrangement of the crimps will only occur at the corners or angles, Fig. 4, while around an oval mandrel, Fig. 6, the crimps will arrange themselves according to the curve, allowing the ribbon to be wound on edge close to the mandrel. A mandrel, B, upon which the ribbon is wound, is shown in Fig. 7. It is a round bolt having a head, *a*, at one end, with a slot for receiving and holding the end of the ribbon, and is screw-threaded at the other end for engaging with a long clamping-nut, *b*. One end of the ribbon is placed in the slot of head *a*, and the ribbon is wound or arranged around the mandrel. The nut *b* is then screwed down upon the ribbon, compressing the coils solidly together, and obliterating, to a great extent, the original crimping. The wound ribbon is then slipped from the mandrel, and, if it has previously been properly insulated is placed upon a core and secured in position, the core and helix forming an electro-magnet.

The electro-magnet C, Fig. 1, has its helices formed in this manner. For insulating the copper ribbon I attach to one or both sides thereof before it is passed through the crimping or corrugating rollers, or I fix to one or both sides of the sheet from which the ribbon is cut, a covering, D, of paper or cloth, by means of paste, glue, dextrine, or other suitable adhesive material. As additional insulation, the paper or fabric may be saturated with gum or varnish, which can of itself be used to fix the material to the surface of the ribbon. This manner of insulating metal ribbon is exceedingly convenient and economical, avoiding the necessity of winding strips of paper or cloth up with the metal ribbon, as has been heretofore practiced in flat winding. Instead of insulating the metal ribbon in this manner, it could be first crimped and formed upon the mandrel, and then removed and opened out sufficiently so that when dipped into a suitable insulating compound all parts of the ribbon will be covered. This compound may be, for example, a varnish. The helix of metal ribbon is then thoroughly dried, after which it is closed again and put upon the core of the magnet. For a still more reliable insulation the helix may be covered, before the varnish is quite dry, with finely-divided flock or other similar non-conductor which will adhere to the varnish.

What I claim as my invention is—

1. An electro-magnet having its helix or

helices composed of crimped or corrugated metal ribbon wound on edge and compressed, substantially as set forth.

2. The method of constructing helices for electro-magnets, consisting in first crimping or corrugating metal ribbon, then winding the same on edge, and then compressing the coils together, substantially as set forth.

This specification signed and witnessed this 15th day of July, 1881.

WILLIAM A. LEGGO.

Witnesses:
RICHD. N. DYER,
H. W. SEELY.