J. C. SIMONSEN.

METHOD OF FORMING ARMATURE COILS.

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**1,171,148.**

Patented Feb. 8, 1916.

Fig. 1.

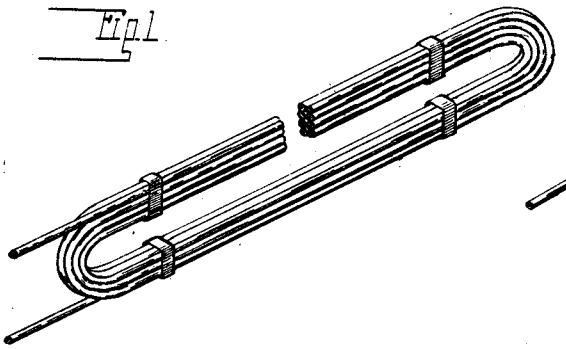
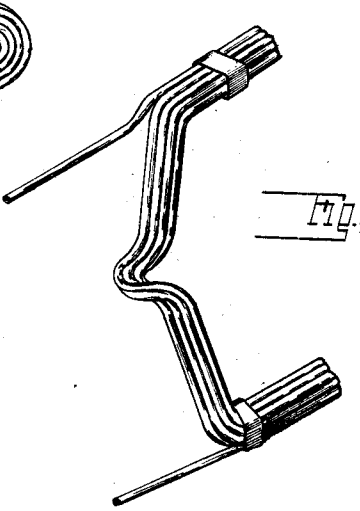


Fig. 2.



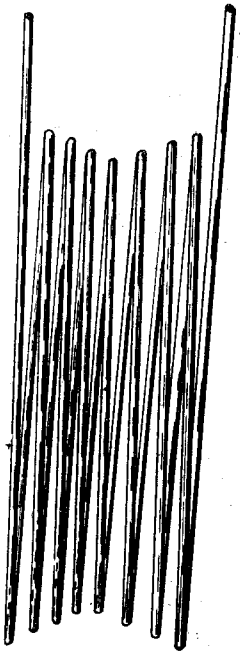


Fig. 3.

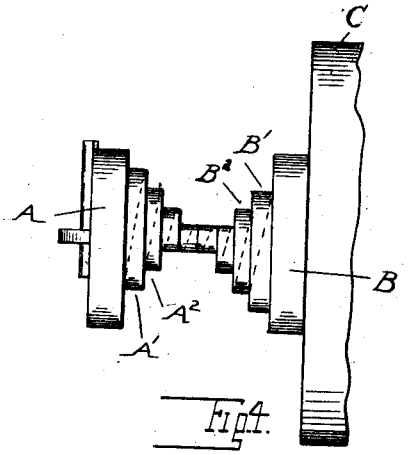



Fig. 4.

Witnesses
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# UNITED STATES PATENT OFFICE.

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## METHOD OF FORMING ARMATURE-COILS.

1,171,148. Specification of Letters Patent. Patented Feb. 8, 1916.

Application filed November 1, 1913. Serial No. 798,646.

*To all whom it may concern:*

Be it known that I, JOHAN CHARLES SIMONSEN, a subject of the King of Norway, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Methods of Forming Armature-Coils, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to the manufacture of fashioned coils for armature windings of a type extensively used in the art. These coils comprise a plurality of convolutions, first formed in a plain coil and bound together by suitable clips and ribbons, after which the coil is re-fashioned in dies to the desired shape. One difficulty experienced with such constructions is the danger of injury to the insulation and short circuiting of the coil, due to the crossing of the terminal wires. This crossing is necessitated by the fact that in winding the coil, one terminal leads to the innermost convolution, while the opposite terminal leads to the outermost convolution. Thus the inner lead must cross the intermediate convolutions. With the present invention I have overcome this difficulty, first, by constructing the coil so that both terminals lead directly to the outermost convolutions, and further by a method of winding which permits of expeditiously constructing such a coil.

In the drawings: Figure 1 is a perspective view, partly in section, of the coil before refashioning; Fig. 2 is a fragmentary perspective view of the completely fashioned coil; Fig. 3 is an end elevation of the coil as first wound; and Fig. 4 is an elevation of the mandrel upon which the coil is wound.

The essential characteristic of my improved coil is the leading of both terminal wires to the outer convolutions, instead of one leading to an outer and one to an inner convolution, as heretofore constructed. This result I obtain by winding the coil upon a suitable mandrel so as to form, first, a series of convolutions progressively decreasing in size and adapted to telescope with each other, followed by a series of convolutions progressively increasing in size and correspondingly adapted to telescope. Thus when these convolutions are bound together there will be formed a coil having a series of parallel pairs of convolutions, the terminals leading to the outer pair.

For convenience in forming such coils, I preferably proceed in the following manner: A mandrel A is formed with a series of spiral steps $A'$ $A^2$, etc., each step being adapted to receive a convolution of the coil and to fashion the same to telescope with the succeeding convolution. A corresponding mandrel B having steps $B'$ $B^2$, etc., is arranged adjacent to the mandrel A, and the whole is mounted upon a suitable winding head C for imparting rotary movement thereto. The operator then winds a coil upon this mandrel, such as indicated in Fig. 3, after which the sections A and B are separated, permitting of the removal of the coil and the telescoping of the same to form the construction shown in Fig. 1. The coil when wound as described, may be clipped and bound in the usual manner and then refashioned, but these subsequent steps form no part of the present invention.

What I claim as my invention is:—

1. The method of forming armature coils, comprising the winding of an open spiral having progressively decreasing convolutions followed by progressively increasing convolutions, and in subsequently telescoping said convolutions to form a closed coil with both terminals leading from the outer convolutions thereof.

2. The method of forming armature coils, consisting in the winding of an open armature coil having spaced spiral convolutions and the subsequent telescoping of the spiral convolutions to form a closed coil with both terminals leading from the outer convolutions thereof.

3. The method of forming armature coils, comprising the winding of an open coil having reversely spaced spirals of progressively

decreasing and progressively increasing convolutions, and in the subsequent telescoping of the spaced decreasing and increasing spiral convolutions to form a closed coil having parallel pairs of convolutions with terminals leading from the outer convolutions thereof.

In testimony whereof I affix my signature in presence of two witnesses.

JOHAN CHARLES SIMONSEN.

Witnesses:
A. C. GIBSON,
CLARENCE S. REEF.