

No. 893,570.

PATENTED JULY 14, 1906.

W. CRAMP.
ARMATURE WINDING MACHINE.
APPLICATION FILED SEPT. 3, 1907.

2 SHEETS—SHEET 1.

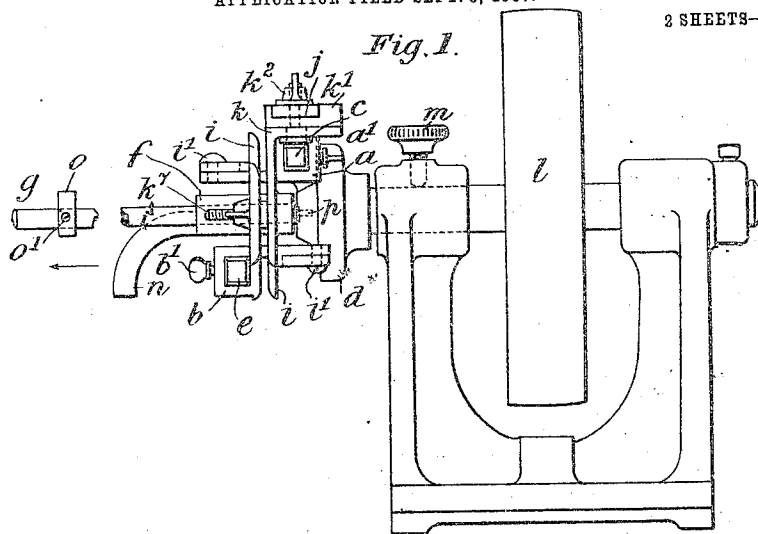


Fig. 6.

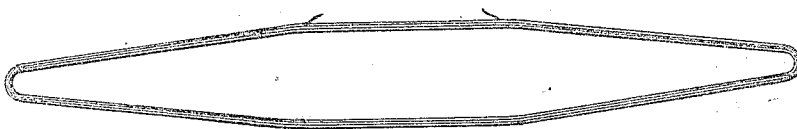
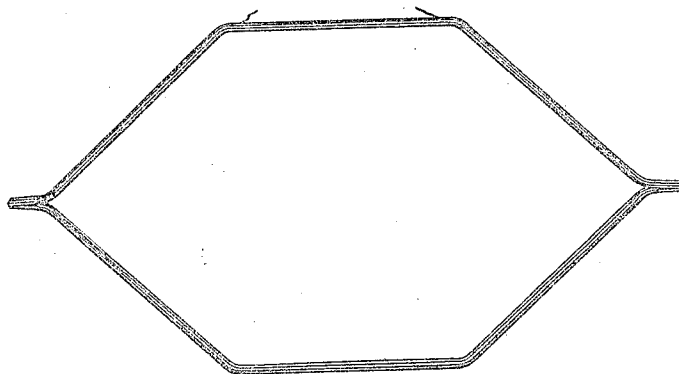


Fig. 7.



Witnesses:
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William Cramp *Inventor,*
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No. 393,570.

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2 SHEETS—SHEET 2.

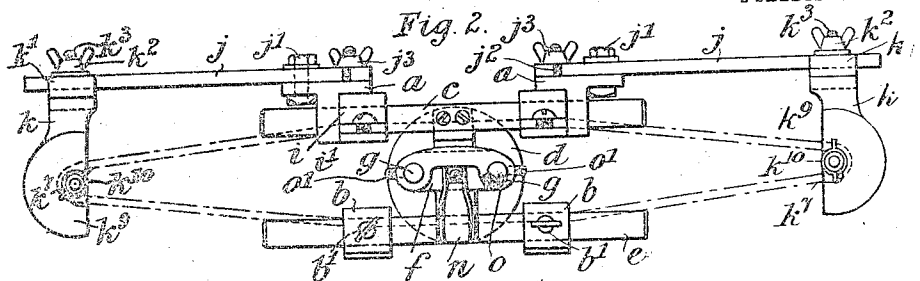
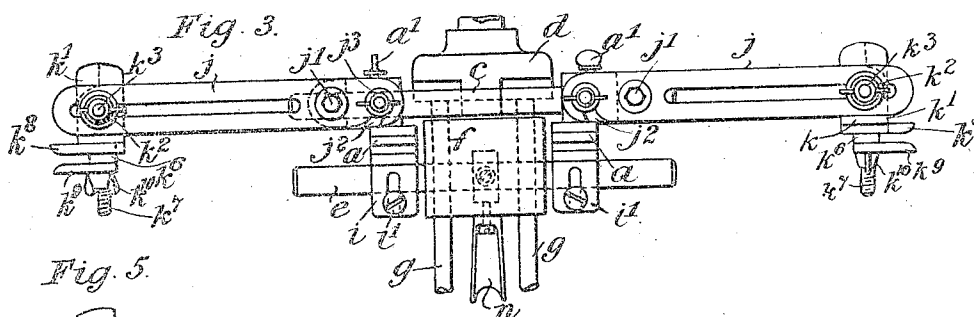
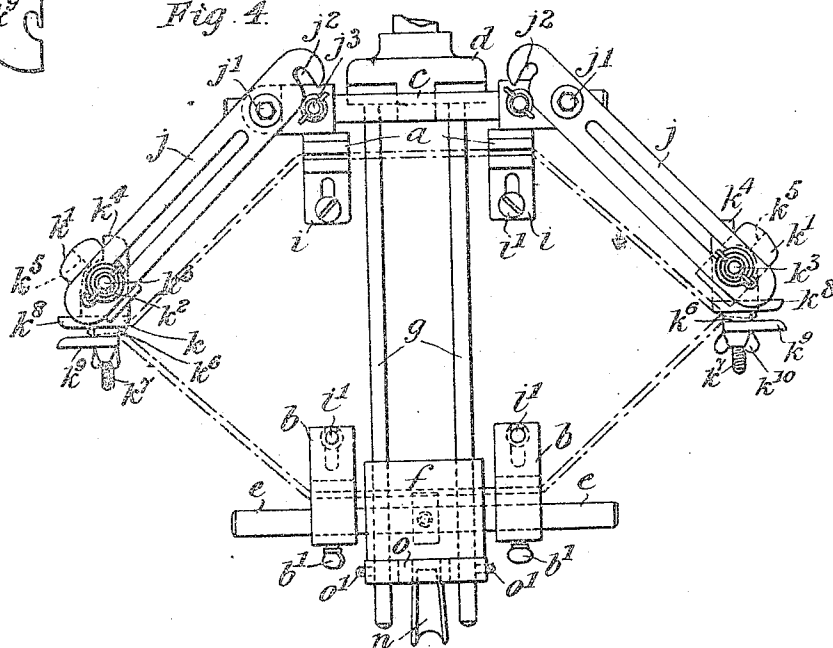


Fig. 5.



Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM CRAMP, OF MANCHESTER, ENGLAND, ASSIGNOR TO SAXON ENGINEERING COMPANY, LIMITED, OF FENTON, STOKE-UPON-TRENT, ENGLAND.

ARMATURE-WINDING MACHINE.

No. 893,570.

Specification of Letters Patent.

Patented July 14, 1903.

Application filed September 3, 1907. Serial No. 331,206.

To all whom it may concern:

Be it known that I, WILLIAM CRAMP, a subject of the King of Great Britain, residing at 7 Brazenose street, Manchester, England, have invented a new and useful Armature-Winding Machine, of which the following is a specification.

My invention relates to machines for shaping coils for so-called former-wound armatures and such like parts of electrical machinery, the object of my invention being to provide a machine for this purpose which is of simple construction.

The machine constructed according to my invention comprises a pair of adjustable jaws capable of rotation which, when the tool is closed lie one above the other in a plane approximately at right angles to the axis of the machine. Attached to one jaw is a pair of adjustable coil-end supports, carried by adjustable arms pivoted to the jaw, the pivots being arranged so that, if necessary, the arms may be locked in position. These parts are arranged so as to be capable by their rotation when closed of forming narrow lozenge shaped coils, of various lengths and sections according to the adjustments made beforehand. Besides being capable of rotation, as stated, one jaw is arranged so that it can slide forward independently of the other in a direction parallel to the axis of rotation. After the coil has been wound it can be opened out to the wide lozenge shape required for drum armatures by causing the jaw which supports one side of the coil to move relatively to the jaw which supports the other side; the one part being drawn forward while the other remains stationary. The ends of the coils are supported and guided by means of the adjustable arms and their end supports; the tension of the coil assisting to form the coil-end always to the desired shape, *i. e.*, as loops in a plane practically at right angles to the axis.

In order that my invention may be more readily understood I will now describe the same with reference to the accompanying drawings in which:—

Figure 1 is a side elevation of a machine constructed in accordance therewith. Fig. 2 is a front elevation thereof; Fig. 3 a plan of the machine in the closed position. Fig. 4 a plan of the same in its open position. Fig. 5 is a detail view of a guide or cheek. Fig. 6 a front view of a coil as formed upon the closed

machine and Fig. 7 is a plan view of the same coil when finished.

a, a and *b, b* are double jaws the former of which are adjustable along a bar *c* and locked in position thereupon by means of screws *a'*, *a'*, the said bar being screwed fast to a rotatable head *d*. The jaws *b, b* are likewise adjustable and set in position by screws *b'*, *b'* along a bar *e* screwed to a block *f* adapted to slide upon rods *g, g* which are screwed or otherwise secured to the rotatable head *d* parallel with its axis. The jaws *a, a* and *b, b* are each made in two parts adjustable relatively to one another in order to accommodate coils of varying thickness, one cheek or side *i* being movable along an extension of the body part and adapted to be fixed in the desired position by a screw *i'* passing through a slot in the part *i*.

j are the adjustable arms pivotally connected by bolts *j'* to the jaws *a, a* and slotted at *j''* so that they may be turned into the closed position under nuts *j'''* by means of which they may be locked while the coil is being wound. The adjustable arms carry the coil-end supports *k* pivotally mounted upon saddles *k'* which may be secured at any point along the arms *j* by means of clamp-nuts *k''* upon bolts *k'''* which also serve as pivots for the supports *k*. In order to retain the supports in line with the jaws *a, b* when the latter are closed, extensions *k''* of the supports engage stops *k'''* upon the saddles *k'*. The supports *k* carry the coil upon a core *k''* formed of one or more washers packed, according to the width of the coil required, upon each of the screws *k'''* projecting from the cheek or guide *k''* forming one side of the support *k*. The cheek or guide *k''* forming the other side of each support is slotted as shown in Figs. 2 and 5 to allow of its ready removal from the screw *k'''* to which it is clamped by the nut *k'''*.

The head *d* is adapted for attachment to a mandrel mounted in a suitable head-stock and adapted to be rotated by means of a wheel *l*, the said head-stock being provided with a set-screw *m* for preventing rotation of the head *d* when required.

In winding a coil with wire from a reel or other suitable source of supply one end of the wire is attached in any suitable manner to some suitable point say to one of the jaws, then with the parts of the machine locked in the position shown in Fig. 3, the wheel *l* is

operated to rotate the jaws and end supports k so that a coil of the shape shown in Fig. 6 and indicated by dotted lines in Fig. 2, is formed, the head being rotated until a sufficient number of turns is laid within the said jaws. The nuts j^3 are then unscrewed slightly to allow the arms j , j to be rotated about the pivots j^1 to the position shown in Fig. 4. This is effected by the operator, who, by pulling the handle n in the direction indicated by the arrow in Fig. 1, slides the block f and with it the jaws b along the guide-rods g so as to open out the coil to the shape shown in Fig. 7 and indicated by dotted lines in Fig. 4. In moving to this position the end supports k may turn freely upon their pivots k^3 though in some cases they may be attached to a parallel motion so as to give them a positive movement from the position shown in Fig. 3 to that in Fig. 4. I have found, however, that this is not usually necessary. To remove the coil from the machine the wing-nuts k^{10} are slightly unscrewed so as to release the cheeks k^9 which can then be removed from the screws k^7 . The coil is then withdrawn from the jaws a , a and can be readily passed over and away from the screws k^7 in the direction of their length.

The movement of the block f is limited by a stop o which can be set at any desired point along the rods g , g by means of set screws o^1 .

A screw p is preferably provided in the rotatable head d and can be screwed in or out for the purpose of limiting the movement of the block f in the direction opposite to that indicated by the arrow in Fig. 1 so that the jaws a may be set in line with the jaws b and end supports k .

I wish it to be understood that the construction described above is by no means necessary to the carrying out of my invention. Also, where a large number of coils of the same size have to be turned out, a machine can be made adapted to the particular size of coils without the adjustments which are necessary where coils of varying sizes have to be made.

It is obvious that in some cases instead of rotating the device upon a mandrel, it might be fixed, and the wire might be wound on the jaws by carrying round the bobbin from which it is wound.

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:—

1. In an armature coil winding machine, the combination comprising the upper and

lower sets of jaws and the end supports carried by pivoted levers, suitably mounted so as to enable a plane coil to be wound and then shifted to open out the coil, substantially as described.

2. In an armature winding machine, the combination with a rigidly secured upper set of jaws, of a lower set of jaws, guides on which said lower set of jaws are mounted, said lower set of jaws being movable on said guides into and out of the plane of the upper jaws and the movably mounted end supports, substantially as described.

3. In an armature winding machine, the combination with a revoluble head, of a pair of jaws rigidly mounted thereon, a pair of movable jaws, guides for said movable jaws connected to said head, and end supports supported from said head and movable in relation thereto, substantially as described.

4. In an armature winding machine, the combination with a revoluble head, of a pair of jaws rigidly secured thereto, a pair of movable jaws, guides for said movable jaws, and end supports mounted upon levers, adapted to be secured in rigid relation to said head, substantially as described.

5. In an armature winding machine, the combination with a revoluble head, of a pair of jaws rigidly secured thereto, a pair of movable jaws, guides for said movable jaws secured to said head, lever supports pivoted to a rigid part of the machine, means whereby said levers may be rigidly secured in position or released to permit movement of the same, and end supports secured to said levers, substantially as described.

6. In an armature winding machine, the combination with a revoluble head, of a pair of jaws rigidly secured thereto, a pair of movable jaws, guides for said movable jaws secured to said head, lever supports pivoted to a rigid part of the machine, means whereby said levers may be rigidly secured in position or released to permit movement of the same, and end supports pivotally secured to said levers, substantially as described.

7. In an armature coil winding machine, the combination comprising the head d on which are mounted the jaws a , a , the levers j , j carrying the end supports, and the block f carrying the jaws b , b , so as to enable the coil to be opened after it is wound, substantially as described.

WILLIAM CRAMP.

Witnesses:

MALCOLM SMETHURST,
GEORGE WEAVER.