J. F. CULLIN.

MACHINE FOR POSITIONING ARMATURE WINDINGS.

APPLICATION FILED OCT 8, 1920.

1,402,217.

Patented Jan. 3, 1922.

4 SHEETS—SHEET 1.

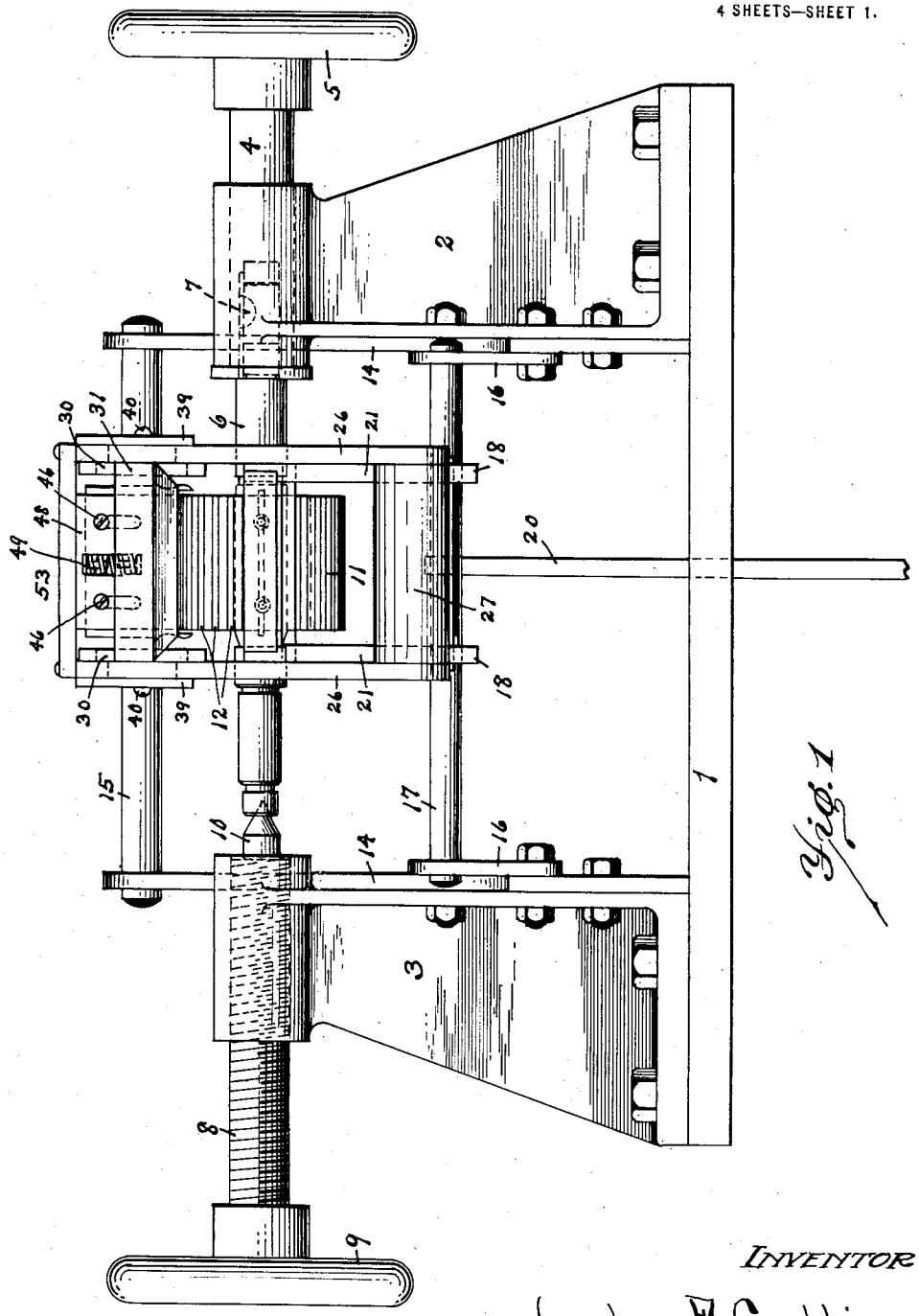


Fig. 1

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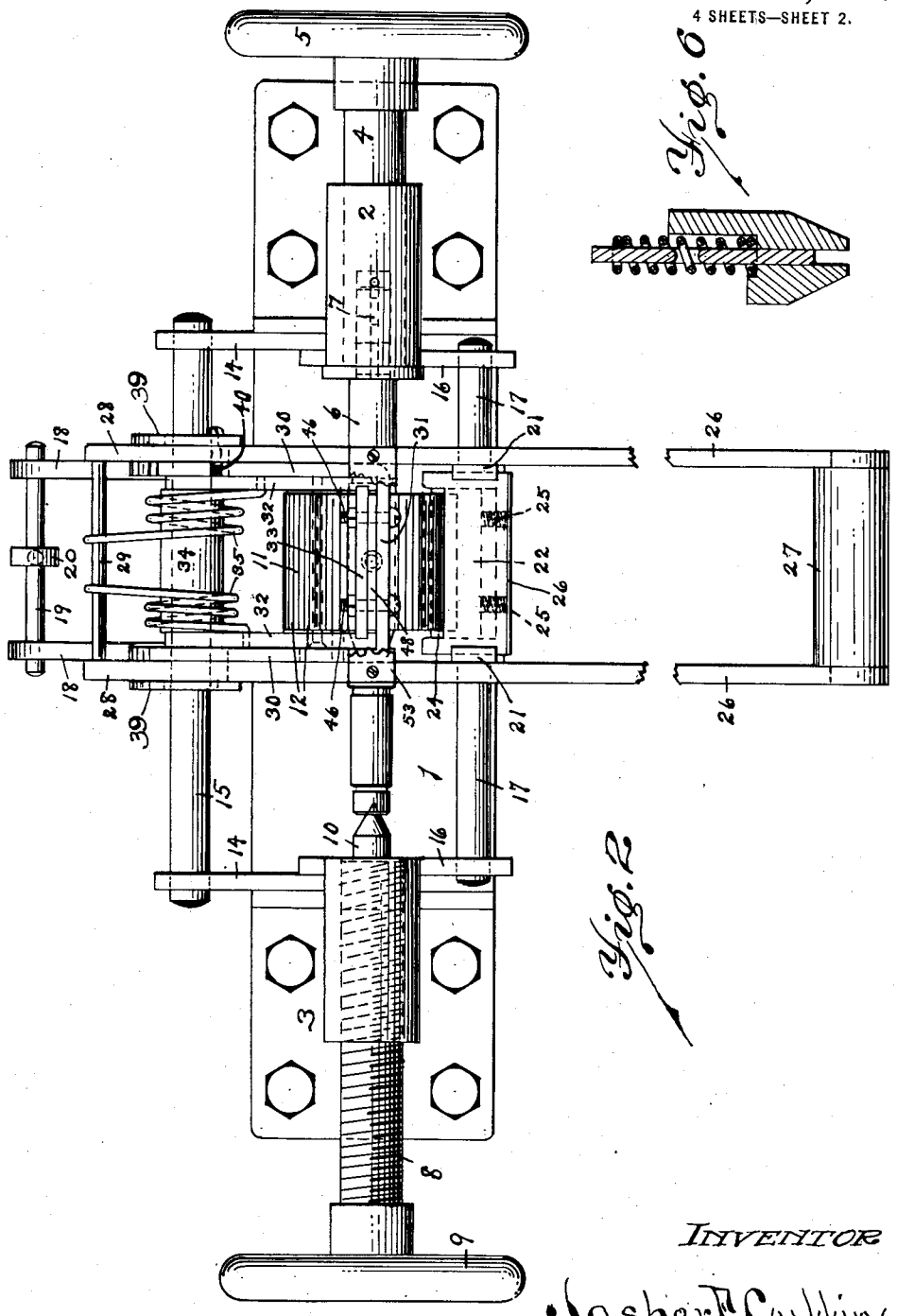


Fig. 2

Fig. 6

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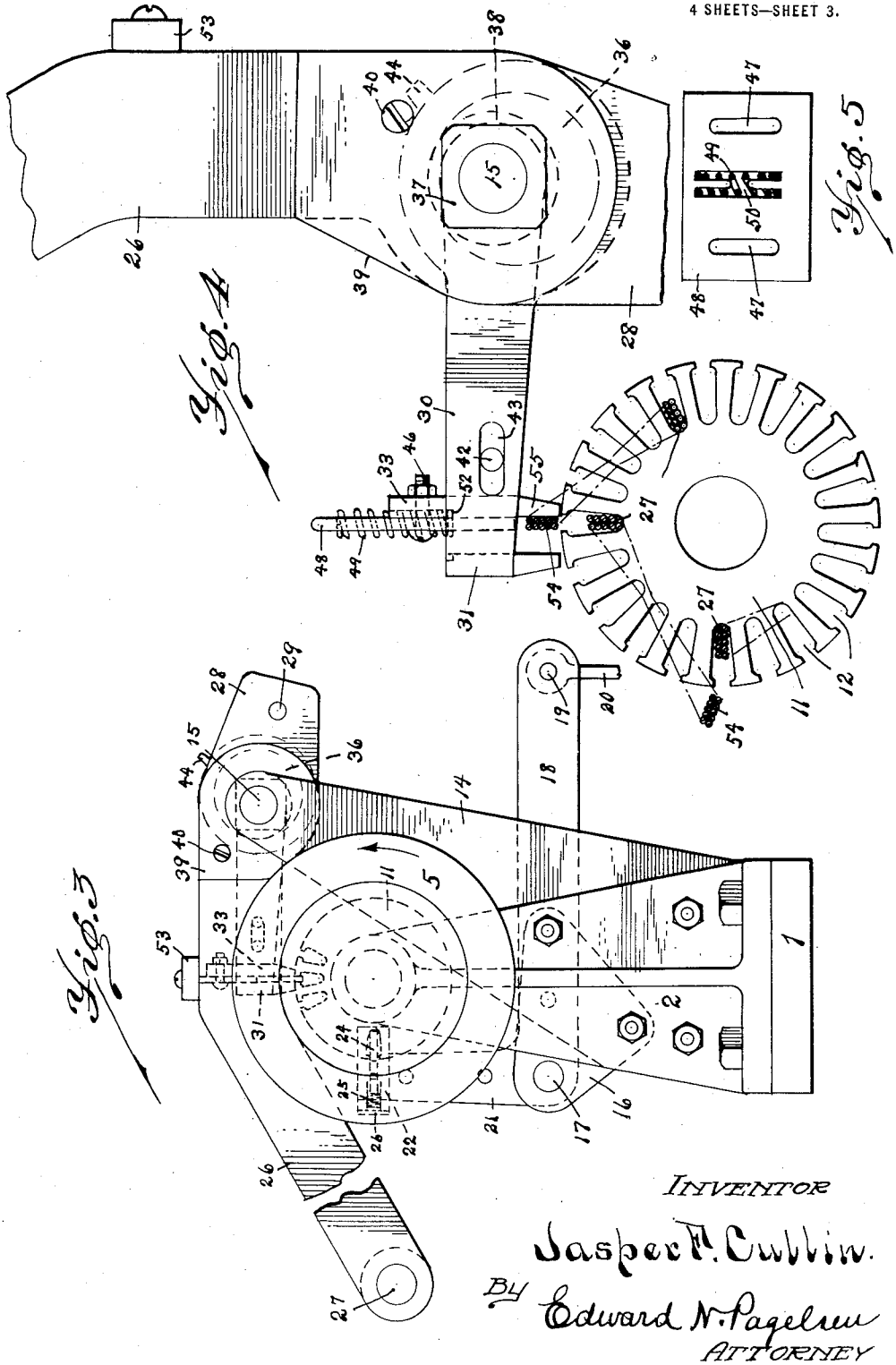


Fig. 4

Fig. 5

Fig. 3

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Fig. 7

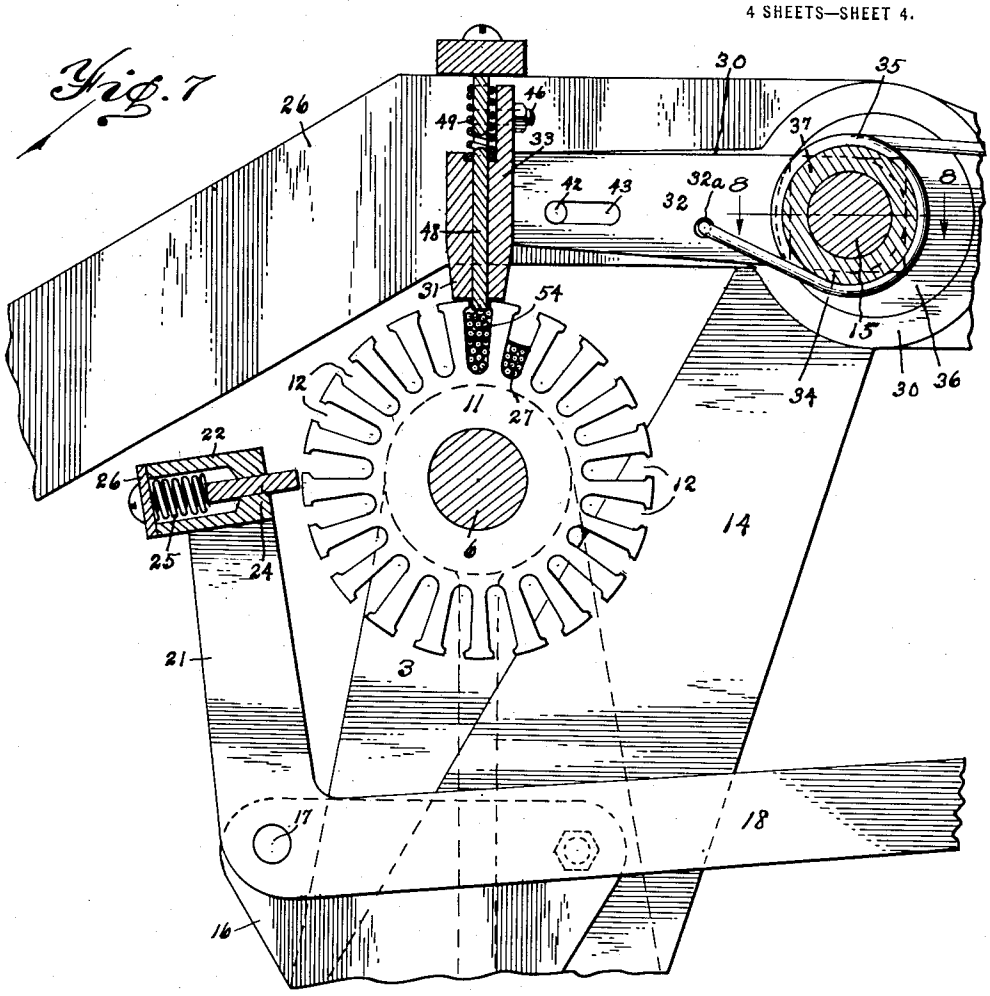
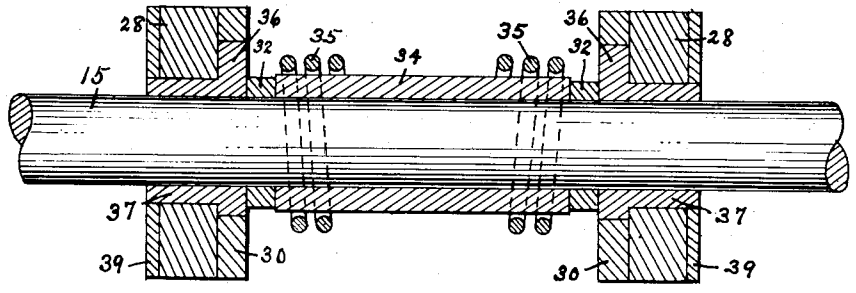


Fig. 8



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UNITED STATES PATENT OFFICE.

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MACHINE FOR POSITIONING ARMATURE WINDINGS.

1,402,217. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed October 8, 1920. Serial No. 415,555.

To all whom it may concern:

Be it known that I, JASPER F. CULLIN, a citizen of the United States, and residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Machine for Positioning Armature Windings, of which the following is a specification.

This invention is embodied in a device for first forcing one of the parallel sides of each of the several windings of armatures of electric machines into the slots in the cores thereof and thereafter pressing the opposite sides of these several windings down onto the sides already in the grooves, and comprises the details of construction illustrated in the accompanying drawings and pointed out in the claims, and particularly in the mechanism for accurately forming the windings so that these second sides may be readily inserted in the grooves.

In the accompanying drawings, Fig. 1 is a front view of the device with the operating handle depressed. Fig. 2 is a plan thereof. Fig. 3 is an end elevation thereof. Fig. 4 is a detail showing the device for giving the windings the desired dimensions after portions thereof have been forced into the bottoms of the grooves in the armature core. Fig. 5 is a front elevation of the blade for forcing the second portions of the windings into the grooves in the cores. Fig. 6 is a vertical section of this blade and the holder therefor. Fig. 7 is a vertical section of the upper part of this machine at right angles to the shafts thereof. Fig. 8 is a section on the line 8—8 of Fig. 7.

Similar reference characters refer to like parts throughout the several views.

The base 1 of this device supports the head stock 2 and the tail stock 3. Rotatable in the head stock is a spindle 4 having a hand wheel 5 by which the armature shaft 6 mounted in this spindle may be turned. The shaft is inserted in a central hole in the spindle and turned by the key 7. The tail screw 8 has a hand wheel 9 and a center 10 to enter a proper center hole in the armature shaft. The drawings show conventionally an armature 11 provided with slots 12 to receive the windings.

Attached to the head and tail stocks are the brackets 14 which carry the shaft 15, and the smaller brackets 16 which carry the shaft 17. Secured to the shaft 17 are two levers 18 between whose outer and rear ends extends a pin 19, to which is connected a link 20 which preferably extends down to a foot pedal (not shown) of any desired construction. Any desired means, preferably a spring (not shown), holds up the foot pedal and the levers 18.

A pair of arms 21 extend up from the levers 18 and between them is secured a cross bar 22 having a longitudinal slot in which the blade 24 is slidable. This blade is normally held toward the armature by the springs 25 which abut against the plate 26 secured to the front side of this cross bar 22.

The armature is turned step by step toward the operator, as indicated by the arrow in Fig. 3. The operator holds the windings vertical and inserts the upper parallel portions 27 of the several windings in the slots 12 and as each slot comes into alinement with the blade 24, he steps on the foot pedal and forces the blade down onto the winding and drives this portion thereof to the bottom of the slot. The operation is repeated until the slots have all received a portion of a winding. As the blade is yieldably held, the danger of shearing off strands of the windings is greatly reduced.

Mounted on the shaft 15 are three pairs of arms, the outer arms having their front ends 26 connected by the handle 27 and their rear ends 28 by the pin 29. The intermediate arms 30 are connected at their front free ends by the cross bar 31, while the inner arms 32 are connected by the cross bar 33. These inner arms are mounted directly on the shaft 15 on each end of the sleeve 34 on which is mounted springs 35 which engage the cross pin 29 carried by the outer arms 28 and also the inner arms 32 and tend to press down these inner arms ahead of the outer arms, the inner arms 32 being formed with holes 32^a to receive the out-turned ends of the springs.

The intermediate arms 30 are mounted on eccentrics 36 which are mounted on the shaft 15 and these eccentrics have square hubs 37 which are rotatable and centered in the bores 38 of the outer arms 28, a plate 39 fitting each of these squared hubs on the outside of the adjacent outer arm to which the plate is attached by means of a screw 40 so that the eccentrics will turn with these outer arms and cause the intermediate arms 30 to move endwise relative to the inner

arms 32. A pin 42 on one of the inner arms extends through a slot 43 in one of the intermediate arms and holds the cross bars 31 and 33 opposite each other. One screw 40 extends through the arm 26 into the path of the projection 44 on one intermediate arm so that when the outer arms are swung up to the position shown in Fig. 4 the intermediate and inner arms may be lifted to permit a new winding to be moved into position.

Screws 46 extend through slots 47 (Fig. 5) in the blade 48 and the spring 49 mounted in the slot 50 in this blade rests on a shoulder 52 (Fig. 4) on the cross bar 33 and normally holds this blade elevated. The cross bar 53 on the outer arms 26 is adapted to press down this blade. The operation of this device is as follows.

The windings having been positioned with their sides 27 in the bottoms of the slots in the armature core, the operator swings his operating handle 27 forward until the springs 35 bring the lip 55 of the cross bar 33 within the winding whose side portion 54 he decides to place in the proper slot above the already positioned side 27. He turns the shaft 6 of the armature until the proper slot 12 is just below this portion 54 and then brings down the operating handle. The eccentrics 36 cause the front cross bar 31 to move back until the side 54 of the winding is compressed to the desired thickness. Further movement of the handle brings the bar 53 down onto the blade 48 which forces the portion 54 of the winding into the slot below it.

The handle 27 is then swung up to permit the blade 48 to rise and also to lift the cross bar 31 out of the path of the next winding which is carried to position against the lip 55 by again turning the hand wheel 5. The alternate turning of this hand wheel by the right hand and depression and then lifting of the handle 27 by the left quickly and accurately positions these windings in their proper slots in the armature core.

The details and proportions of this machine may all be changed by those skilled in the art without departing from the spirit of my invention as set forth in the following claims.

I claim:—

1. In a machine of the class described, the combination of means for rotatably supporting the armature of an electric machine, means to place one side of each of the windings of said armature in their proper slots in the armature, means to position the opposite sides above their proper slots, means to reduce the windings to their proper thickness, and means to force said opposite sides into said slots.

2. In a machine of the class described, the combination of a pair of stocks to rotatably support the armature of an electric machine comprising a rotatable spindle and a hand wheel at the outer end thereof and a longitudinally movable spindle with a center in its inner end, means to place one side of each of the windings of said armature in their proper slots, means to position the opposite sides above their proper slots, means to reduce the windings to their proper thickness, and means to force said opposite sides into said slots.

3. In a machine of the class described, the combination of means for rotatably supporting the armature of an electric machine, a shaft and bearings therefor, a pair of arms mounted on the shaft and a cross bar connecting the ends of said arms, a spring held blade mounted in said cross bar and adapted to engage one side of the windings of the armature and force them into the slots in the armature, means to position the opposite sides of said windings above their proper slots, means to reduce the windings to their proper thickness, and means to force said opposite sides into said slots.

4. In a machine of the class described, the combination of means for rotatably supporting the armature of an electric machine, means to place one side of each of the windings of said armature in their proper slots in the armature, a shaft and a pair of arms mounted therein, a cross bar connecting the ends of said arms and adapted to engage the opposite sides of said windings, means to reduce the windings to their proper thickness, and means to force said opposite sides into said slots.

5. In a machine of the class described, the combination of means for rotatably supporting the armature of an electric machine, means to place one side of each of the windings of said armature in their proper slots in the armature, a shaft and a pair of arms mounted thereon, a cross bar connecting the ends of said arms and adapted to engage the opposite sides of said windings, a spring to hold the cross bar down against said armature, means to reduce the windings to their proper thickness, and means to force said opposite sides of the windings into said slots.

6. In a machine of the class described, the combination of means for rotatably supporting the armature of an electric machine, means to place one side of each of the windings of said armature in their proper slots in the armature, a pair of arms, a shaft and a pair of eccentrics on which the arms are mounted, a cross bar connecting the ends of said arms, and an operating handle to turn said eccentrics, and means connected to said operating handle to force the opposite sides of the windings into said slots.

7. In a machine of the class described, the combination of means for rotatably sup-

porting the armature of an electric machine, means to place one side of each of the windings of said armature in their proper slots in the armature, means to position the opposite sides of the windings above their proper slots, means to reduce the windings to their proper thickness comprising a pair of arms, a shaft and a pair of eccentrics on which the arms are mounted, a cross bar connecting the ends of said arms, a spring held blade mounted on said cross bar, and an operating handle to turn said eccentrics and to force said spring held blade down onto the windings.

8. In a machine of the class described, the combination of means for rotatably supporting the armature of an electric machine, means to place one side of each of the windings of said armature in their proper slots, a shaft parallel to the armature shaft, three pairs of arms mounted on said shaft, a cross bar connecting the two inner arms and having a downwardly extending lip to position the opposite sides above their proper slots, a spring supported blade mounted on said cross bar, a cross bar connecting the two intermediate arms and eccentrics on said shaft on which the opposite ends of said arms are mounted, the outer pair of arms being connected to said eccentrics to force the second named cross bar toward the first to reduce the windings between them to proper thickness, an operating handle connecting said outer arms, and a cross bar connected to said outer arms and adapted to engage the blade carried by the first named cross bar to force the windings into said slots.

9. In a machine of the class described, the combination of means for rotatably supporting the armature of an electric machine which has had one side of each of the windings of said armature positioned in their proper slots, means to position the opposite sides of the windings above their proper slots, and means to force said opposite sides into said slots.

10. In a machine of the class described, the combination of means for rotatably supporting the armature of an electric machine which has had one side of each of the windings of said armature positioned in their proper slots, means to position the opposite sides of the windings above their proper slots, means to reduce the windings to their proper thickness, and means to force said opposite sides into said slots.

11. In a machine of the class described, the combination of means for rotatably supporting the armature of an electric machine, means to place one side of each of the windings of said armature in their proper slots in the armature, means to position the opposite sides of the windings above their proper slots, and means to force said opposite sides into said slots.

JASPER F. CULLIN.