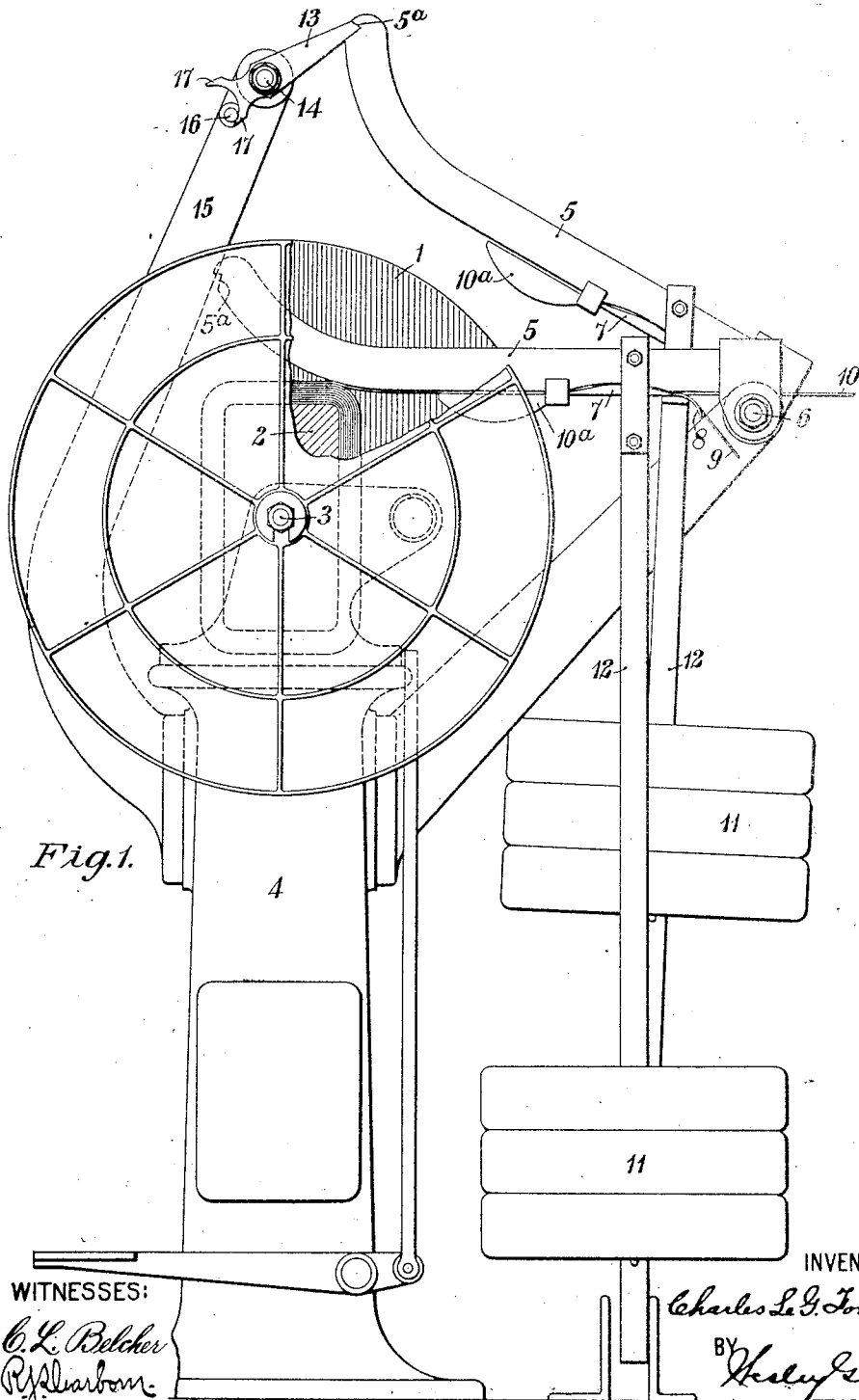


C. LE G. FORTESCUE.
 COIL WINDING MACHINE.
 APPLICATION FILED JULY 3, 1905.

999,772.

Patented Aug. 8, 1911.
 3 SHEETS—SHEET 1.



WITNESSES:

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 R. J. Barron

INVENTOR

Charles Le G. Fortescue

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3 SHEETS-SHEET 2.

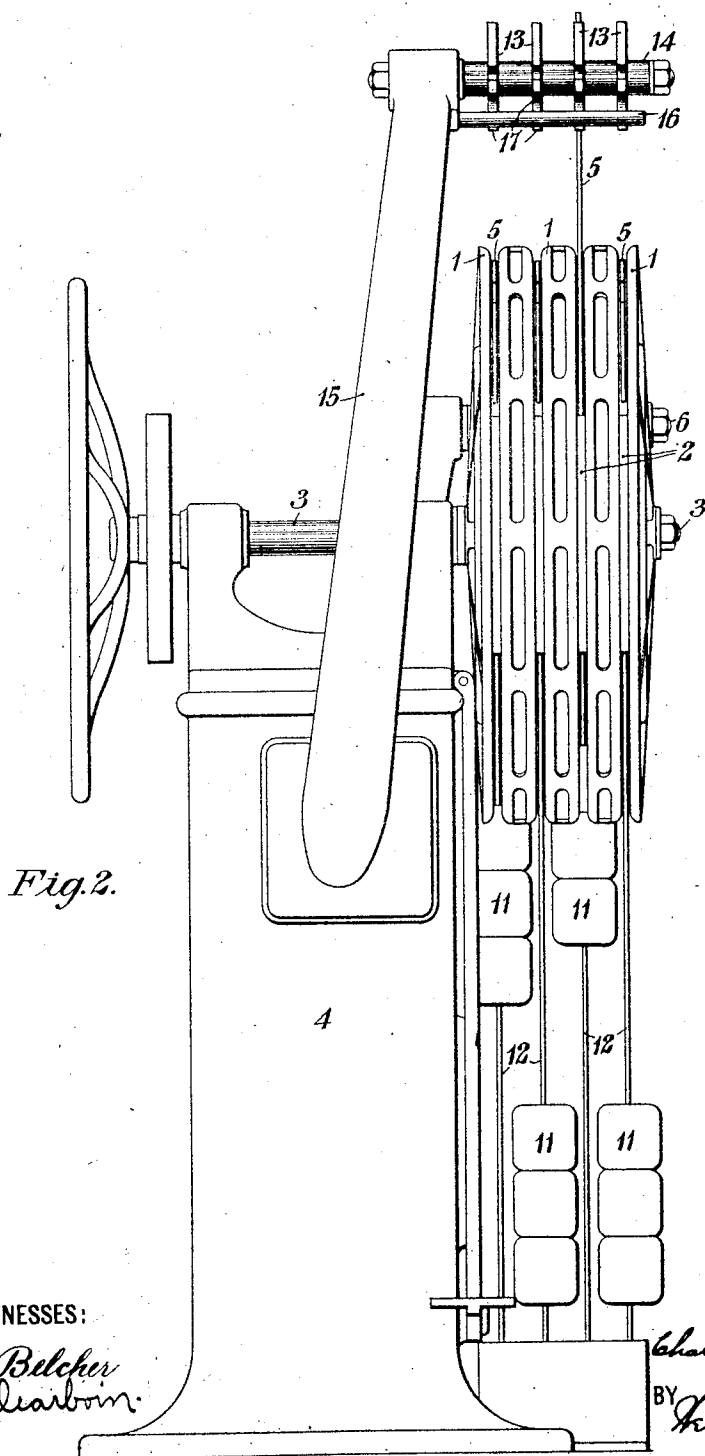


Fig. 2.

WITNESSES:

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R. J. Leaborn

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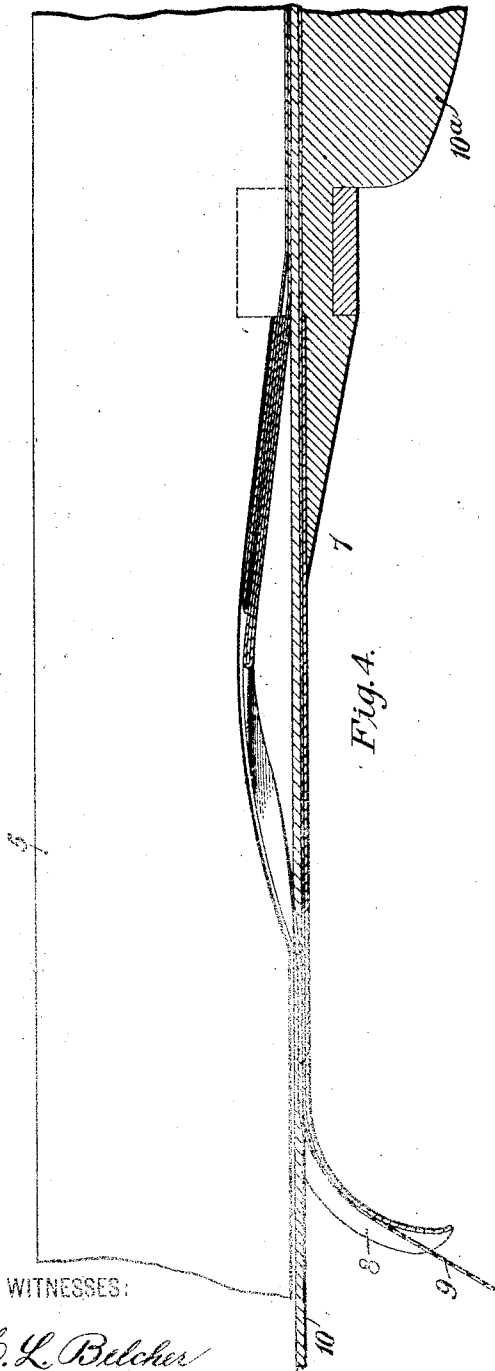
Wm. J. Carr
 ATTORNEY

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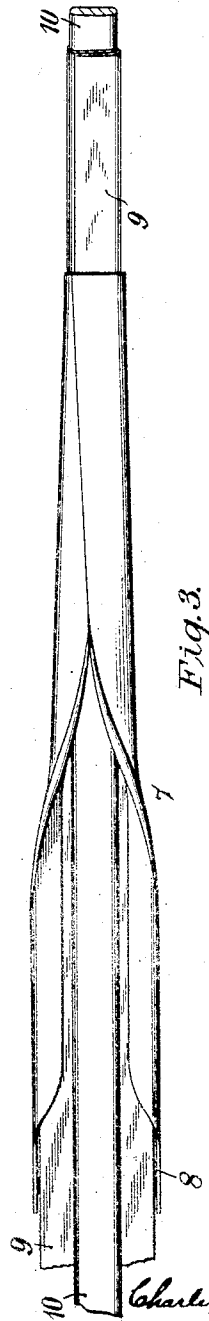
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3 SHEETS-SHEET 3.



WITNESSES:

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R. J. Harbison



INVENTOR

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UNITED STATES PATENT OFFICE.

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COIL-WINDING MACHINE.

999,772.

Specification of Letters Patent.

Patented Aug. 8, 1911.

Application filed July 3, 1905. Serial No. 268,263.

To all whom it may concern:

Be it known that I, CHARLES LE G. FORTESCUE, a subject of the King of Great Britain, and a resident of Wilkesburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Coil-Winding Machines, of which the following is a specification.

My invention relates to means for forming and insulating coils for electrical apparatus and it has special reference to means that are adapted for properly insulating strap conductors and forming them into transformer coils simultaneously.

The object of my invention is to provide means for automatically and simultaneously insulating a conductor and guiding it into position on a winding form that shall be simple and durable in construction and effective in operation.

Transformer coils are usually composed of strap conductors and, in the prior art, such coils were ordinarily either insulated by wrapping a relatively short section of the conductor with tape or other insulating material and then winding the insulated portion onto the former, or previously insulated conductors were utilized, in which case an insulating strip was usually fed onto the former with the conductor, which formed an extra insulation between the turns of the coil. The manual process is necessarily slow and laborious and may be materially facilitated and cheapened by the use of my invention, which automatically covers the conductor with insulating material, as it is fed onto the former, and makes the process continuous.

A further advantage lies in the fact that the operating parts of a machine embodying my invention lend themselves readily to multiple assembling on a single machine, so that several coils may be wound either in a vertical or a horizontal plane at the same time.

My invention is illustrated in the accompanying drawings, in which—

Figures 1 and 2 are, respectively, an end and a side elevation of a machine constructed in accordance therewith and arranged for multiple coil winding in a vertical plane, a portion of the guide plate being broken away, in Fig. 1, to disclose a coil in process of formation. Fig. 3 is a plan and Fig. 4 a sectional view of a tucker or wrapper used in

connection with the machine of Figs. 1 and 2 for folding the insulating strip around the conductor as it is fed onto the former or mold.

Referring to the drawings, a plurality of guide-plates 1 and coil-centering blocks 2 are rotatably mounted upon a horizontal shaft 3, which is journaled in a stationary base 4 and may be driven by any suitable means. A plurality of guide-arms 5 are rotatably mounted upon a shaft 6, which is also supported from the base 4, and each comprises a straight body portion that supports a tucker or folder 7, and a curved end portion that engages the insulated conductor as it is fed onto the coil.

Referring particularly to Figs. 3 and 4, the tucker or folder 7 comprises a tube one side of which is open for some distance at one end and is curved downwardly at the end to form a tongue 8 over which an insulating strip 9 may be fed. A strap conductor 10 is fed into the tube 7 on top of the insulating strip 9, which is made of sufficient width to completely infold the conductor. The construction of the folder 7 is such that the insulating strip is automatically wrapped about the conductor 10 as they pass through, so that the conductor comes from the opposite end of the tube completely wrapped in insulating material and may be wound directly onto the winding form or coil-centering block 2. A tucker or folder tube may be conveniently constructed to accomplish these results by folding over the edges of a strip of sheet metal so that an insulating strip of the desired width may readily slide under the turned edges, which are sufficiently narrow to permit the strap conductor to lie between them upon the insulation. The flanged metal strip is then bent into the form of a substantially elliptical tube at one end, one flanged side overlapping the other, through which the conductor may be fed after being insulated. At the other end of the metal strip, where it is relatively flat, the edges are not turned over and the end is curved to form the guide tongue 8 for the insulating strip. A considerable length of metal strip is utilized in the evolution from the flat portion to the elliptical tube, so that the insulating strip may be gradually bent and folded around the conducting strap, thereby avoiding injury to the insulation and

allowing the conductor to be fed to the machine more rapidly. As the insulated strap leaves the folder 7, it is forced against the edge of its supporting guide-arm by a spreader 10^a which serves to prevent the abrasion of the insulation by the guide-plates and also serves to more closely press the insulating strip against the conductor.

The former blocks 2, which are attached to the winding plates 1, are made commensurate with the cross-section of the core on which the coils are to be assembled and their thickness is equal to the width of the insulated strap conductor. The thickness of each guide-arm 5 is also made substantially equal to the width of the insulated conductor and is so placed on the shaft 6 that it may rest against the surface of its guide-plate 1 and engage the former block 2 without interference with the next adjacent similar plate, which further acts as a guide for the coil. It is advisable to curve the ends of the arms 5 which engage the coils to such a radius that downward pressure may be exerted upon the insulated conductors 10 just as they engage each preceding turn. The arms may be advantageously arranged to bend the conductor slightly away from the center of the coils before they are wound, so that they may lie in close engagement with the preceding turns, particularly on the flat sides of the blocks 2. Care should be taken, however, that the radius employed is not too small, which gives set to the conductors and is detrimental to the formation of the coils. The arms are held in engagement with the coils in process of construction by means of weights 11, which

are hung from the arms 5 by suspending rods 12 that are attached thereto between the shaft 6 and the points of contact with the coils. When one or more of the arms 5 are not in service, they may be held out of engagement with the rotating members, by means of a series of similar locking devices 13 that engage notches 5^a near the free ends of the arms 5 and are rotatably mounted upon a shaft 14, which is supported by an arm 15 that is attached to the base 4. The locking devices 13 are limited to a predetermined arc of rotation by a rod 16 which is parallel to the shaft 14 and engages the one or the other of two projections 17 on each device 13.

Although I have shown and described a specific arrangement as a means to an end, I desire that structural variations which do not materially change the mode of operation or result shall be included within the scope of my invention.

I claim as my invention:

A folder for applying an insulating strip to a strap conductor, said folder comprising a downwardly projecting curved outer end provided with upright guide flanges at its edges, an intermediate, partially closed tubular portion and an elliptical tubular inner end.

In testimony whereof, I have hereunto subscribed my name this 28th day of June, 1905.

CHARLES LE G. FORTESCUE.

Witnesses:

BIRNEY HINES,
J. C. MORSE.