(No Model.)

F. WYNNE.

METHOD OF AND APPARATUS FOR FORMING ARMATURE CORES.

No. 363,106. Patented May 17, 1887.

FIG. 1

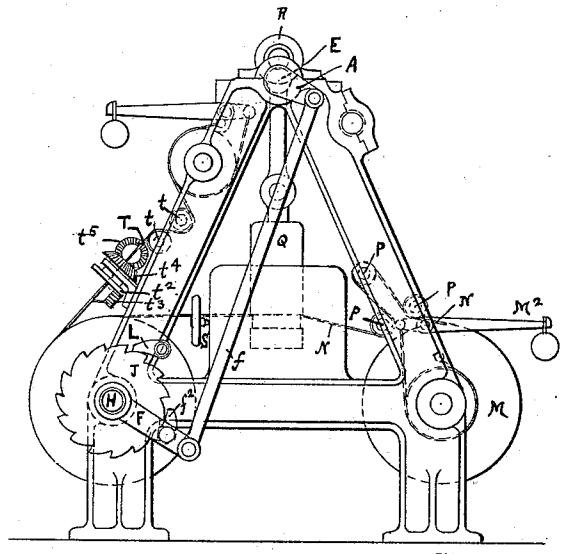


FIG. 3.

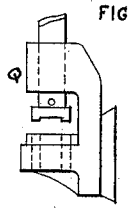


FIG. 4.

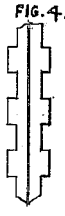
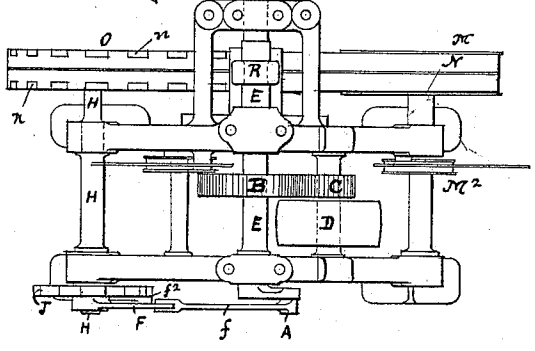


FIG. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRANK WYNNE, OF WESTMINSTER, COUNTY OF MIDDLESEX, ENGLAND.

METHOD OF AND APPARATUS FOR FORMING ARMATURE-CORES.

SPECIFICATION forming part of Letters Patent No. 363,106, dated May 17, 1887.

Application filed September 18, 1886. Serial No. 213,943. (No model.) Patented in Germany January 21, 1885, No. 32,990, and in England June 5, 1885, No. 6,883.

To all whom it may concern:

Be it known that I, FRANK WYNNE, engineer, a subject of the Queen of Great Britain and Ireland, and residing at No. 4 Carteret street, Queen Anne's Gate, in the city of Westminster and county of Middlesex, England, have invented certain Improvements in Means and Apparatus for Making the Cores of Disk or Ring Armatures, (for which I have obtained patents in Great Britain, No. 6,883, dated June 5, 1885, and in Germany, No. 32,990, dated January 21, 1885,) of which the following is a specification.

My invention relates to that class of armatures for dynamo-electric machines known as "disk" or "ring" armatures, of which the well-known Brush and Schuckert armatures are examples, the bobbins of the armatures being wound in pockets formed by the projection of the cheeks of laminated iron beyond the armature-core proper and about as far as the wire of the bobbin extends beyond the core proper. Among other plans of constructing the cores of the said armatures, a ribbon or band or iron is wound spirally, and the cheeks are formed of laminated strips or gap-pieces interposed between the layers of the iron so wound. This method of forming the projecting cheeks is imperfect, inasmuch as the space between the two adjacent bobbins being wedge-shaped a different width of cheek-piece or cheek-pieces is required in each consecutive layer. This in practice is difficult to attain with sufficient accuracy, or else two or more pieces being used to fill up the space gaps of greater or less width are left.

My invention consists in so shaping the band of iron of which the armature-core is wholly or partly made up that in the process of winding it may form the pockets for the reception of the bobbins of the armature.

I will describe my invention with reference to the accompanying drawings, whereof—

Figure 1 is an elevation, and Fig. 2 is a plan.

A is a crank-pin on a shaft, E, driven by ordinary gearing, B C D. The said crank-pin A is connected to an arm, F, by a connecting-rod, *f*, the said arm *f* working round on the end G of the shaft H as a center and carrying a pawl, f^2. This shaft H carries the foundation-ring or other suitable device on which the armature-core is to be wound. Affixed to the shaft H is the ratchet-wheel J, through which the said shaft is driven round by the pawl f^2, the detent L serving to hold the wheel when the pawl f^2 is making its return-stroke.

M is a drum on which band-iron N, of suitable width for the construction of the armatures, is wound.

In the drawings the armature O is shown nearly wound. A brake is shown attached to the drum M, to produce a strain on the band-iron N; but this may be replaced by a weight or spring, or other convenient device, which it has to wind up, and further strain may be brought on the band-iron by the rollers or bars P P.

Q is a punch through or by which the strip of iron N passes, the said punch being shown in greater detail in Fig. 3. It is worked by a connecting-rod and crank, R, from the shaft E. The punch Q and die can be moved laterally through a small distance nearer or farther from O as required by the hand-wheel and screw S. This is to allow of slight adjustment which may be necessary. The ratchet-wheel J has as many teeth as there are pockets *n* to be provided in the armature core, and these teeth are spaced in the same proportion as the angular distance of the pockets from each other, or thereabout. The cranks A and R are so placed relatively to each other that when the pawl f^2 is in gear and forcing J around, Q is being lifted, and when f^2 is making its return-stroke, J being held by L, Q is descending and punching the band N, as required, and before f^2 again begins to force round J, Q is raised and the band-iron is free to be drawn forward. It follows that the strip N will be punched in such a way that the gaps punched in it will succeed each other in the different coils, one above the other, subject to slight differences, as the diameter of the core increases, which slight differences can be corrected from time to time by varying the distance of Q from O.

Fig. 4 shows a part of an armature wound of two parallel strips, each of which may of course be punched and wound separately.

The winding of an intervening strip, over which tape or other insulating material is lapped, may be effected simultaneously with the winding of the main strip for giving proper insulation and air-spaces, as described in the specification of my application for a patent of even date with this.

Fig. 1 shows the wide strip N being wound alternately with a narrow strip, T, lapped with tape or other material, which strip T is about the breadth of the core proper, between the pockets of the armature-core. The strip T may be passed over rollers *t*, as shown, and a rotatory motion given by any suitable arrangement of gearing to the disk t^2, carrying a bobbin, t^3, on which tape is wound, the strip T passing through the center of the disk t^2, as shown, and as it is traversed the tape is lapped around it by the revolution of the said bobbin.

It is not absolutely necessary to have Q and H in mechanical connection, as above described, since, if the crank A, connecting-rod *f*, arm F, pawl f^2, and stop-pawl L were omitted, the shaping of N could be effected by coiling short lengths—say half a circumference—at a time, marking where the punches should act, and then uncoiling it back under the punch, which could be worked by hand or power, then coiling this half-circumference forward again permanently, and an additional half-circumference is then to be marked, as before, and uncoiled for punching, and so on till the whole was coiled and punched. This would require a brake on H as well as M, and fast and loose gearing to wind the parts in opposite directions.

In operating with the drums H and M and the punch Q in this way to turn the ring on H, half a revolution is given to H, the strip N being then marked where the punching is to be done, and then drawn back under the punch Q by the gearing on M, the tension of the strip being obtained by pressure of brake on H. Then, after rewinding this part of the strip permanently on the ring, the shaft H will be wound a further half-circumference, the tension of the strip being obtained by pressure of the brake on M. The half-circumference of N would then be marked, drawn backward, and so on to and fro, winding a whole circumference and unwinding a half-circumference until the winding of the core is completed.

I claim—

1. A machine for the manufacture of cores of the type hereinbefore mentioned, consisting in the combination of a shaft or carrier for the ring or holder of the armature-core and a drum or holder for the strip to be wound and an intervening punch, the said punch being operated and the ring or support of the armature-core being rotated by mechanism giving alternately operation to one and the other.

2. In machines for winding armature-cores of the type hereinbefore mentioned, the combination, with the shaft or carrier for the ring or holder of the armature-core, a drum or holder for the strip to be wound, and an intervening punch, said punch being operated and said ring or holder being rotated by mechanism giving operation alternately to one and the other, of a holder for an additional strip and means for winding a tape or separator therearound, the said strip being laid between the convolutions of the first-named strip.

3. In apparatus for winding strip metal to form armature-cores, the combination of a ratchet and pawl, a carrier for the ring or support for the core, and a punch so relatively arranged and operated that parallel slots may be formed between radiating cheeks for the winding on of the coils.

4. The method of forming the cores of dynamo-machine armatures of the disk type with projecting cheeks, forming pockets within which the armature-coils are wound, the essential features of the said method being the alternate winding of the strips and punching of the same at unequal distances, determined by the changing radius of the wound strip, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK WYNNE.

Witnesses:

CHAS. ROCHE,

JAMES BRISTOW,

Both of 8 St. Martin's Place, Trafalgar Square, London, Notary's Clerks.