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- (54) Benævnelse: **ANORDNING OG FREMGANGSMÅDE TIL VIKLING AF POLER AF KERNER TIL ELEKTRISKE DYNAMOMASKINER**
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DESCRIPTION

Background of the invention

[0001] The present invention relates to winding coils of electric dynamo machines. In particular, the solutions of the invention relate to winding poles of cores where the slots for receiving the coils have external openings.

[0002] The turns of the coils are wound by at least one dispenser arm capable of delivering wire on the surfaces of wire guide members, where the wire runs to reach predetermined positions in the slots. The final winding result requires that the wire of the turns be deposited in the slots according to a predetermined disposition, therefore not randomly.

[0003] The turns of the coils are positioned during winding according to a required disposition to optimize the quantity of conductor wire that can occupy the available space of the slot. Furthermore, the turns should not cross each other, or be excessively deformed locally to avoid damaging the wire insulation.

[0004] The disposition of the turns around a pole foresees progressively winding a series of turns in the radial direction of the core. One turn is wound along the sides and along the axial ends of the pole. The sides of the pole delimit a slot. The succession of turns wound in this manner forms a layer of turns. Within the layer, the turns have a so called "radial stratification"; in other words a disposition where the turns are one next to the other in the radial direction of the pole that is being wound.

[0005] To complete the coil further layers are formed. In each further layer the turns are again wound one next to the other in the radial direction of the pole. A further layer is formed above the layer wound previously, therefore positioning of the successive layers occurs in an angular direction of the core to form the so called "stratification of the layers of the turns".

[0006] In a same slot, there will be positioned portions of two coils (layers of turns). Each portion of a coil is wound around a pole that is adjacent to two poles. Therefore, there are specific portions of the slot space occupied by respective coil portions of coils, and there is a certain part of the slot space which remains empty. This empty part is a delimitation area between the portions of the coils wound in the same slot. The empty portion is radially aligned with the opening of the slot where the wire passes to enter the slot during winding.

[0007] Winding in this context may require connection of the coil leads to termination structures of core, like tangs or other devices, where the wire needs to be connected, for example by wrapping or insertion techniques.

[0008] Machines and methods for winding coils in the context described above are described in US 6,848,646. In this case, the solution foresees a dispenser arm that rotates around the poles to dispense the wire forming wire turns. The wire leaving the dispenser arm is intercepted by a wire guide assembly, which is aligned with the aperture of the slots and with the position of the pole where the turns being wound need to be positioned.

[0009] In the solution of this document no parts of the wire guide enter the slots of the core, and the part of the wire guide that guarantees the radial stratification of the turns along the pole is progressively distanced from the axial end of the core, as the layers are formed in order to perform depositing of the wire correctly.

[0010] US 5,484,114 discloses a armature winding device using a needle for dispensing wire inside the armature. According to US 5,484,119 the needle has a flange for guiding the wire, wherein the flange partly reaches inside the slot opening between the poles.

[0011] The solutions of publication EP 1420505 make use of a needle provided with translation motion, and rotation of the core to wind the turns around the poles. If the needle is sufficiently narrow, it can be made to pass through the openings of the slots, and therefore the needle can accomplish deposition trajectories producing radial stratification.

[0012] The needle solution has a trajectory consisting of translations combined with rotations with respect to the core. The resulting trajectory has stretches where loss of tension occurs on the wire (particularly for a wire that is greater than a certain diameter) due to an excessive release of wire from the needle.

[0013] The stretches of wire where this release occurs are difficult to position around the pole. Furthermore, the size of the needle thickness that enters the slot and occupies the empty portion of the slot, which delimits the portions of coils present,

impedes a maximum and optimized filling of turns with respect to the available space.

[0014] The solution of the present invention are capable of achieving the maximum filling of turns in the slots using a stratified disposition in the radial direction and of the layers in the angular direction.

[0015] Furthermore, the solution of the present invention is capable of achieving connection of the coil leads to termination structures of the core.

[0016] In relation to termination solutions, EP 1,353,436 describes solutions for accomplishing connections of the coil leads to termination structures of the core using a rotating flyer arm for winding and a wire guide for accomplishing radial stratification of the turns along the pole.

Summary of the invention

[0017] It is therefore one object of the invention to wind cores having slots with external "openings so that the wire forming the turns is correctly tensioned and results properly positioned in the slots using a wire dispenser that has a rotating trajectory to deliver the wire to be wound.

[0018] It is a further object of the present invention to guarantee that the wire wound on the pole of the core results correctly positioned in all areas of the slot that is available for the turns of wire.

[0019] It is also an object of the invention to guarantee a maximum filling of the slots of the core.

[0020] It is another object of the invention to provide a winding solution that is rapid in the time necessary for winding the coils of the core.

[0021] It is a further object of the present invention to also achieve connection of the coil leads to termination structures of the core.

[0022] These and other objects are achieved by the present invention through an apparatus according to the appended independent apparatus claim 1 or through the appended independent method claim 12. Further characteristics of the invention are set out in the dependent claims.

Brief description of the drawings

[0023] These and other objects and advantages of the invention will become apparent from the following detailed description, which is only provided by way of non-limiting example, with reference to the annexed drawings, wherein:

- Fig. 1 is an elevation view with a partial section of the apparatus of the solution of the invention;
- Fig. 2 is a partial view according to direction 2 of figure 1 with certain parts omitted for reasons of clarity showing an operation stage before starting winding;
- Fig. 3 is an enlarged view from direction 2 of figure 1 showing a winding stage of the core using the solution of the invention;
- Fig. 4 is a partial section view according to directions 4-4 of Fig. 1;
- Fig. 5 is a partial section view of an embodiment of the invention that is capable of connecting coil leads to termination structures of the core. The section part of figure 5 is similar to the view of figure 4;
- Fig. 6 is a section view as seen from directions 6 - 6 of figure 5.

Detailed description of the invention

[0024] With reference to Figures 1-4, and in particular to the enlarged view of figure 3, there is shown a core 10 of a dynamo electric machine having slots 10a and 10b which delimit pole 10c. Slots 10a and 10b have respective apertures 10a' and 10b'

facing externally, when considered in their orientation with respect to a central axis 10' of the core. In figure 3, a guide member 32 has been illustrated transparent to show the area below pole 10c. Furthermore, turns Sp which cross pole 10c are shown without section, whilst others indicated with S and represented by a circle, are sectioned for reasons of clarity and simplification of the explanations.

[0025] The turns Sp and S of coils B of wire W are wound in slots 10a and 10b according to a required disposition. In particular, as shown in figure 3 a first stretch of a turn of layer ST1 of coils B is positioned against a longitudinal sides L and axial ends A of pole 10c which delimit a slot. Other layers of turns ST2, ST3 become progressively superimposed overlapped as shown in figure 3.

[0026] With reference to figure 1, the apparatus of the invention comprises a dispenser arm 11 fixed to a rotor shaft 12 by means of a clamp fastened by bolts 13. In figures 2 and 3 the dispenser arm 11 has been omitted for reasons of clarity.

[0027] In figure 1 the rotor shaft 12 is shown as a hollow member supported on bearings 14 of a motor 15 and bearing 16 of a hub 17. Furthermore, a tubular member 18 is foreseen seated in shaft 12, as shown in figure 1.

[0028] The winding wire W travels through the tubular member 18 and is re-directed at a pulley wheel 19, which is integral to shaft 12. At pulley wheel 19, aligned slots are present on member 18 and shaft 12, as shown in figure 1. These slots of member 18 and shaft 12 form a passage 20 for wire W to reach an exit of dispenser arm 11, as shown in figure 1. A wire guide 21 fixed to shaft 12 by means of bolts (shown in the figures but not numbered) is located in the slots of member 18 and shaft 12 to form a wall of passage 20. The wire guide 21 also acts as an engagement member with member 18 to accomplish that member 18 and shaft 12 are angularly integral (for rotation around axis of rotation 11' of dispenser arm 11).

[0029] When shaft 12 is rotated by a stator part of motor 15, according to known technical principles, the dispenser arm 11 rotates around axis 11' to deliver wire W from the exit of dispenser arm 11, as shown in the figures. At the same time, also tubular member 18 rotates around axis 11', seeing that tubular member 18 is integral to shaft 12 due to the engagement of member 21 described above.

[0030] A second support member 23 is joined to a collar 24 by means of the bolts shown, but not numbered in figure 1. Collar 24 is assembled on bearing 25, which in turn is assembled on the end of shaft 12, as shown in figure 1. Therefore, the second support member 23 is assembled free to rotate on shaft 12. However, as will be described in the following, the rotation of member 23 is impeded by a belt mechanism 26.

[0031] The belt mechanism 26 foresees a toothed pulley wheel 27, which is integral to fixed hub 17. Shaft 29 is assembled in an idle manner on an extension 28 of the clamp of dispenser arm 11. The two ends of arm 29 support idle pulley wheels 30 and 31. Toothed pulley wheel 30 is connected by means of a belt 30' to the toothed pulley wheel 27, whilst pulley wheel 31 is connected by means of a further belt 31' to toothed pulley wheel 33, which is integral to collar 24. The transmission ratios of pulley wheel 27 with pulley wheel 30 and of pulley wheel 33 with pulley wheel 31 are the same. Therefore, when dispenser arm 11 is rotated, shaft 29 rotates integral to it, and collar 24 is caused to remain stationary. Consequently the second support member 23 remains stationary due to the belt mechanism 26.

[0032] In an embodiment that has been foreseen, but not shown in the figures, the belt mechanism 26 can be substituted with a gear mechanism. The gear mechanism is provided with two pairs of engaged gear wheels, each pair of engaged gear wheel substitutes pulley wheels 27 and 30 and pulley wheels 33 and 31. The transmission ratio between the pair engaged gear wheels that substitute the pulley wheels 27 and 30 is equal to the transmission ratio existing between the pair engaged gear wheels that substitute the pulley wheels 33 and 31.

[0033] With reference to figure 1, a support member 35 is connected to the tubular member 18 by means of joint 42 which is equipped with a bearing. In this way the translations of tubular member 18 in directions X and X' are transmitted integrally to support member 35, whilst the rotations of tubular member 18 around axis 11' are not transmitted to support member 35.

[0034] A first guide 32 for winding wire W in the slots to form the coils is fixed to support member 35 by means of a central bolt (see figures 1 and 4). The movement of the support member 35 in directions X and X' is guided and supported by the second support member 23 on bushing 23' (see in particular figures 1 and 4). To impede possible rotations of the first guide 32 around axis 11', an engagement fork 34 is foreseen fixed to the second support member 23 by means of bolts, as shown in figures 1, 2 and 6.

[0035] With particular reference to figures 2, 3 and 4, a second wire guide 36 and a third wire guide 37 are present. Both of

these are necessary for winding wire W, as shown in figures 1-6. Each of the wire guides 36 and 37 can be in the form of a blade, which extends for a length that is longer than side L of the core, as shown in figure 1 for wire guide 36. The wire guides 36 and 37 are particularly necessary for correctly positioning the turns in the layers ST_i, which are more distant from the sides L and the axial ends A of the pole. The wire guides 36 and 37 are assembled to be integral respectively with slides 36' and 37' (see figures 2 and 4). Slides 36' and 37' are moveable respectively on guides 38 and 39. Guides 38 and 39 are inclined by a predetermined angle with respect to the rotation axis 11' and are located on respective sides DX and SX.

[0036] Each of the guides 38 and 39 is formed of two guides positioned at a certain distance from each other on member 23 (a superior guide and an inferior guide) positioned symmetrically with respect to axis 11'. In figure 2, the superior guides of the guides 38 and 39 are shown, whilst in figure 4, the inferior guides of the guides 38 and 39 are shown.

[0037] Bolts 40 and 41 (see figure 4) respectively connect slide 36' and slide 37' to the support member 35. In this way, when there is movement of support member 35 in direction X, slides 36' and 37' respectively move in directions P and Q, whilst when there is movement of support member 35 in the X' direction, slides 36' and 37' respectively move in directions P' and Q'. Therefore, guides 36 and 37 move in respective directions P, Q, P', Q' integral with the respective slides 36' and 37' to which they are connected.

[0038] To move the support member 35 in directions X and X', the tubular member 18 is capable of moving in directions X and X' by means of the movement assembly 50 shown in figure 1. More particularly, arm 51 is fixed to member 18 by means of the rotation joint 52, although rotation joint 52 allows rotation of tubular member 18 around axis 11'. Sleeve 53 is fixed to arm 51. Sleeve 53 has internal helical grooves for circulation of balls present on screw 54. Screw 54 is rotated by transmission 55 consisting of a motor belt. The motor of transmission 55 is controlled according to predetermined programs to assure that tubular member 18 accomplishes required movements in directions X and X' as a function of time and the rotation of dispenser arm 11.

[0039] With reference to figure 1, guide 56 supports tube 57, which is fixed to arm 51, to guide translation of tube 57 in directions X and X'.

[0040] With reference to figure 3, an instant of the winding cycle to form the turns of wire is shown. Before the instant shown in figure 3 and to form the turn that is shown partially wound in figure 3, wire W that is exiting dispenser 11 in the stage of clockwise rotation C around axis 11', engages guide 37 and runs along it to reach edge 37a. Continuing with the rotation of the dispenser arm 11, wire W passes from edge 37a to edge 32a of guide 32. Here it runs to become positioned on the pole as shown in figure 3. Successively, during the rotation of dispenser arm 11, wire W runs on edge 36a, and, at the end, engages an edge 60a of deflector 60 to exit from slot 10a.

[0041] The alignment which is guaranteed by guides 38 and 39 of the edges of wire guides 36a and 37a with the position of the slots and the pole where the wire needs to be deposited (see figure 3) guarantees minimum bending of wire W, and minimum variation of tension of wire W in the stage of forming of a turn. At the same time, the position of support member 35 determines the positions of guides 38 and 39 and of edge 32a, therefore the simultaneous alignment of wire guide edges 36a, 37a and 32a between each other and with the pole 10c to form the turns correctly.

[0042] When the number of layers ST increases, the formation of the turns occurs very near to the area of the slots 10a and 10b occupied by the delimiting space required for wire guides 36 and 37. In this situation, edges 36a and 37a deliver the wire W directly on the turns that have been formed, seeing that the latter are adjacent to edges 36a and 37b. Therefore, it is particularly important to achieve an accurate movement of edges 36a and 37a aside the pole 10c by means of the movements in directions X and X' so that deposit of the turns occurs one next to the other without crossing each other.

[0043] Deflectors 60 and 61 shown enlarged in figure 3, functions as wire deflectors to avoid contact of the wire with the edge of the slot opening, where they are next to and covering, as shown in figure 3. Therefore, deflector 61 with its edge 61a avoids contact of the wire with the edge of opening 10b' when the wire enters slot 10b during the clockwise rotation C.

[0044] The assembly for moving member 35, which uses transmission 55, can comprise a control unit for achieving that the motor rotates screw 54 for predefined angles contained in a program. The control unit applies the program and guarantees in real time that screw 54 rotates with rotations linked by a predefined function to the rotation angles of dispenser arm 11.

[0045] In this manner the guide edges 36a, 37a, 32a are positioned in alignment with the position of pole 10c, being wound as a function of the rotations of dispenser arm 11. This achieves the alignment of edges 36a, 37a, 32a with the angular position around axis 11' of the wire stretch W which extends from dispenser arm 11 to core 10.

[0046] As shown with particular reference to figure 1, the wire guide 32, is provided with two edges 32a, each for guiding the wire in correspondence to a respective axial end A of the core 10. In this way, the action of a guide edge 32a, described with particular reference to figure 3, occurs in correspondence with the two axial ends A of core 10 for each complete rotation of dispenser arm 11.

[0047] Figure 2 illustrates the second support member 23 in a position that is more distant from core 10 in directions X and X' with respect to the position which it occupies during winding as shown in the other figures. This positioning situation of figure 2 is necessary for placing the core 10 before winding, and at the end of operations, when winding has been completed. To reach the situation of figure 2, a movement assembly (not shown) is able to move the entire apparatus shown in figure 1 in directions X and X', to position it near or away with respect to core 10, by moving part 70 in direction X and X'.

[0048] With reference to figures 5 and 6, an embodiment is shown where a termination member 80 is capable of partially seating in seat 80a a termination structure like a tang 91. This seating condition is achieved by moving member 80 in direction X from the condition shown in figures 5 and 6. When tang 91 is partially seated in seat 80a, dispenser arm 11 performs rotation around axis 11' to deliver wire W, which becomes intercepted by an inclined surface 80' of the termination member 80. The wire runs along the inclined surface 80' to reach a final position in the trough portion of tang 91. Here, the wire remains seated for connection to tang 91. Further rotations of the dispenser arm 11 wraps the wire W sufficiently around tang 91.

[0049] Similar operations to connect and wrap a wire around a tang like 91 are described, for example, in US 5,493,770, and are normally required for wire that connects one coil to another, or for connection of initial leads to a tang when winding needs to start to wind a first coil, or for connection of final leads to a tang when winding of the last coil has been completed.

[0050] Termination member 80 is also capable of motion in the direction X' opposite to direction X for moving away from tang 91, after the connection operation has been completed, i.e. in order to return to the position shown in figures 5 and 6.

[0051] Termination member 80 is bolted to carriage member 82 by means of bolts 87. Carriage member 82 is assembled to slide in key way 92 of support member 23 to move in direction X and X' when required, like has been described in the foregoing. The movement of termination member 80 in directions X and X' occurs by moving carriage 82 respectfully in direction X and X'. Termination member 80 moves through passage 81 of first wire guide 32 when required to move in the directions X and X'.

[0052] Carriage 82 is provided with passage 82'. Pin 84 crosses passage 82' and is integral to carriage 82. Lever arm 83 is hinged on pin 88 to be able to rotate around pin 88. Pin 88 crosses passage 93 of support member 23 and is integral to support member 23. End 83" has the form of a fork which receives pin 84, as shown in figure 6. End 83' of lever arm 83 is received in seat 85 of support member 35.

[0053] Carriage 82 is moved in direction X by moving support member 35 in opposite direction X'. Tubular member 18 is moved in direction X' to move support member 35 in direction X'. In this situation, end 83' of lever arm 83 is pushed in direction X' by side 85' of seat 85, like is the instant shown in figure 6. Consequently, lever arm 83 rotates around pin 88 to cause pin 84 to be pushed in direction X. This has the consequence of moving carriage 82 in direction X.

[0054] Spring 86, is connected between carriage 82 and fixture 94, as shown in figure 5. A similar spring and connection is present on the opposite side of carriage 82, where figure 5 has the section representation. Fixture 94 is fixed to support member 23 by bolts 89. Registration bolt 95 which is screwed into fixture 94 abuts against carriage 82 and can be used to adjust the extreme position that carriage 82 has in direction X'. This adjustment determines the position of lever arm 83 with respect to further movements of support member 35 in direction X, like is required during winding.

[0055] In fact, support member 35 moves in direction X and X' to accomplish winding of the turns. During winding, support member 35 is more nearer to core 10 than the position it has in figures 5 and 6. In this situation of winding, lever arm 83 is maintained stationary due to the pull of the springs like 86 of carriage 82 against bolt 95, whilst seat 85 of support member 35 moves in directions X and X' without abutting and pushing end 83'.

[0056] Returning to the movement of termination member 80 to reach tang 91, as caused by movement of carriage 82 in direction X, spring 86, which becomes stretched during this movement is successively used to recall carriage 32, i.e. to cause carriage 32 to move in direction X' and bring it in abutment against registration bolt 95, when termination member is required to move away from the core by movement of support member 35 in opposite direction X.

[0057] According to this arrangement, termination member 80 is moved in direction X to seat tang 91 for connection of the wire

leads, when first wire guide 32 is moved oppositely i.e. in direction X' to reach a more distant position outside of core 10, therefore when first wire guide 32 has completed winding of a coil. Similarly, termination member 80 is moved in direction X' to come away from tang 91, once connection and wrapping of the wire leads has been completed, i.e. when first wire guide 32 needs to be moved towards pole 10c for winding.

[0058] The foregoing description of a specific embodiment will so fully reveal the invention according to the conceptual point of view, so that others, by applying current knowledge, will be able to modify and/or adapt for various applications such an embodiment without further research and without parting from the invention, and it is therefore to be understood that such adaptations and modifications will have to be considered as equivalent to the specific embodiment. The means and the materials to realise the different functions described herein could have a different nature without, for this reason, departing from the field of the invention. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

REFERENCES CITED IN THE DESCRIPTION

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PATENTKRAV

1. Anordning for vikling af spoler (B) af en leder (W) omkring tilsvarende poler (10c) af en elektrisk dynamomaskinkomponents kerne (10); hvilke spoler (B) har viklinger (SP,S), hvor en vikling er dannet af to modsatte langsgående strækninger, hvor hver langsgående strækning lægges i en tilsvarende spalte (10a, 10b), og hvor to strækninger af en vikling hver lægges stødende op til en tilsvarende aksial ende (A) af polen (10c); hvilken anordning omfatter:
 - en wirefordelingsarm (11) til at rotere omkring polerne for at fordele wiren (W), der danner wireviklingerne;
 - 10 - en første wirestyring (32), der er placeret og bevæges under vikling stødende op til en aksial ende (A) af en pol (10c), der vikles for at danne en spole; hvilken anordningen er kendetegnet ved, at den endvidere omfatter:
 - en anden wirestyring (36), der er placeret og bevæges inde i en første spalte (10a) stødende op til den pol (10c), der vikles;
 - 15 - en tredje wirestyring (37), der er placeret og bevæges inde i en anden spalte (10b) stødende op til den pol (10c), der vikles;
 - et første støtteelement (35) til at understøtte den første wirestyring (32);
 - et andet støtteelement (23) til at understøtte den anden wirestyring (36) og den tredje wirestyring (37);
 - 20 - første styringsmiddel (38) til at styre den anden wirestyring (36) langs en tilsvarende akse af den første spalte (10a), og hvor det første styringsmiddel (38) er understøttet af det andet støtteelement (23);
 - et andet styringsmiddel (39) til at styre den tredje wirestyring (37) langs en tilsvarende akse af den anden spalte (10b), og hvor det andet styremiddel (39) understøttes af det andet støtteelement (23);
 - 25 - et middel til bevægelse (18, 26, 50) af det første støtteelement (35) til at bevæge den første wirestyring (32) langs en bevægelsesakse (11'), den anden wirestyring (36) og den tredje wirestyring (37) i en forhåndsbestemt justering i forhold til hinanden og med spolen (10c), der vikles, hvor den anden wirestyring (36) og den tredje wirestyring (37) henholdsvis bevæges langs det første og andet styremiddel (38, 39).
 - 30
2. Anordning ifølge krav 1, hvor midlerne til bevægelse omfatter midler til at forbinde (40, 41) den anden wirestyring (36) med det første støtteelement (35) på en første side i forhold til bevægelsesaksen (11') og den tredje wirestyring (37) med det første støtteelement (35) på en anden side i forhold til bevægelsesaksen (11').
- 35
3. Anordning ifølge krav 1, hvor den første wirestyring (32) bevæges langs bevægelsesaksen (11')

parallelt med den radiale retning af polen (10c); den anden wirestyring (36) bevæges langs en bane, der hælder i forhold til bevægelsesaksen (11') og er placeret på en første side (DX) af bevægelsesaksen (11'); og den tredje wirestyring (37) bevæges langs en bane, der hælder i forhold til bevægelsesaksen (11') og er placeret på en anden side (SX) i forhold til bevægelsesaksen (11').

4. Anordning ifølge krav 1, hvor midlet til bevægelse omfatter et første rørformet element (18), der bevæges langs rotationsaksen (11') af wirefordelingsarmen (11) og wiren (W), der skal vikles, løber gennem det rørformede element (18) for at nå wirefordelingsarmen (11).

5. Anordning ifølge krav 4, hvilken anordning endvidere omfatter et andet rørformet element (12), der omgiver det første rørformede element (18); hvor wirefordelingselementet (11) er fastgjort til det andet rørformede element (12) og det andet rørformede element (12) roteres direkte af en elektrisk motors (15) stator.

6. Anordning ifølge krav 1, hvor midlet til bevægelse omfatter en skruetransmission (53, 54) og et programmerbart drev (55) til bevægelse af det første støtteelement (35) ifølge en forhåndsindstillet bevægelsesfunktion.

7. Anordning ifølge krav 1, hvor det andet støtteelement (23) holdes stationært omkring rotationsaksen (11') af wirefordelingselementet (11) af en remtransmission (26), eller af en tandhjulstransmission, hvilken transmission kan rotere en aksel (29) samlet excentrisk og integralt med wirefordelingsarmen (11).

8. Anordning ifølge krav 1, hvilken anordning endvidere omfatter et termineringselement (80) til at forbinde spoleledere med kernens (10) termineringsstruktur (91); transmissionsmidler (83, 88) til transmission af bevægelse til termineringselementet (80) fra det første støtteelement (35); og hvor termineringselementet (80) understøttes og styres af det andet støtteelement (23) for bevægelsen.

9. Anordning ifølge krav 8, hvor transmissionsmidlet (83, 88) vender bevægelsesretningen transmitteret af det første støtteelement (35).

10. Anordning ifølge krav 8, hvor det første styreelement (32) er forsynet med en passage (81), hvor termineringselementet (80) bevæges for at blive placeret ved kernens (10) termineringsstruktur (91).

11. Anordning ifølge krav 9, hvor første støtteelement (35) omfatter et sæde (95) til modtagelse af en del (83') af transmissionsmidlet (83, 88).
12. Fremgangsmåde til vikling af spoler (B) af en leder (W) omkring tilsvarende poler (10c) af en elektrisk dynamomaskinkomponents kerne (10); hvilke spoler (B) har viklinger (Sp,S), hvor en vikling er dannet af to modsatte langsgående strækninger, hvor hver langsgående strækning lægges i en tilsvarende spalte (10a, 10b), og to strækninger af viklingen hver lægges stødende op til en tilsvarende aksial ende (A) af polen (10c); hvilken fremgangsmåde omfatter følgende trin:
- dannelse af wireviklingerne af en spole (B) ved anvendelse af en wirefordelingsarm (11), der roterer omkring polerne for at fordele wiren (W);
 - placering og bevægelse af en første wirestyring (32) under vikling stødende op til en aksial ende (A) af en pol (10c), der vikles;
- hvilken fremgangsmåde er kendetegnet ved, at den endvidere omfatter følgende trin:
- placering og bevægelse af en anden wirestyring (36) inde i en første spalte (10a) stødende op til den pol (10c), der vikles;
 - placering og bevægelse af en tredje wirestyring (37) placeret inde i en anden spalte (10b) stødende op til den pol (10c), der vikles;
 - understøtning af den første wirestyring (32) ved anvendelse af et første støtteelement (35);
 - understøtning af den anden wirestyring (36) og den tredje wirestyring (37) ved anvendelse af et andet støtteelement (23);
 - styring af den anden wirestyring (36) langs en tilsvarende akse af den første spalte (10a) ved anvendelse af første styringsmiddel (38) understøttet af det andet støtteelement (23);
 - styring af den tredje wirestyring (37) langs en tilsvarende akse af den anden spalte (10b) ved anvendelse af andet styringsmiddel (39) understøttet af det andet støtteelement (23);
 - bevægelse (18, 26, 50) af det første støtteelement (35) for at bevæge den første wirestyring (32) langs en bevægelsesakse (11'), den anden wirestyring (36) og den tredje wirestyring (37) i en forhåndsbestemt justering i forhold til hinanden og med spolen (10c), der vikles, og bevægelse af den anden wirestyring (36) og den tredje wirestyring (37) henholdsvis langs det første og andet styremiddel (38, 39).
13. Fremgangsmåde ifølge krav 12, hvilken fremgangsmåde endvidere omfatter forbindelse af den anden wirestyring (36) med det første støtteelement (35) på en første side i forhold til bevægelsesaksen (11') og den tredje wirestyring (37) med det første støtteelement (35) på en anden side i forhold til bevægelsesaksen (11').

14. Fremgangsmåde ifølge krav 12, hvilken fremgangsmåde endvidere omfatter bevægelse af den første wirestyring (32) langs en bevægelsesakse (11') parallelt med den radiale retning af polen (10c);
- 5 - bevægelse af den anden wirestyring (36) langs en bane, der hælder i forhold til bevægelsesaksen (11') og placeret på en første side (DX) af bevægelsesaksen (11');
- bevægelse af den tredje wirestyring (37) langs en bane, der hælder i forhold til bevægelsesaksen (11') og placeret på en anden side (SX) i forhold til bevægelsesaksen (11').
- 10 15. Fremgangsmåde ifølge krav 12, hvor trinnet med bevægelse omfatter bevægelse af et første rørformet element (18) langs rotationsaksen for wirefordelingsarmen (11) og at bevirke, at wiren (W), der skal vikles, løber gennem det rørformede element (18) for at nå wirefordelingsarmen (11).
- 15 16. Fremgangsmåde ifølge krav 14, hvilken fremgangsmåde endvidere omfatter et trin med tilvejebringelse af et andet rørformet element (12), der omgiver det første rørformede element (18); hvor wirefordelingselementet (11) er fastgjort til det andet rørformede element (12).
- 20 17. Fremgangsmåde ifølge krav 12, hvilken fremgangsmåde endvidere omfatter et trin med bevægelse af det første støtteelement (18) ifølge en forhåndsbestemt bevægelsesfunktion.
- 25 18. Fremgangsmåde ifølge krav 12, hvilken fremgangsmåde endvidere omfatter et trin med justering af styringskanterne (36a, 37a, 32a) af den første wirestyring (32), den anden wirestyring (36) og den tredje wirestyring (37) i forhold til positionerne for den pol (10c), der vikles, som en funktion af wirefordelingsarmens (11) rotationer.
- 30 19. Fremgangsmåde ifølge krav 12, hvilken fremgangsmåde endvidere omfatter et trin med tilvejebringelse af et termineringselement (80) til forbindelse af spoleledere med en termineringsstruktur (91) for kernen (10).
20. Fremgangsmåde ifølge krav 19, hvilken fremgangsmåde endvidere omfatter et trin med bevægelse af termineringselementet (80) mod kernen (10) for forbindelse af wirelederne ved bevægelse af det første wirestyringselement (32) væk fra kernen (10).

DRAWINGS

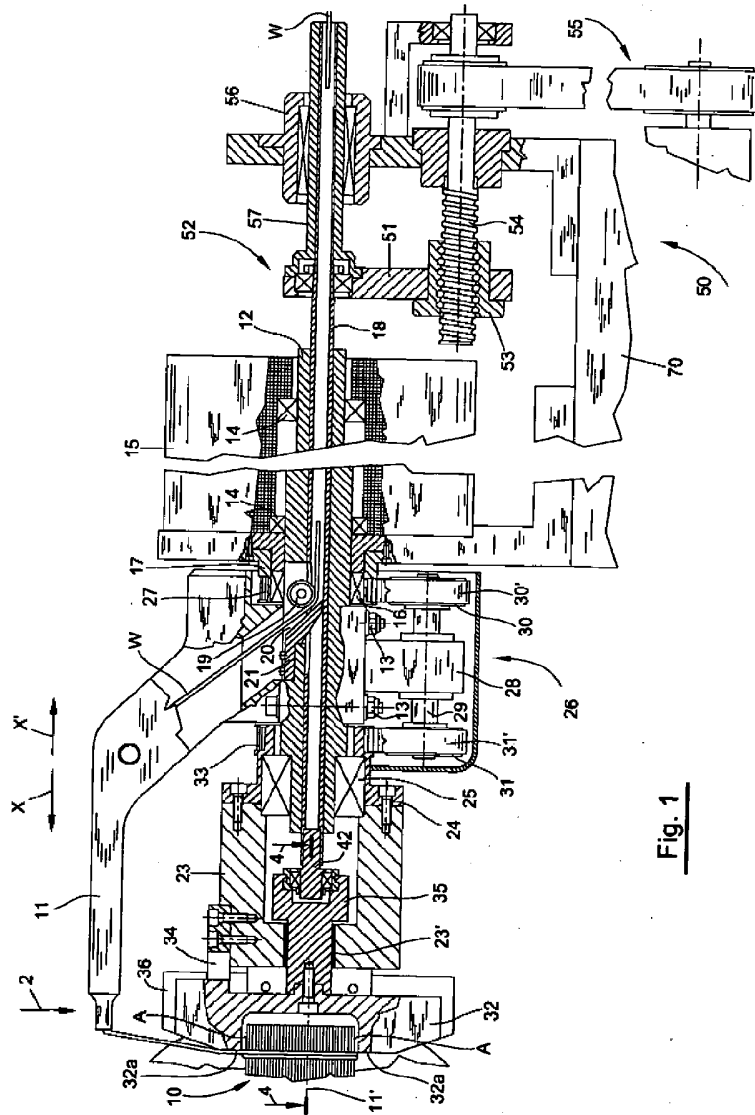
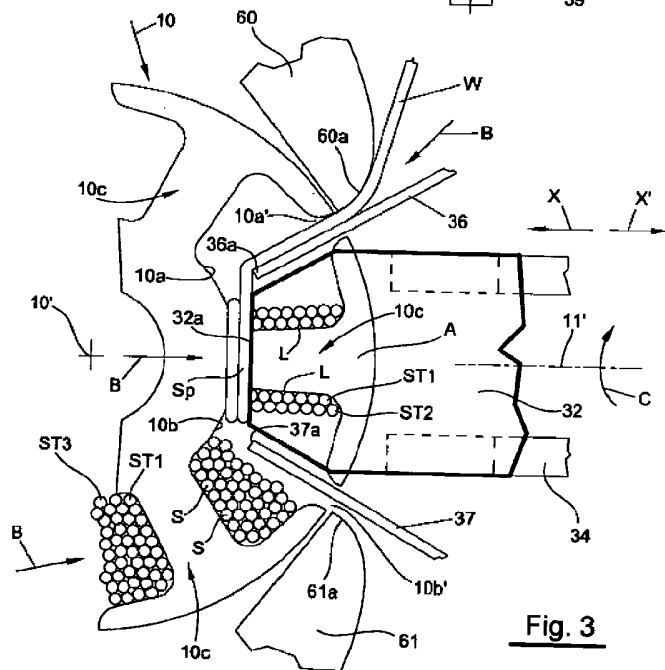
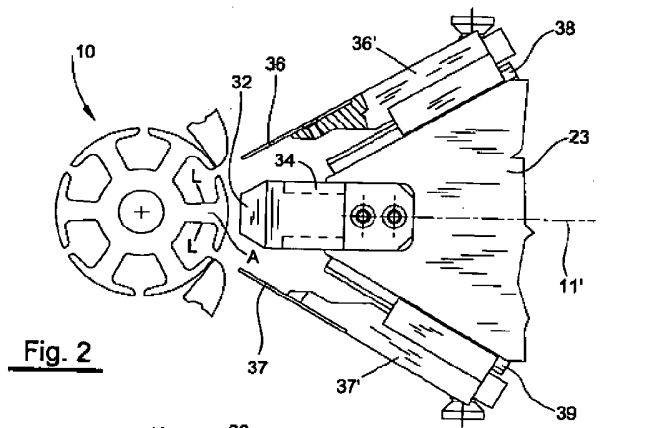
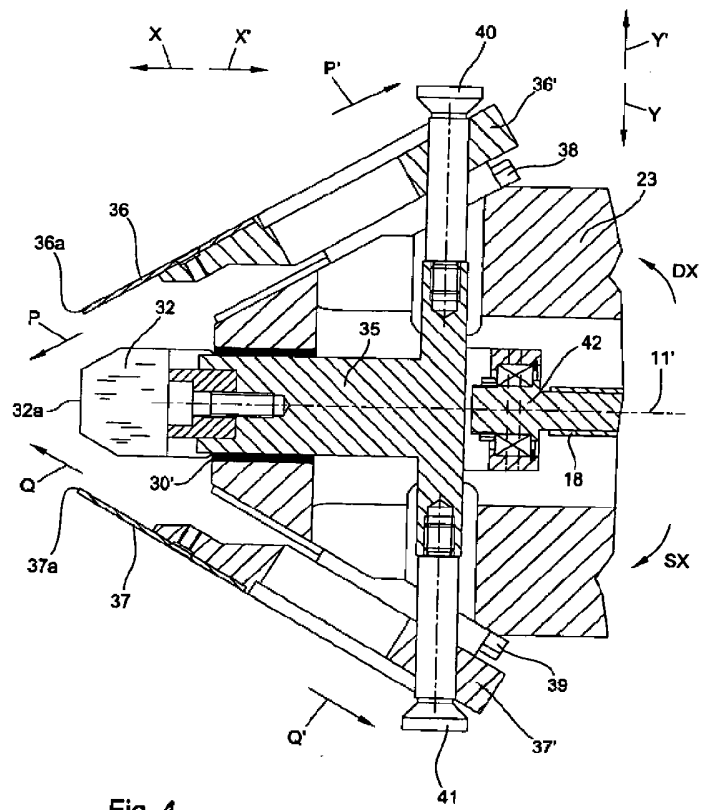


Fig. 1





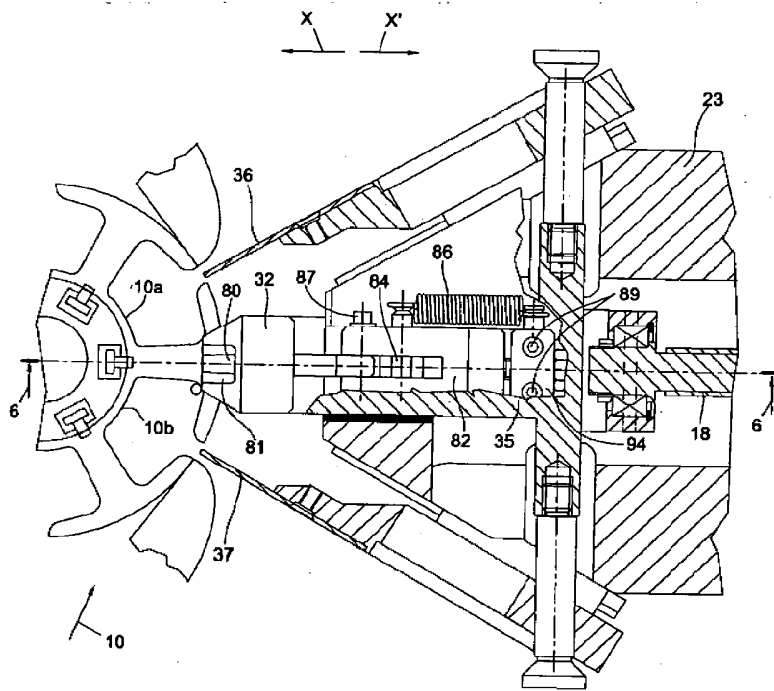


Fig. 5

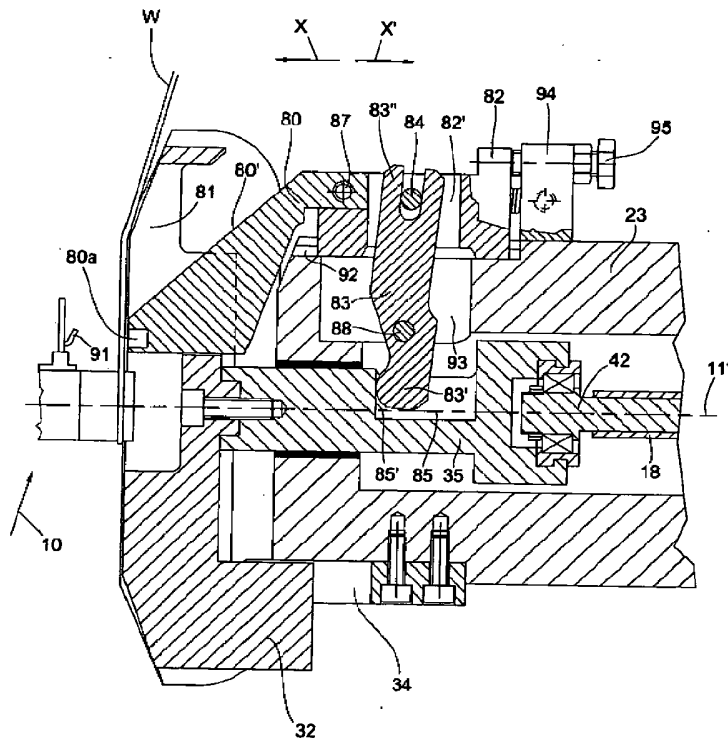


Fig. 6