No. 896,321. PATENTED AUG. 18, 1908.

H. G. REIST.

FIELD MAGNET STRUCTURE.

APPLICATION FILED APR. 16, 1902. RENEWED JUNE 12, 1905.

2 SHEETS—SHEET 1

Fig. 2.

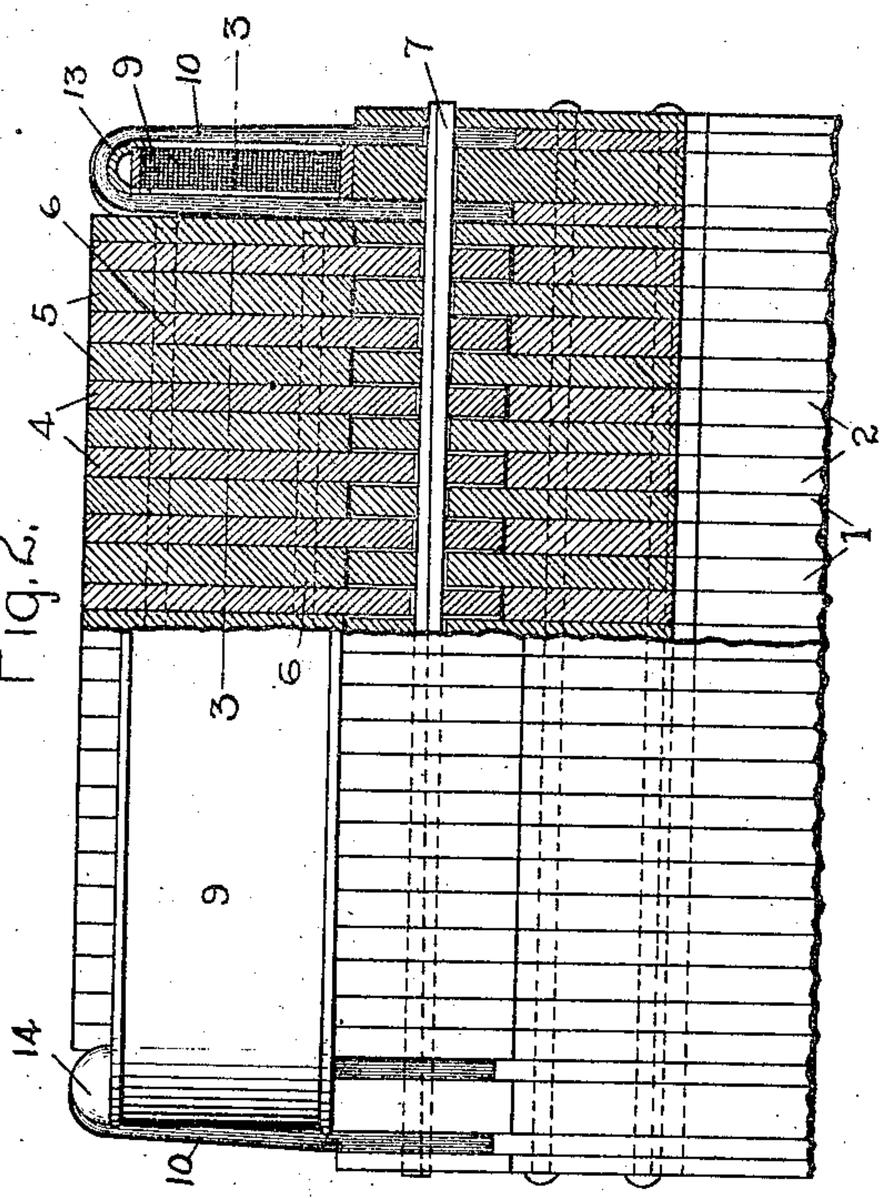


Fig. 3.

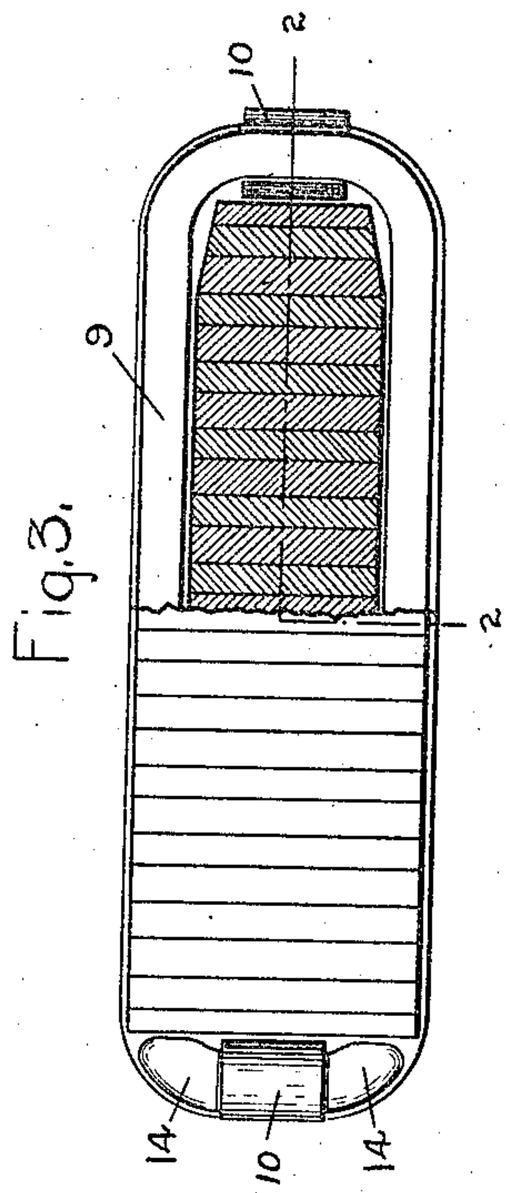


Fig. 1.

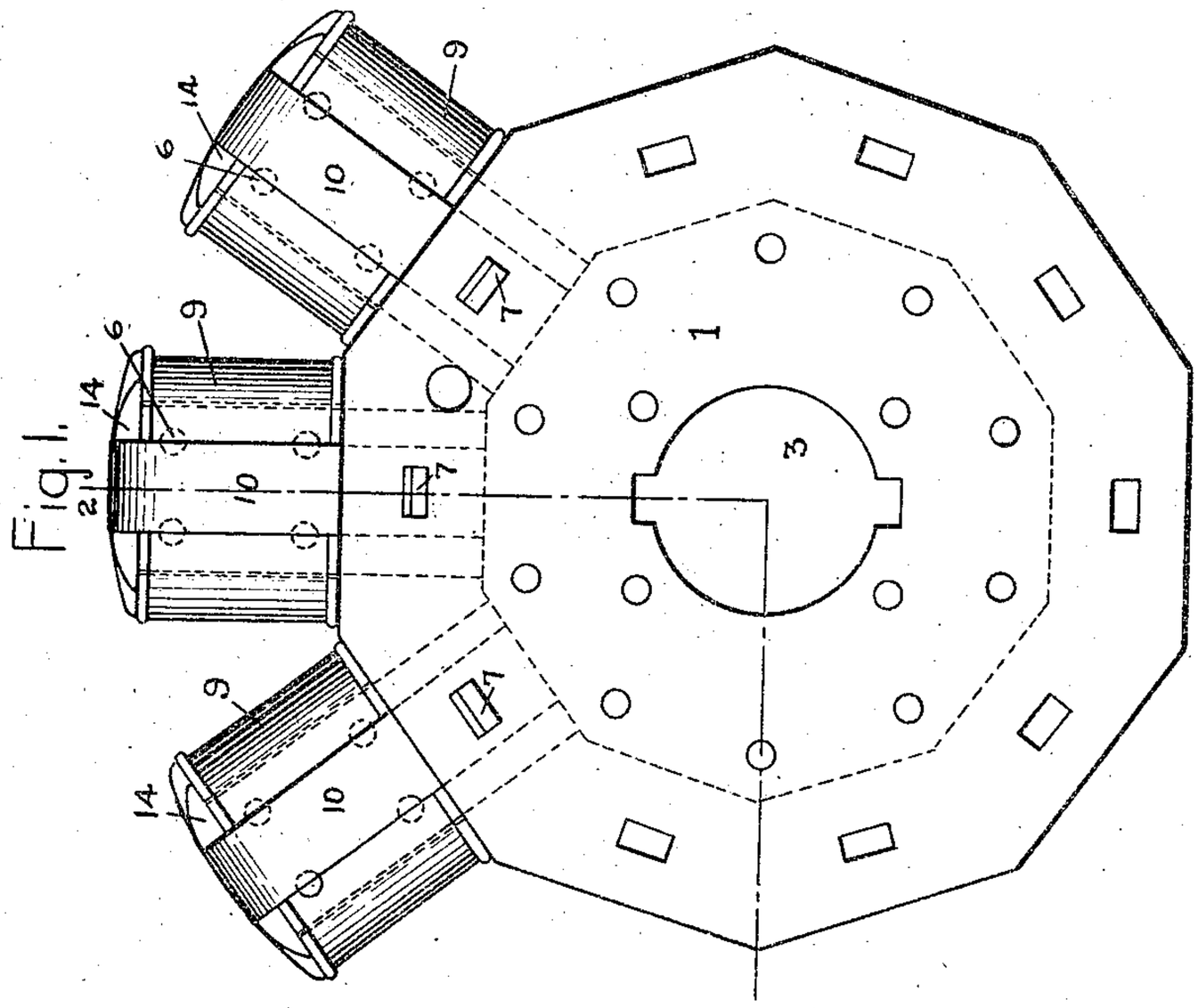
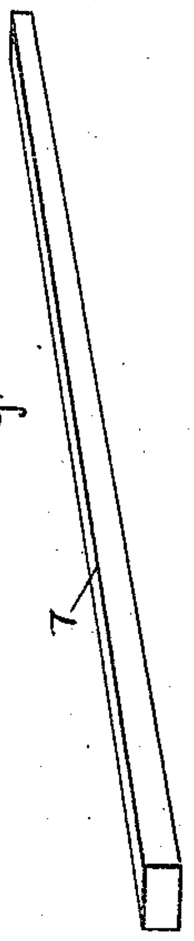


Fig. 15.



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Inventor:
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Atty.

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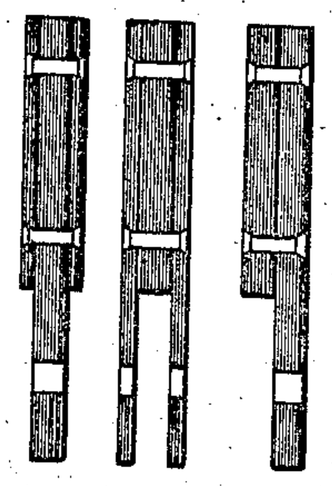
2 SHEETS—SHEET 2.

Fig. 12. Fig. 13. Fig. 14. Fig. 4.



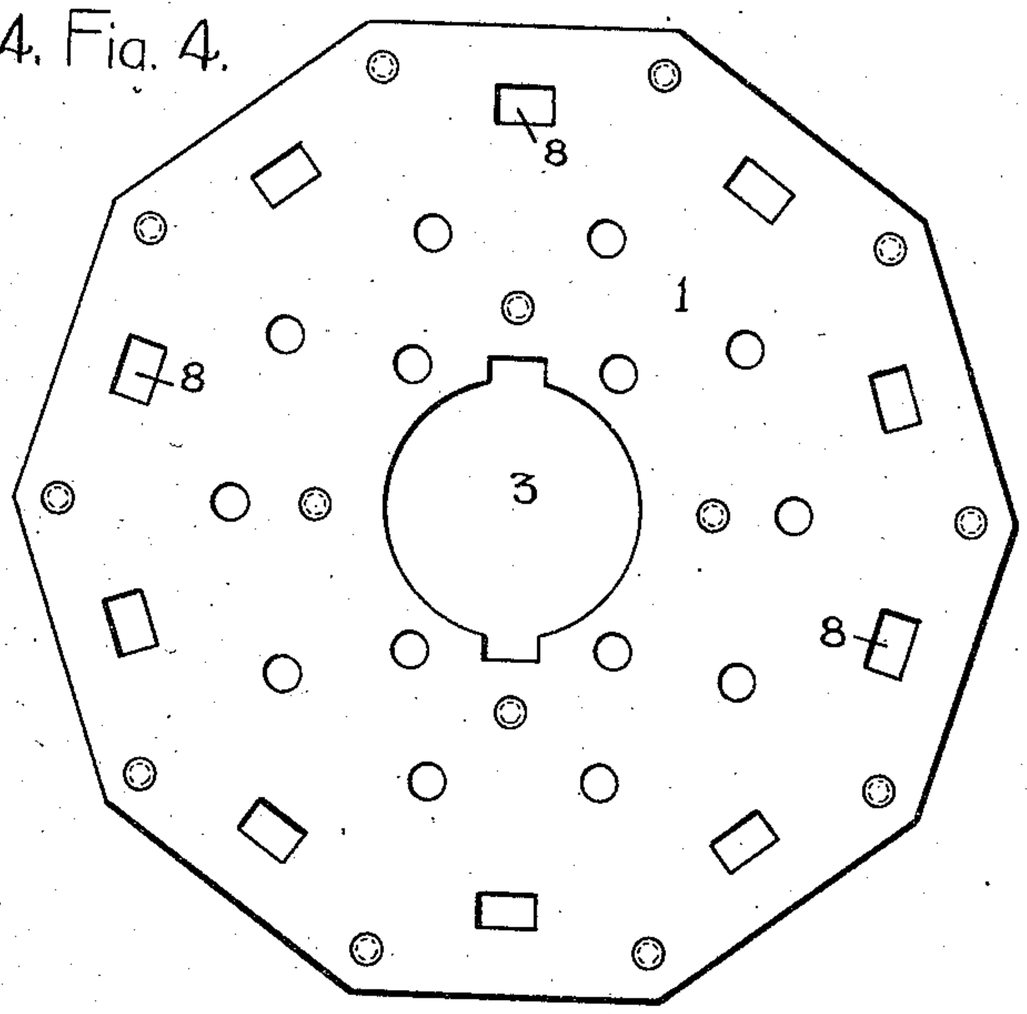


Fig. 5.

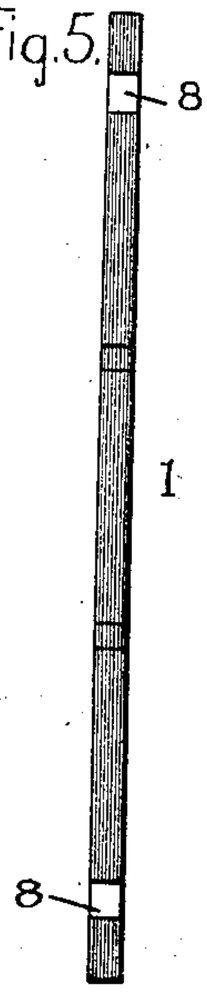


Fig. 16.

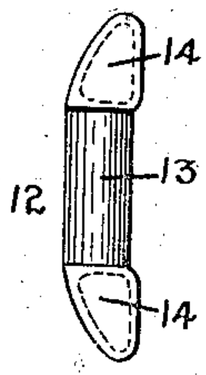


Fig. 6.

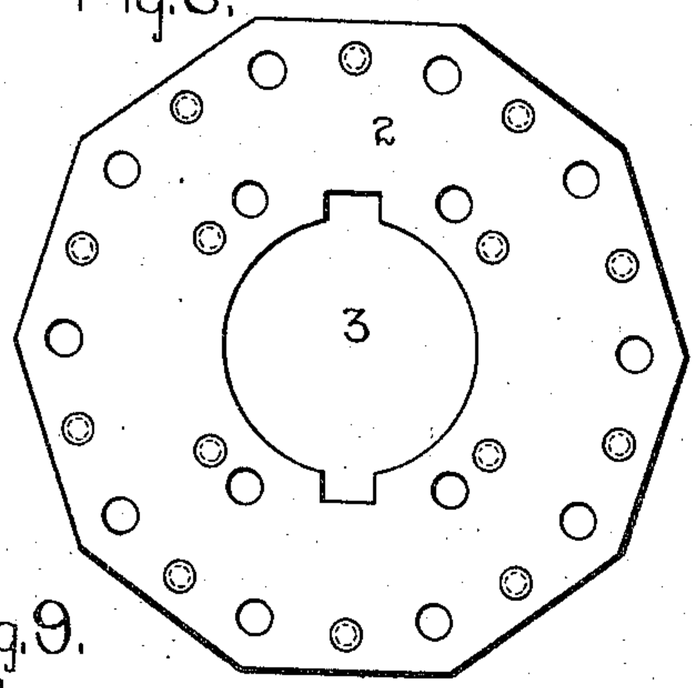


Fig. 7.

Fig. 8.

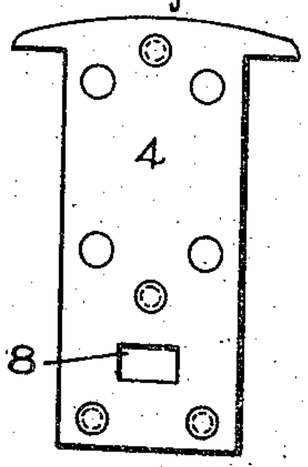


Fig. 9.

Fig. 17.

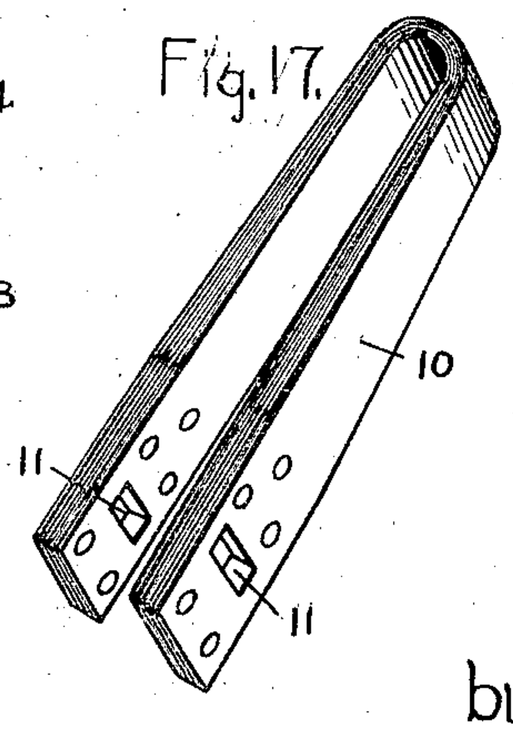


Fig. 10.

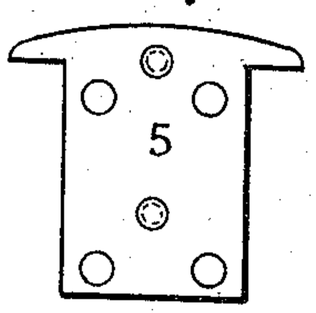
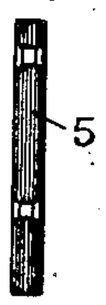


Fig. 11.



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UNITED STATES PATENT OFFICE.

HENRY G. REIST, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

FIELD-MAGNET STRUCTURE.

Specification of Letters Patent. Patented Aug. 18, 1908.

No. 896,321.

Application filed April 16, 1902, Serial No. 103,101. Renewed June 12, 1905. Serial No. 264,940.

To all whom it may concern:

Be it known that I, HENRY G. REIST, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Field-Magnet Structures, of which the following is a specification.

This invention relates to the field-magnets of dynamo-electric machines, and particularly to those in which the field-magnet rotates and the armature remains stationary. In machines of this type, particularly those adapted to generate or utilize alternating currents, it is necessary or preferable for the field-magnet structure to be laminated. It is a matter of extreme difficulty to produce such a structure which will permit removable field-magnet coils to be used, and yet will be strong and compact and capable of resisting centrifugal and other strains when rotated at high speeds.

In the best form of my invention I use a field-magnet structure built up of laminations, the body having alternate circumferential tongues and grooves, and the pole-pieces having alternate long and short portions forming tongues and grooves which interlock with those of the body and are fastened thereto by longitudinal keys driven through registering slots in said interlocking tongues. The body herein shown is built up of polygonal disk-shaped laminations grouped in units, each unit being composed of a given number of laminations united together. The units are made in two sizes, so that by assembling a plurality of them on a shaft in alternate succession, a body is formed having a polygonal surface containing alternate circumferential tongues and grooves. The pole-pieces are similarly composed of a plurality of long and short units alternately arranged so as to form tongues and grooves which will interlock with those of the body, each unit being made of laminations riveted together. The tongues have transverse keyways slotted through them to receive longitudinal locking keys which fasten the pole-pieces to the body. The coils are held on the pole-pieces by U-shaped clips whose ends have slots engaged by said longitudinal keys.

In the accompanying drawings, Figure 1 is an end view of a field-magnet structure embodying my invention, showing only three pole-pieces and coils in place; Fig. 2 is a longitudinal sectional elevation on the line 2 2, Figs. 1 and 3; Fig. 3 is a top plan sectional view on the line 3 3, Fig. 2; Fig. 4 is an end view of one unit of the body or central portion; Fig. 5 is a sectional view of the same; Figs. 6 and 7 are similar views of another body unit; Fig. 8 is an end view and Fig. 9 a section of one unit of the pole-pieces; Figs. 10 and 11 are similar views of another pole-piece unit; Figs. 12, 13 and 14 show modified constructions of pole-piece units; Fig. 15 is a perspective view of a key for fastening the pole-pieces to the body; Fig. 16 is a top plan view of an end plate for a pole-piece; and Fig. 17 is a perspective view of the clip for holding the coils on the pole-pieces.

The body of the field-magnet is composed of a plurality of alternately large and small polygonal disk-shaped units 1 2 having central openings 3 to fit on a driving-shaft. Each disk or unit is composed of a group of sheet-metal laminations riveted together. When assembled, the disks constitute a polygonal body whose faces are made up of alternate circumferential tongues and grooves.

The pole-pieces are composed of alternate long units 4 and short units 5, shown respectively in Figs. 8, 9, 10 and 11. Each unit is made up of a group of similar laminations riveted together. The plurality of long and short units constituting a pole-piece are firmly secured together by rivets 6 passing through all of them.

Instead of using separate long and short units, each unit may be built up of long and short laminations grouped, as shown in Fig. 12 or Fig. 13 or Fig. 14, and riveted together. A plurality of similar units, such as shown in any one of these figures, will produce a pole-piece having alternate tongues and grooves adapted to fit on a face of the body portion, and interlock with the tongues and grooves thereof. When a pole-piece built up from any of the above described units is placed upon a face of the body portion, the long units 4 enter the grooves and rest upon the edges of the small disks 2, while the short units 5 rest on the edge of the large disks 1. Long keys or wedges 7 are then driven through registering slots 8 in the disks 1 and the long units 4, and firmly secure the pole-pieces in place.

The insulated field-coils 9, of a height to tightly fill the space between the pole shoulders and the edges of the larger core disks 1, as shown in Fig. 1, are wound on a form and slipped over the pole-pieces before the latter are applied to the body. To hold them securely, a U-shaped clip 10 is passed down over each end of the coil, said clip having long ends which enter two of the grooves in the body-portion and have slots 11 through which the long keys or wedges 7 pass. The clip is preferably made of laminations riveted together. Between the top of the coil and the bight of the clip I prefer to insert a filling-block 12 having its middle portion 13 rounded to fit the clip, and its ends 14 shouldered to engage the edges of the clip and retain it in place.

It will be seen that a field-magnet structure made as herein shown and described is compact and solid, the coils are positively supported both top and bottom, and the entire structure has great strength to resist centrifugal and torsional strains, besides being easily and quickly assembled, or taken apart for repairs. Each pole-piece and its coil can be removed without disturbing the others by merely knocking out the longitudinal key which secures the clips and the pole-piece.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. A field magnet structure comprising a body made out of a plurality of units, each of said units consisting of a number of laminæ secured together.

2. A field-magnet structure having a body composed of a plurality of alternate large and small laminated units.

3. A field-magnet structure having a body composed of a plurality of alternate large and small disks, each consisting of laminations secured together.

4. A field-magnet structure having a body composed of a plurality of alternate large and small polygonal disks, each consisting of laminations secured together.

5. A field magnet structure having a body composed of alternate large and small polygonal units each comprising a plurality of laminæ riveted together, and means for securing said units in fixed relation.

6. A field-magnet structure having a body composed of polygonal laminated units grouped to form alternate circumferential tongues and grooves.

7. A field-magnet structure having a body composed of laminated units grouped to form circumferential tongues and grooves.

8. A field magnet structure comprising a pole piece made up of a plurality of units, each of said units consisting of a number of laminæ secured together.

9. A field-magnet pole-piece composed of a plurality of long and short laminated units.

10. A field-magnet pole-piece composed of a plurality of alternate long and short laminated units.

11. A field-magnet pole-piece composed of a plurality of alternate long and short units, each consisting of laminations secured together.

12. A field magnet structure comprising a body and pole pieces, each made up of a plurality of units, each of said units consisting of a number of laminæ secured together.

13. A field-magnet structure comprising a body and pole-pieces each made up of a plurality of laminated units, with interlocking portions.

14. A field-magnet structure comprising a body and a pole-piece each made up of a plurality of laminated units, and having alternating interlocking tongues.

15. A field magnet structure comprising a body and a pole-piece each made up of a plurality of laminated units of different sizes and thicknesses whereby said parts are adapted to interlock with clearance.

16. A field-magnet structure comprising a body and a pole-piece each made up of a plurality of laminated units having alternating interlocking tongues, and a locking key passing through said tongues.

17. A field-magnet structure comprising a body having grooves, a pole-piece, a coil on said pole-piece, clips on said coil entering said grooves, and means for fastening said clips to said body.

18. A field-magnet structure comprising a body having circumferential grooves, a pole-piece, a coil on said pole-piece, a U-shaped clip passing down over the end of said coil into said grooves, and means for fastening said clip to said body.

19. A field-magnet structure comprising a body having circumferential tongues and grooves and a keyway slotted transversely through said tongues, a pole-piece having tongues entering between the body-tongues, a coil on said pole-piece, a U-shaped clip passing down over the end of said coil into two of said grooves, and a key passing through the tongues and clip.

20. A field-magnet structure consisting of a body composed of alternate large and small laminated units, pole-pieces consisting of alternate long and short laminated units and interlocking with the body-units, coils on said pole-pieces, U-shaped laminated clips passing over the ends of said coils and into said body, and longitudinal keys driven through slots in the interlocking body and pole-piece units and the ends of the clips.

21. A field magnet structure comprising a body formed with grooves or recesses, a pole piece carried by said body, a coil on said pole piece, coil retaining clips entering said grooves or recesses for fastening said clips to said body.

22. A field magnet structure comprising a body formed with grooves or recesses, a pole piece carried by said body, a coil on said pole piece, U-shaped coil retaining clips the ends of which enter said grooves or recesses, and means for fastening said clips to said body.

23. In combination, a laminated body formed with grooves or spaces, a pole piece carried thereby, a coil on said pole piece, a laminated U-shaped coil retaining clip the ends of which enter said grooves or spaces, and means for securing said ends to said body.

24. A revoluble field-magnet structure having a laminated body portion, a plurality of laminated poles secured thereto each provided with an exciting coil, means connected to the poles for holding the central portions of the coils against centrifugal force, and means independent of the poles for holding the respective end portions of the coils, said independent means being fastened to said body portion.

In witness whereof, I have hereunto set my hand this 14th day of April, 1902.

HENRY G. REIST.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.