Dec. 11, 1951 O. WIRTH 2,578,495

COIL FORM

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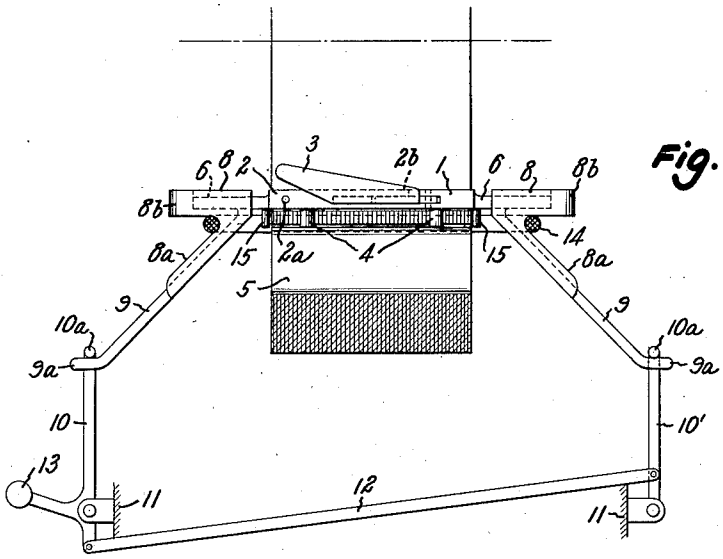


Fig. 1.

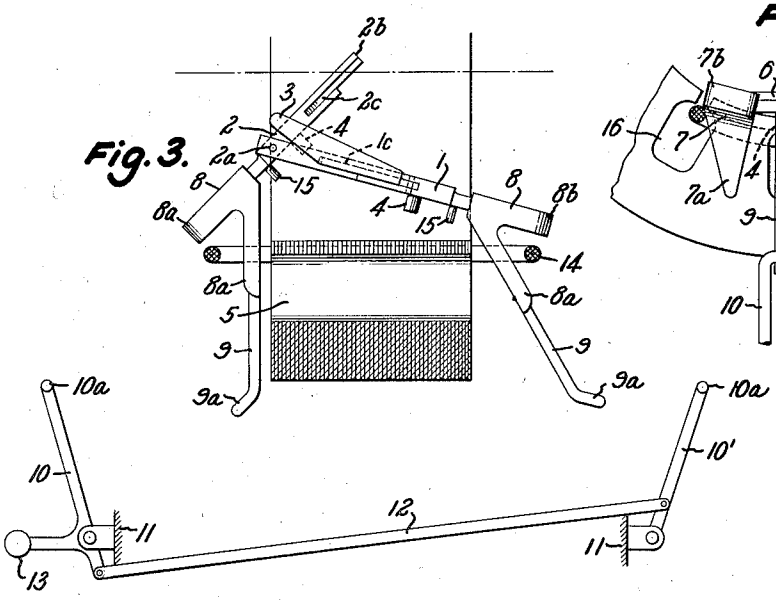


Fig. 3.

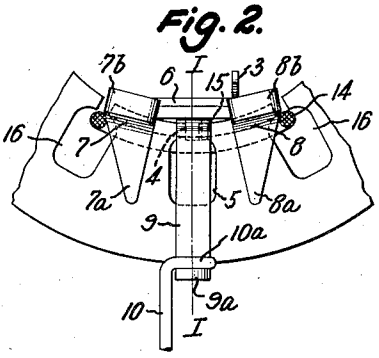


Fig. 2.

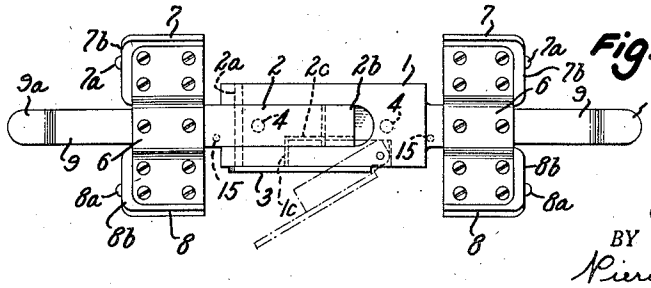


Fig. 4.

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UNITED STATES PATENT OFFICE

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COIL FORM

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6 Claims. (Cl. 242—1)

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This invention relates to forms used in the winding of coils for and on the stator elements of dynamoelectric machines such as motors, generators and the like.

Forms of this general type are in common use in the electrical industry and enable the coil to be wound mechanically in the stator slots it will occupy in the finished machine. The form is first placed in position on the stator adjacent a particular slot; the wire conductor is then mechanically wound round and round upon the form until the required number of turns to form the coil have been completed; the form is then removed, leaving the coil sides in the slots; and finally the coil heads are bent downward by means of a press. This technique has proven to be quite satisfactory since the conductor is stressed but very little and the coil turns are not distorted on the heads as is the case when the conductor is wound in a bent form. Furthermore, the simpler movements of the conductor guide permit a much higher winding speed.

The object of the present invention is to provide an improved and more simple construction for the form on which the stator coil is wound. One advantage of the new construction is that but very little time is required to mount the form in operating position on the stator or to remove the same after the coil has been completed. Another advantage is that the form is held securely in position on the stator while the winding operation is taking place.

A more specific object is to provide a collapsible coil form comprised of a pair of pivotally connected members which may be quickly locked in and unlocked from their extended, coil winding position.

The foregoing as well as other objects and advantages inherent in the invention will become more apparent from the following detailed description of a preferred structural embodiment when considered with the accompanying drawings in which:

Fig. 1 is a longitudinal section of the stator core taken on line 1—1 of Fig. 2 with the coil form thereon in its extended position for winding the coil;

Fig. 2 is an end view of the stator section and coil form shown in Fig. 1;

Fig. 3 is a view similar to Fig. 1 showing the form in its retracted condition after the coil has been removed; and

Fig. 4 is a plan view of the device.

Referring now to the drawings, the coil form is seen to be composed of two levers 1 and 2.

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Lever 2 is pivotally connected intermediate its ends at 2a to one end of lever 1 in such manner that the inner end 2b of lever 2 will lie alongside and engage the face of lever 1 when the two levers are moved into coaxial alignment. Because of the double arm, end pivot arrangement, it will be obvious that the axial distance between the outer ends of the two levers is a maximum when they occupy the extended position shown in Fig. 1, and that this distance decreases when the levers are rotated relative to the pivot 2a to their contracted position shown in Fig. 3.

For securing the levers 1 and 2 in their extended position, a wedge type of lock is preferred, the lock including a wedge 3 pivotally secured to lever 1 and which is adapted to engage horizontal recesses 1c, 2c, provided in the levers for such purpose.

Depending from the lower side of the levers are two sets of locating pins 4, 15. As is evident from Figs. 1 and 2, when the form is in its extended position on the stator preparatory to winding one of the coils 14 in the slots 16, the pins 4 extend into the empty slot 5 intermediate the two slots 16 to secure the form against lateral displacement; and similarly the pins 15 engage the end faces of the stator to secure the form against endwise displacement.

At the outer ends of the levers 1, 2 are carried transversely extending arms 6, and carried by each of the latter are left and right hand elongated coil crotches 7 and 8. These crotches each include a lower leg 7a, 8a inclined outwardly from the stator and a horizontal leg 7b, 8b, between which the coil 14 is wound. As seen in Fig. 2, the crotch legs 7a, 8a in plan are of generally triangular shape being broad at the top and tapering downwardly to a small apex at the bottom.

Also depending from the outer ends of the levers 1, 2 and at the same angle as the crotch legs 7a, 8a are rigid extension pieces 9, the lower ends 9a of which are bent to lie horizontally for engagement by the horizontal offsets 10a at the upper ends of levers 10, 10' which are pivotally anchored to opposite sides of the stator 11 for movement in a central plane. Levers 10, 10' are coupled in such manner that when one of them is turned inwardly toward the stator the other executes a like movement, and likewise a turning movement of one outwardly causes the other to also move outwardly. The preferred arrangement for effecting the result is constituted by a rod 12 extending from the lower end of the left hand lever 10 (which is pivoted to the stator 11

at a point intermediate its ends) to an intermediate point on the right hand lever 10' (the latter being pivoted to the stator 11 at its lower end below the connection to rod 12). One of the levers such as lever 10 is provided with a handle 13 extending in a generally outward direction from the lever's pivot axis to enable both levers to be swung inwardly to engage the lower ends 9a of extensions 9 as shown in Fig. 1, or to be swung outwardly to the disengaged position as shown in Fig. 3.

The manner in which the form is used is believed to be obvious from the foregoing description of its component parts. However, in the interest of assuring a complete understanding of the device, a brief summary of the operating sequence will now be given.

At the start, the two levers 1, 2 of the form are first brought to the extended position shown in Fig. 1 and locked in such position by actuating the wedge 3. The "extended" form is thus placed on the stator in alignment with an empty slot 5 between the two slots 16 that are to receive the coil 14 when wound, the pins 4 engaging the groove and the pins 15 engaging the sides of the stator intermediate the slots. Handle 13 is then swung upwardly to engage the ends 10a of the levers 10, 10' with the lower ends 9a of extensions 9. When so engaged, the levers 10, 10' exert a downward pull on the locked levers 1, 2, thus causing the winding form to be pressed fast against the body of the stator.

Coil 14 is then wound on the form by conventional winding apparatus (not shown), and the coil form having now served its purpose can now be collapsed and removed to another slot in the stator for a repeat operation. To collapse the form requires merely a repetition of the foregoing procedure in reverse sequence. That is, handle 13 is swung downwardly to release the ends of extensions 9; levers 1 and 2 are unlocked by reverse motion of wedge 3; and the levers are then collapsed upwardly about their pivot connection sufficiently to permit the extensions 9 to be freed from the heads of the wound coil 14.

In conclusion, while I have presented a construction for the coil form which in my opinion best embodies the inventive principles involved, it will be evident that modifications can be made by others without however departing from the spirit and scope of the invention as defined in the pending claims.

I claim:

1. A form for use in the winding of coils in the grooves of the stator element of electric generators and the like comprising a pair of lever members pivotally connected such that the distance between the outer ends of said members is extended upon movement thereof to an erected position longitudinally of the stator grooves with said levers in coaxial alignment, releasable means for locking said levers in said erected position, spaced aligning pins depending from said levers and adapted to project into a first groove in said stator intermediate two other grooves which are to receive the coil for locating and maintaining said levers in alignment with and over said first slot, and coil guiding members extending transversely of said levers at the outer ends thereof.

2. A coil form as defined in claim 1 wherein a first one of said lever members is pivotally connected intermediate the ends thereof to the end of the second of said lever members, and said releasable means is comprised of a latch member pivotally secured to said second lever member and slidable into coregistering recesses in said lever members.

3. A form for use in the winding of coils in the grooves of the stator element of electric generators and the like comprising a pair of lever members pivotally connected such that the distance between the outer ends of said members is extended upon movement thereof to an erected position longitudinally of the stator grooves with said levers in coaxial alignment, releasable means for locking said levers in said erected position, a first set of aligning pins depending from said levers and adapted to project into a first groove in said stator intermediate two other grooves which are to receive the coil for locating and maintaining said levers in alignment with and over said first slot, a second set of aligning pins depending from said levers and adapted to engage the opposite end faces of said stator for securing said levers when erected against endwise displacement, and coil guiding means extending transversely of said levers at the outer ends thereof.

4. A coil winding form as defined in claim 3 wherein said coil guiding means are constituted by crotch members.

5. A coil winding form as defined in claim 3 and which further includes an extension piece depending from the outer end of each one of said pair of pivotally connected lever members when locked in coaxial alignment, and means engageable with said extension pieces for exerting a pull thereupon and hence also upon said lever members in the direction of the stator.

6. A coil winding form as defined in claim 5 wherein said means engageable with said extension pieces is comprised of a pivotally anchored member individual to each of the pair of extension pieces, and said anchored members are interconnected by a tie rod for effecting common operation thereof.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,121,798	Chapman	Dec. 22, 1914
2,007,830	McNeil	July 9, 1935

FOREIGN PATENTS

Number	Country	Date
223,270	Germany	July 7, 1909