Feb. 6, 1940. D. W. RANDOLPH ET AL 2,189,524

MAGNETO ROTOR CONSTRUCTION

Filed April 3, 1936

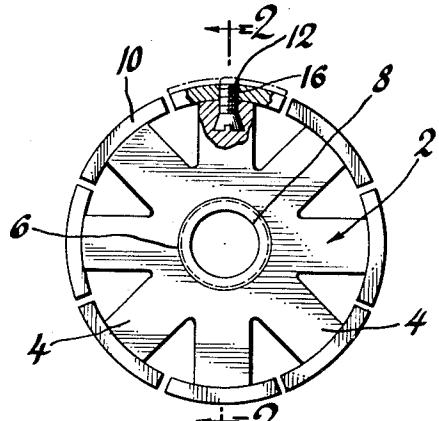


Fig. 1

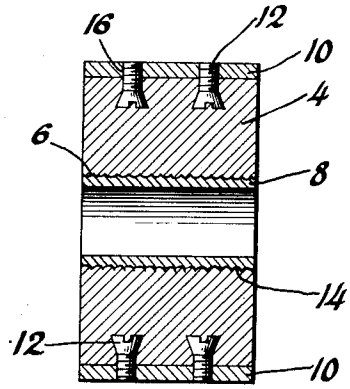


Fig. 2

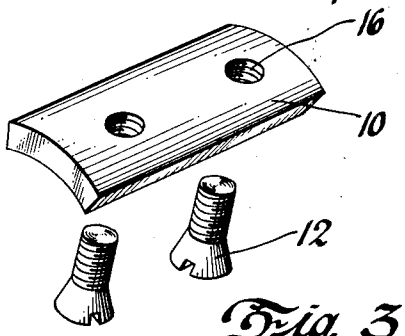


Fig. 3

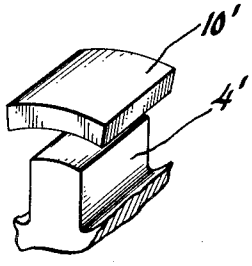


Fig. 4

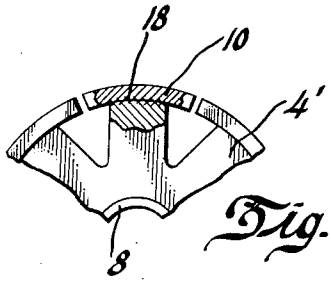


Fig. 5

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MAGNETO ROTOR CONSTRUCTION

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3 Claims. (Cl. 171—209)

This invention relates to electromagnetic apparatus and more particularly to the construction of rotors which are used in magnetos.

In the ordinary form of magneto rotors that have a plurality of poles projecting radially from a central body about the axis of which the whole is adapted to rotate, the ends of the poles are expanded circumferentially to form pole shoes and these have been made of the same piece of metal. One of the substances that has been used for this design to give proper mechanical characteristics is a comparatively hard alloy of

Ni-Al-Fe

which is comparatively hard to machine and whose magnetic properties, particularly its permeability, are not as satisfactory as might be desired.

It is therefore an object of our invention to provide a magneto rotor having high permeability without sacrificing mechanical strength.

It is a further object to provide a magneto rotor in which the necessary surfaces may be easily machined.

It is a still further object of our invention to provide a unitary rotor composed of materials having different characteristics which are specifically utilized.

With the above and other objects in view which will become evident as the disclosure proceeds, the embodiments of our invention are set forth in the following specification and claims and illustrated in the accompanying drawing, in which;

Fig. 1 is an end elevation partly in section of a rotor embodying our invention.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a perspective view showing the shoes and securing means in spaced relation.

Fig. 4 is a perspective view showing a plain pole and shoe in spaced relation.

Fig. 5 is a partial end elevation partly in section showing a modified means of assembling the pole and shoe.

Rotors of the general cross section shown in Fig. 1 have been cast in one piece using an alloy of 13% Al, 25% Ni and 62% Fe but the low magnetic permeability of the alloy caused a weak flux at the expanded pole tips which in turn caused a high starting speed in operation. Further, this alloy is difficult to machine.

The embodiment of our invention shown in Fig. 1 includes a body 2 having a plurality of radially extending arms or poles 4. Through the center of the body is an axial opening 6 in which is a steel sleeve 8. The outer ends of each of the poles is curved circumferentially about the axis of the body and secured against these surfaces are a plurality of soft iron pole shoes 10 by machine screws 12. These pole shoes are curved to conform to the surface of the ends of the poles and to form a circular assembly.

The whole is assembled by placing the machine screws in the threaded openings 16 in the pole shoes, placing the shoes in a mold and placing the steel sleeve 8 in the center and casting in the body 2.

It will be noted that the exterior surface of the sleeve 8 is threaded as at 14 which forms a more satisfactory bond with the body 2 and also tends to prevent the sleeve from cracking as the cast body 2 shrinks upon cooling.

In this form the steel sleeve may easily be machined to fit any shaft upon which the rotor is mounted and the pole shoes may be machined or ground if necessary to fit within any housing. Furthermore the permeability of the shoes is increased by a large amount and gives a low starting speed of operation for the magneto.

Instead of casting the securing machine screws into the poles, the poles and rotor body may be cast as before with the steel central sleeve or bushing and the pole shoes 10′ may be secured to the outer end of the poles 4′ by welding as shown at 18 in Fig. 5. The same advantages would obviously be attendant in this form.

We claim:

1. In a magneto rotor construction, a cast, central, solid, body portion, arms integral with said body portion and extending radially therefrom and having their outer ends on substantially the same circumference, a plurality of shoes having high magnetic permeability, one shoe for each arm, the shape of the inner face of the shoes conforming to the shape of the end face of the arms and means to connect the shoes to the arms, said means being secured to the shoes and being permanently and non-removably embedded in the ends of the arms.

2. In a magneto rotor construction, a central, cast, body portion having a plurality of radially extending arms integral therewith, a plurality of shoes of arcuate shape having tapped openings extending radially therethrough, means threaded in said tapped openings in each of said shoes and enlarged end portions on said means, said end portions extending inwardly of the rotor and being embedded in the ends of said arms when said body portion is formed by casting.

3. In a magneto rotor, a plurality of mild steel shoes of arcuate shape, said shoes spaced apart and arranged to form the annular rim portion of said rotor, tapped holes in each of said shoes extending radially of the axis of said rotor, flat head machine screws in each of said tapped holes, a mild steel sleeve concentric with said rim portion and located at the axis of said rotor, and a central portion cast between said shoes and said sleeve capable of being magnetized and retaining magnetism and having poor machinability characteristics, said central portion having radially extending pole portions, the ends of which are formed by contact with the inner arcuate surface of each of said shoes, the heads of said machine screws being embedded in the radially extending pole portions.

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