(No Model.)

R. E. B. CROMPTON.

METHOD OF MAKING CONDUCTORS FOR ARMATURES.

No. 497,001. Patented May 9, 1893.

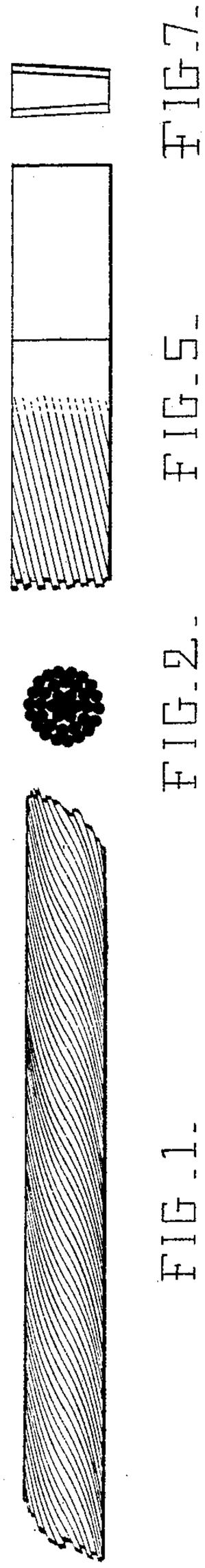

FIG. 1.

FIG. 2.

FIG. 3.

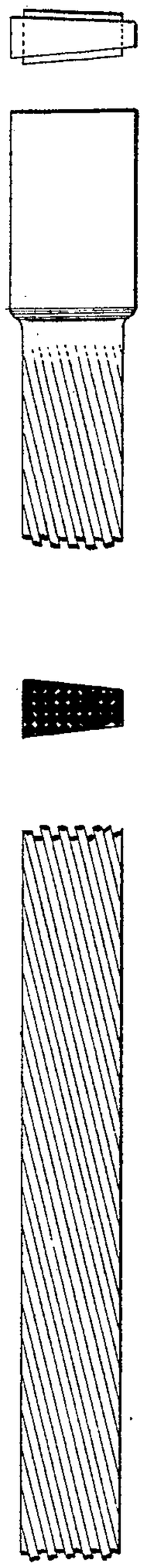

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

WITNESSES

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METHOD OF MAKING CONDUCTORS FOR ARMATURES.

SPECIFICATION forming part of Letters Patent No. 497,001, dated May 9, 1893.

Application filed March 26, 1892. Serial No. 426,628. (No model.)

To all whom it may concern:

Be it known that I, ROOKES EVELYN BELL CROMPTON, electrical engineer, a subject of the Queen of Great Britain, residing at Arc Works, Chelmsford, in the county of Essex, England, have invented certain new and useful Improvements in the Making of Conductors for the Armature Winding of Dynamo-Electric Machines and Electric Motors, of which the following is a specification.

My invention relates to the method of making conductors for the winding of armatures for the dynamos or motors which have to carry large currents.

The object of the invention is to diminish the heating and consequent waste of power which is generally observed when large solid conductors are used to carry large armature currents. In place of these large solid conductors or of the special form of compound conductors twisted in the middle of their length as described and claimed by me in my application of even date herewith, Serial No. 426,627, I employ sections of winding consisting of bundles of originally straight wires twisted in an even and regular manner throughout the entire length and afterward compressed into any desired form most convenient for the armature conductor. To accomplish this I take any desired number of single wires of soft annealed copper carefully straightened. I arrange by so carrying out the annealing that the surface of the wire is covered with a film of oxide of copper or by the use of stannic paint composition or of other insulating paints or varnishes which resist the action of heat and still retain their insulating qualities. I insure that each wire is covered with a film of insulating material. I introduce these straightened and insulated wires into a cylindrical tube in such a manner that they all lie parallel to one another and so form a cylindrical bundle of wires the axes of which are all approximately parallel to that of the tube. I then impart the desired degree of twist to this bundle of wires by a piece of apparatus similar to an ordinary mechanics lathe the tube being mounted on a saddle which is capable of being moved away from a revolving spindle at any desired speed by means of change wheels. The ends of the bundles of wires projecting from one end of the tube are attached by suitable chuck or claw head to the revolving spindle of the lathe and the speed of revolution of this spindle and the rate of longitudinal movement of the saddle carrying the tube are so proportioned to one another by means of suitable change wheels that when the apparatus is at work the tube is slowly drawn away from the head stock at the same time the desired regular twist is given to the bundle of wires. The loose ends are secured by binding or soldering or in any convenient manner and the twisted bundle of wires is then laid in a groove in the die of a hydraulic press. The dies are made of such form that the cylindrical bundles can be compressed to any desired form of cross section, that most generally used being a trapezoid.

Figures 1 and 2 show the cylindrical bundle of wires in side view and cross section. Figs. 3 and 4 show the same bundle in side view and cross section after they have been compressed into the trapezoidal form. Figs. 5 and 6 show the ends of the conductors which have been subjected a second time to hydraulic pressure. Figs. 7 and 8 are end views respectively of Figs. 5 and 6.

Referring to Figs. 1, 2, 3, and 4, it will be seen by this method of procedure that I insure that the finished conductor is still composed of a straight central wire with the other wires disposed symmetrically and spirally round it although forced by the pressure in the dies to take up the trapezoid form of cross section shown on Fig. 4. I thus obtain the result that every individual wire of this twisted and compressed strand remains partially insulated from the adjoining wires forming the combined conductor and that as each individual wire forming the conductor makes at least one revolution round the central one the electro-motive force that is introduced into each and every one of them when passing through a varying magnetic field must be exactly equal, hence there is no tendency for currents to circulate up the wire and back through the wire on the opposite side through the close circuit made by these same wires being solidly soldered into the end connections.

In some cases I find it convenient to submit the ends of the conductors a second time to hydraulic pressure in suitable dies so that the cross section at the ends can be altered in

such manner that the ends are made narrower circumferentially and deeper radially than the active portion of the conductor which lies on the outside of the core itself. By this device I obtain the result that the full section of the armature conductor is maintained through the joints at the ends of the core and I obtain the additional advantage that increased surface is given for making a good soldered joint either to the commutator itself or to the adjoining section as the case may be.

In Fig. 5 I show the ends of the conductors carried through out of the same section as the center portion but in Fig. 6 I show the end portion with the section altered in the manner above described.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is, in an armature for a dynamo-electric machine or motor intended to carry large currents—

1. The described method of forming the active part of the conductors, consisting in laying together a number or bundle of wires, twisting such bundle and then compressing the same in the manner and for the purposes as hereinabove described.

2. The described method of forming the conductors, consisting in twisting together a bundle of parallel wires compressing such twisted bundle as described, and then altering the cross-section of the ends of such twisted and compressed conductors into their required form of cross-section substantially as and for the purposes as hereinbefore set forth.

In testimony whereof I, the said ROOKES EVELYN BELL CROMPTON, have hereunto set my hand this 12th day of March, 1892.

ROOKES EVELYN BELL CROMPTON.

Witnesses:

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