March 6, 1928. 1,661,342

W. E. PABST

APPARATUS FOR ALIGNING ARMATURE CORE LAMINÆ

Filed Aug. 21, 1926 2 Sheets-Sheet 1

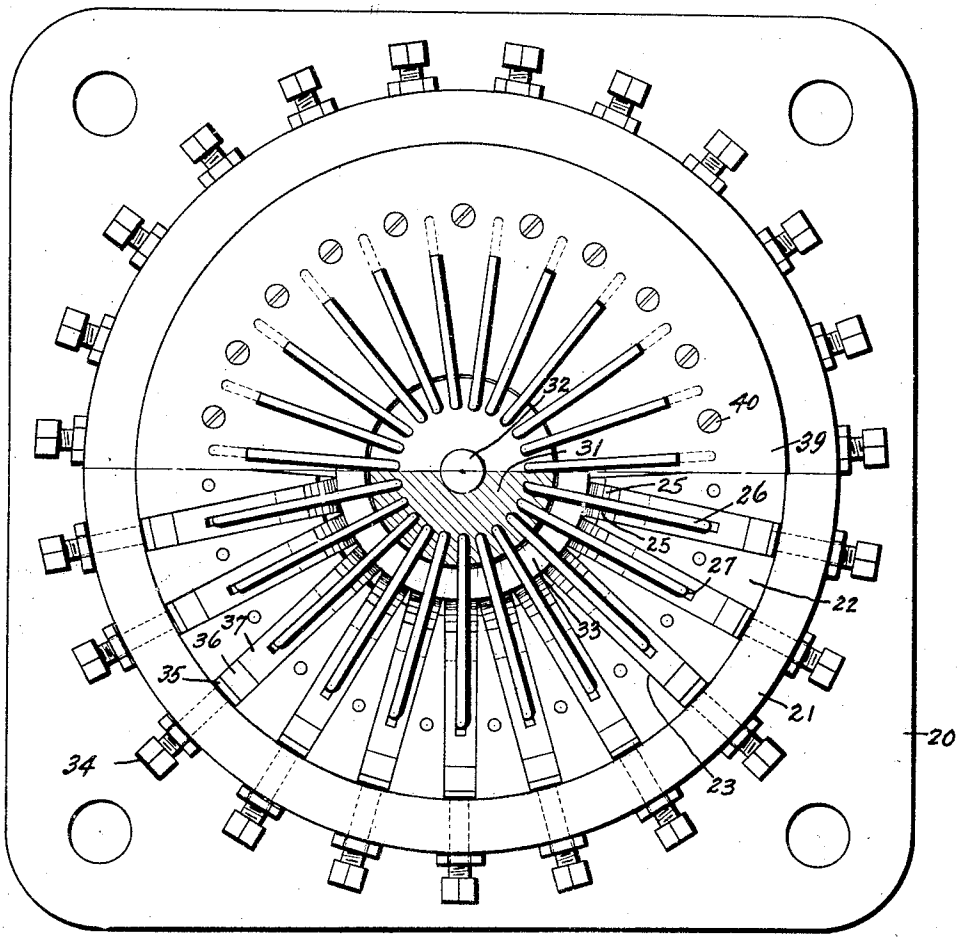


Fig. 1

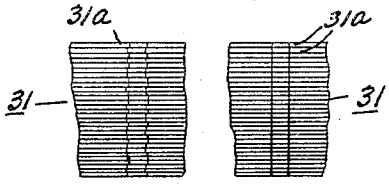


Fig. 2 Fig. 3

Inventor
William E. Pabst
By Spencer Sundell & Hardman
his Attorneys

March 6, 1928. 1,661,342

W. E. PABST

APPARATUS FOR ALIGNING ARMATURE CORE LAMINÆ

Filed Aug. 21, 1926 2 Sheets-Sheet 2

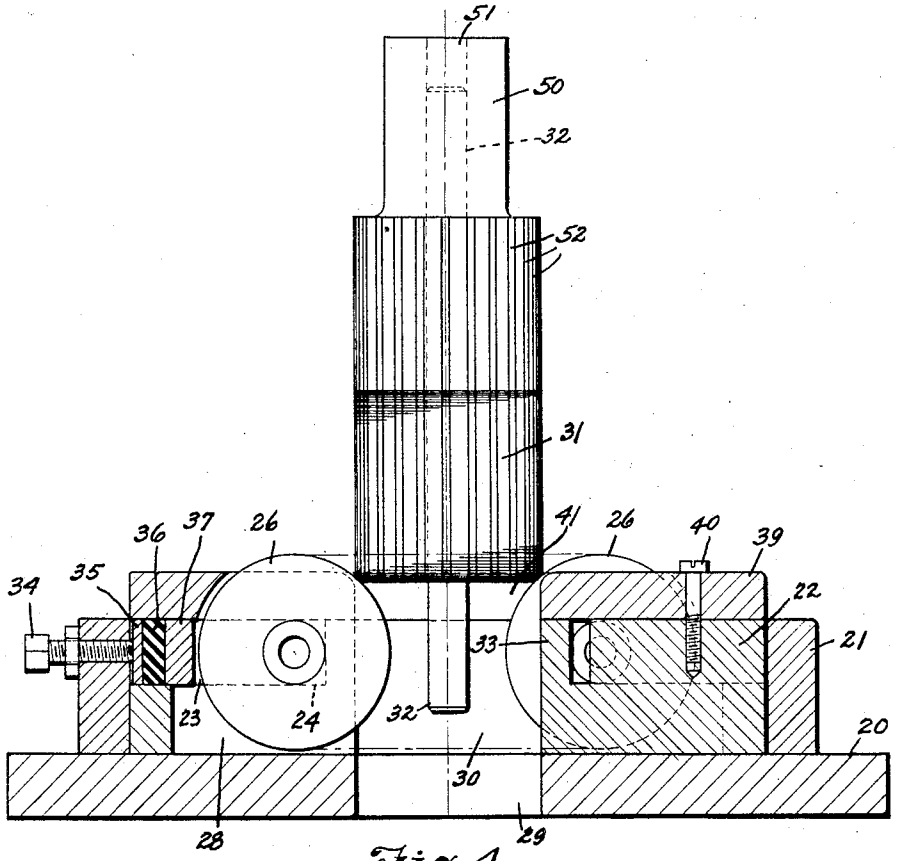


Fig. 4

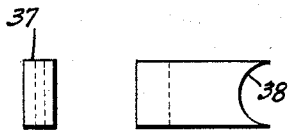
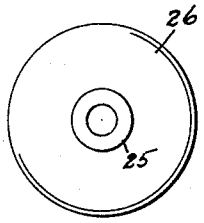


Fig. 5 Fig. 6



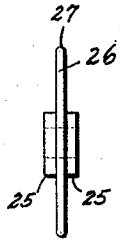


Fig. 7 Fig. 8

Inventor

William E. Pabst

By Spencer Sendall & Hardman

his Attorneys

Patented Mar. 6, 1928. 1,661,342

UNITED STATES PATENT OFFICE.

WILLIAM E. PABST, OF ANDERSON, INDIANA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO DELCO-REMY CORPORATION, OF DAYTON, OHIO, A CORPORATION OF DELAWARE.

APPARATUS FOR ALIGNING ARMATURE-CORE LAMINÆ.

Application filed August 21, 1926. Serial No. 130,617.

This invention relates to the manufacture of armatures for dynamo-electric machines and particularly to armatures having slotted cores composed of a number of thin plates or laminations assembled upon a shaft.

In the manufacture of armatures it has been the practice to form the core by assembling a plurality of similar punchings upon a shaft having preferably a straight knurled portion which receives the punchings. Unless extreme care is taken in maintaining the punchings in alignment with each other when they are forced upon the shaft, the punchings will not be in perfect alignment consequently the surface bounding the core slots will be irregular and rough. This condition interferes with assembling core slot insulation and armature conductors especially in a process of manufacture in which the slot lining members and the conductors are inserted through the slots lengthwise of the armature.

One of the objects of the present invention is to provide an apparatus for aligning the laminæ of armature cores or for truing the slots of a laminated armature core prior to assembling of slot lining insulation and conductors.

Futher objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a plan view partly in section of apparatus constructed in accordance with the present invention.

Fig. 2 is a fragmentary view on a larger scale than Fig. 1 showing a portion of a laminated armature core having its core laminations slightly displaced angularly.

Fig. 3 is a view similar to Fig. 2 showing the core after being operated upon by the apparatus shown in Fig. 1.

Fig. 4 is a longitudinal sectional view of the apparatus shown in Fig. 1.

Figs. 5 and 6 are end and side views respectively of one of the members for applying pressure to one of the truing discs.

Figs. 7 and 8 are side and edgewise views respectively of one of the truing discs.

The apparatus comprises chiefly, means for guiding the core for endwise movement thereof, devices such as rotatable discs adapted to be received by the core slots for progressively displacing the laminations of the core angularly in order to force them into alignment, and means for pressing the core against the truing device.

The guiding means or fixture comprises a base 20 upon which is mounted a ring 21 surrounding a block 22 which is provided with a plurality of radially disposed grooves 23. The bottom surface 24 of each groove supports a hub 25 of a truing disc 26 having parallel plane sides a periphery 27 which is preferably rounded or so shaped that it is adapted to progressively enter the slots of laminations which are slightly angularly displaced. The block 22 is provided with a plurality of radially disposed notches each of which is adapted to provide clearance for free movement of a disc 26. The base 20 and the block 22 are provided with aligned openings 29 and 30 which are adapted to receive a laminated armature core 31 which is assembled upon a shaft 32. The opening 30 is surrounded by an annular wall 33 provided by the block 22.

Each disc 26 rotates about an axis at right angles to the axis of the shaft 32 and is yieldingly urged toward the shaft due to pressure applied by a screw 34 and transmitted to the hub 25 of the disc 26 through a metal plate 35, a resilient rubber block 36 and a bifurcated block 37 each branch of which is provided with a semicircular notch 38 for receiving each end portion of the hub 25. The members 35, 36 and 37 are slidable within the grooves 23, and, together with the disc hubs 25, are maintained within the grooves by a cover plate 39 which is attached by screws 40 to the block 22. The cover plate 39 is provided with an opening 41 which is in alignment with the openings 29 and 30 when the cover is attached to the block 22. Thus the base 20, the block 22 and the cover 39 provide a fixture for guiding the core during endwise movement thereof. The base 20 is adapted to be mounted upon a horizontal bed or table of a punch press.

The core 31 is forced into engagement with the truing discs 26 and through the central openings in the fixture by a member 50 which is adapted to be attached to the movable head of a punch press. The member 50 is provided with a central bore 51 to provide clearance for one end of the arma-

ture shaft 32. The bottom surface of the member 50 is coextensive with the upper surface of the armature core, and is provided with slots 52 located in alignment with the slots of the core 31 so that clearance will be provided for the truing disks 26.

Downward movement of the member 50 causes the core 31 to be forced through the openings 41, 30 and 29. During the movement of the core relative to the fixture each truing wheel or disk 26 will be received by a core slot beginning at one end or the bottom of the core and at a point adjacent the periphery of the core. As the core 31 is moved downwardly its laminations will be successively engaged by the truing disks so that its laminations 31^a which may be slightly out of alignment as shown in Fig. 2 will be moved into more perfect alignment as shown in Fig. 3. As the core 31 is moved downwardly or as relative bodily movement is produced between the core and the truing disks the point of application of the pressure by each truing disk upon the laminations will move progressively from the periphery toward the bottom or inner end of the core slot. The periphery 27 of each disk 26 is rounded or so shaped that it may enter successively the slots of the slightly displaced laminæ of the core and cause them to be displaced angularly and to be brought into more perfect alignment. It will be noted that the truing disk will engage a plurality of laminæ simultaneously. At the time the disk is entering the slot of a certain lamina the disk has already progressed toward the bottom or inner end of the slots of preceding laminæ. The truing operation may be carried on with relatively small effort and at relatively high speed because the laminæ are successively engaged by the truing disks and pressure is applied initially at a point most remote from the axis about which the laminæ are displaced in order to bring them more nearly into perfect alignment.

The truing wheels not only function to shift the laminæ or armature punchings into more perfect alignment, but also smooth the sides of the armature core teeth which define the core slots. While metal may not be actually removed from the core teeth, small projections of metal such as burrs may be rubbed into the minute crevices between the laminæ.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Apparatus for truing the slots of a laminated armature core assembled upon a shaft comprising, in combination, means for guiding the core for endwise movement, devices adapted to be received by the core slots for progressively displacing the laminations of the core angularly in order to force them into alignment, and means for pressing the core against said devices.

2. Apparatus for truing the slots of a laminated armature core assembled upon a shaft comprising, in combination, means for guiding the core for endwise movement, devices adapted to be received by the core slots for progressively displacing the laminations of the core angularly in order to force them into alignment, and means exerting pressure upon the end of the core and surfaces thereof adjacent the slots for pressing the core against said devices.

3. Apparatus for truing the slots of a laminated armature core assembled upon a shaft comprising, in combination, means for guiding the core for endwise movement, devices adapted to be received first by the core slots beginning at one end of the core and adjacent the periphery thereof, and adapted progressively to engage the laminations and to displace them angularly relative to the shaft, the point of application of pressure applied by each device starting adjacent the core periphery and moving toward the bottom of the slot which receives it, and means for pressing the core against said devices.

4. Apparatus for truing the slots of a laminated armature core assembled upon a shaft comprising, in combination, means for guiding the core for endwise movement, a plurality of rotatably supported discs each adapted to be received by a core slot and having a periphery shaped progressively to enter the slightly displaced slots of the laminations and to move the laminations angularly into alignment, the application of pressure by the disc progressing from the periphery to the bottom of the slot, and means for producing relative movement between the core and said discs axially of the core.

5. Apparatus for truing the slots of a laminated armature core assembled upon a shaft comprising in combination, a fixture for guiding the core for endwise movement, a plurality of truing discs each adapted to be received by a core slot, said discs being supported by the fixture for rotation at right angles to the axis of the core devices for yieldingly urging the discs toward the core, and means for producing relative movement between the core and said discs axially of the core.

In testimony whereof I hereto affix my signature.

WILLIAM E. PABST.