Oct. 16, 1928. 1,687,513

H. G. REIST

ROTOR

Filed Jan. 13, 1928

Fig. 1.

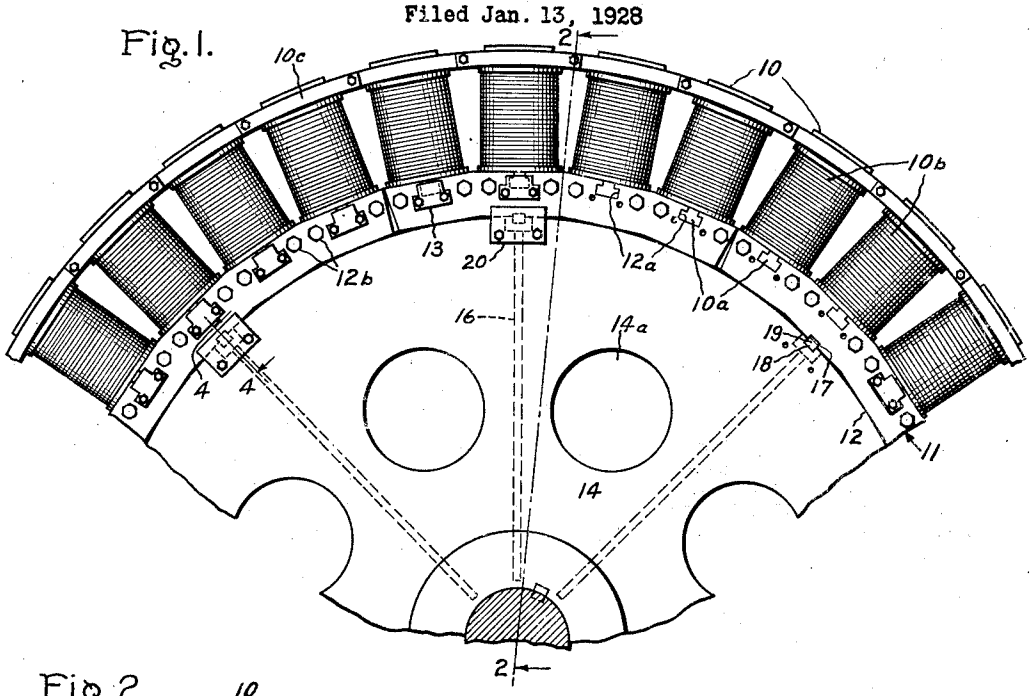


Fig. 2.

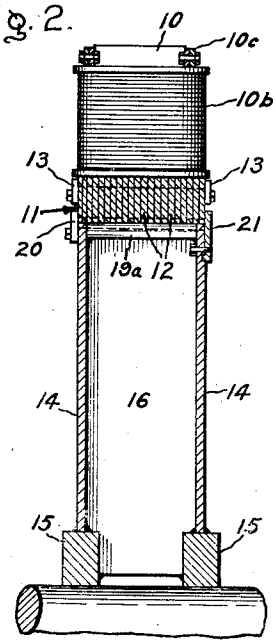


Fig. 3.

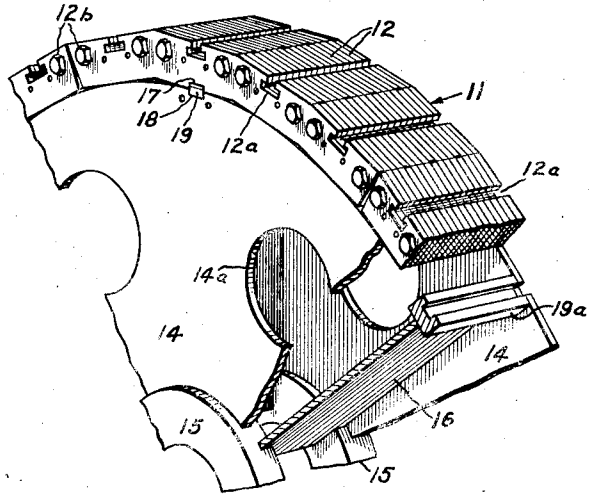
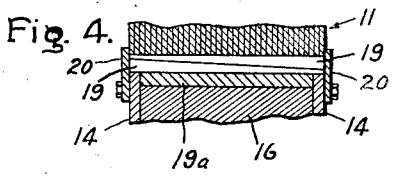


Fig. 4.



Inventor
Henry G. Reist,
by Charles F. Mullen
His Attorney.

Patented Oct. 16, 1928. 1,687,513

UNITED STATES PATENT OFFICE.

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

ROTOR.

Application filed January 13, 1928. Serial No. 246,630.

My invention relates to rotors for dynamo-electric machines and has for its object the provision of an improved construction in which the magnetic structure is mounted on a central supporting structure in such manner that centrifugal stresses in the magnetic structure are not transmitted to the central supporting structure, and in which the latter can be readily constructed at a plurality of flat plates secured together.

My present invention will be more fully set forth in the following description referring to the accompanying drawing and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In the drawing, Fig. 1 is a fragmentary end view of my improved rotor partly broken away; Fig. 2 is a transverse section on the line 2—2 of Fig. 1; Fig. 3 is a perspective view partly broken away of a portion of the rotor with the pole pieces removed and Fig. 4 is a section on the line 4—4 of Fig. 1.

Referring to the drawing, the embodiment of my improved rotor shown therein includes a magnetic structure comprising pole pieces 10 and an annular body 11 which is mounted on a central supporting structure keyed to the rotor shaft in the usual manner. In building the magnetic structure, a plurality of flat arcuate plates 12 are punched or cut out of metal plates with dovetail slots 12^a and holes formed therein in such relation that when the arcuate plates are assembled in staggered relation with their edges presented outwardly, that the dovetail slots and holes are aligned so as to form slots and holes extending axially through the rotor. These arcuate plates are secured together by bolts 12^b extending through the holes therein so as to constitute a rigid continuous annular body 11 and the pole pieces 10 are secured to this annular body by dovetail projections 10^a which closely fit the dovetail slots 12^a formed therein and are retained in the slots by end plates 13 bolted to each end of the annular body. Although I prefer to secure the pole pieces 10 to the annular body 11 by the use of dovetail slots, they may be secured thereto in any other convenient manner. The pole pieces 10 are provided with exciting windings 10^b which are retained in place by coil retaining clamps 10^c.

The magnetic structure is mounted on a central supporting structure which in accordance with my present invention comprises annular plates 14 spaced apart axially of the rotor and welded to hub members 15. The annular plates, which may have holes 14^a formed therein to lighten the structure, and the hub members are rigidly connected together by radially arranged webs 16 extending between them and welded thereto. Openings 14^a are formed in the annular plates 14 to lighten the structure and to facilitate the circulation of air through the rotor.

In order to prevent centrifugal stresses being transmitted from the magnetic structure to the central supporting structures, I form keyways 17 in the former and keyways 18 in the latter, having their sides in alignment, and place keys 19 therein between plates 20 bolted to one of the plates 14 and an annular braking plate 21 bolted to the other of the plates 14 to which a brake may be applied to stop the rotor. These keys form a driving connection for transmitting torque between the magnetic structure to the central supporting structure without restricting radial movement of the former relative to the latter whether the rotor is used in a motor or a generator. The keyways 17 are formed in each of the plates 12, when it is cut or punched out, in such manner that when the plates are assembled, the keyways 17 extend entirely across the inner periphery of the annular body. The keyways 18 are formed in blocks 19^a which extend between the plates 14 and are welded thereto and to the ends of the webs so that the blocks reinforce the central supporting structure in addition to carrying the keys 19 which form the driving connection between the magnetic and central supporting structures. The keys 19 are each made in two tapering parts which extend the entire length of the keyways. These parts are driven in place so as to subject the annular body to an initial stress great enough that when the rotor is revolving at the normal speed of operation, the circumferential elongation of the annular body 11 under centrifugal stress will not unseat the keys 19 from the keyways 18. In this way the annular body 11 is maintained accurately centered on the central supporting structure throughout the range of its speed of operation.

It will be seen that in the foregoing described construction, the centrifugal stresses

in the magnetic structure, which comprises most of the weight of the rotor, are resisted substantially altogether by circumferential tension in the annular body 11 for the reason that the latter is freely supported on the central supporting structure by the keys 19 and cannot transmit radially acting forces thereto. Moreover, the arrangement of the plates which constitute the central supporting structure, is such that it can readily be constructed of parts cut or punched out of metal plates.

Modifications of my improved rotor construction will occur to those skilled in the art, so that I do not desire to be limited to the particular construction set forth except as defined in the appended claims.

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

1. A rotor for dynamo-electric machines having a central supporting structure comprising a plurality of axially spaced annular plates and radially extending webs arranged between said plates, said webs being connected to said plates to form a rigid supporting structure, an annular body surrounding said central supporting structure, and means including keys carried by said webs for forming a driving connection between said central supporting structure and said annular body, said keys being arranged to provide for outward movement of said annular body relative to said central supporting structure independently thereof when they are subjected to centrifugal stresses, so that centrifugal forces acting on said annular body will be resisted substantially altogether by tension stresses therein.

2. A rotor for dynamo-electric machines having a central supporting structure comprising a plurality of axially spaced hub members each having an annular plate secured thereto, radially extending webs connecting said plates and said members to form a rigid supporting structure, an annular body surrounding said central supporting structure having pole pieces secured thereto, and means including keys carried by said webs for forming a driving connection between said central supporting structure and said annular body, said keys being arranged to provide for outward movement of said annular body relative to said central supporting structure independently thereof when they are subjected to centrifugal stresses so that centrifugal forces acting on said annular body will be resisted substantially altogether by tension stresses therein.

In witness whereof, I have hereunto set my hand this 12th day of January, 1928.

HENRY G. REIST.

CERTIFICATE OF CORRECTION.

Patent No. 1,687,513. Granted October 16, 1928, to

HENRY G. REIST.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 9, for the word "at" read "of"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of December, A. D. 1928.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.