Nov. 10, 1936. W. J. SPENGLER 2,060,260

MAGNETO GENERATOR

Filed June 20, 1935

Fig. 1

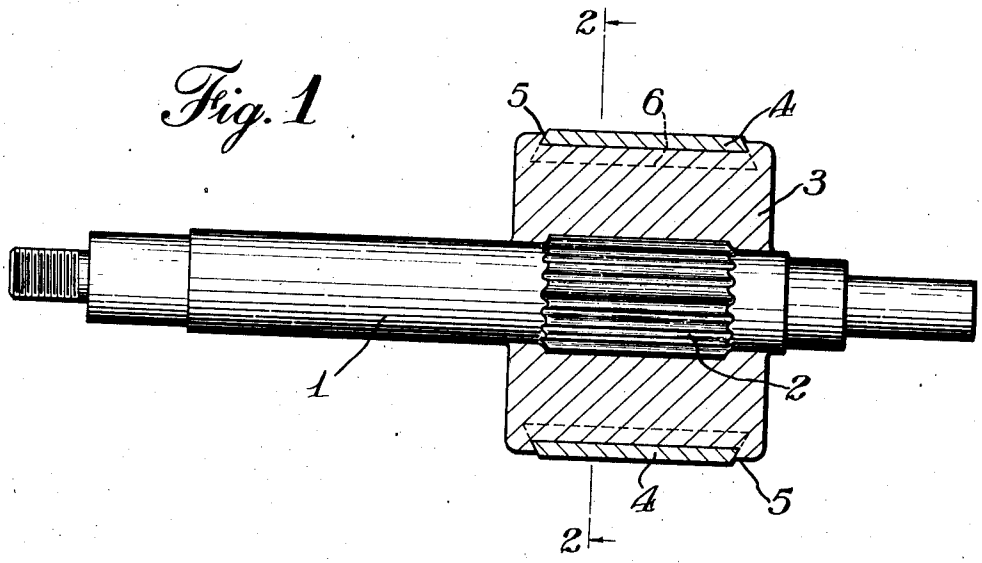


Fig. 2

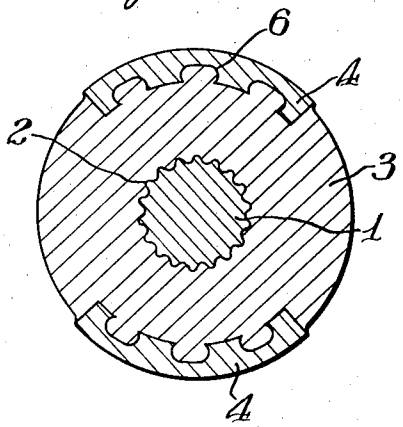
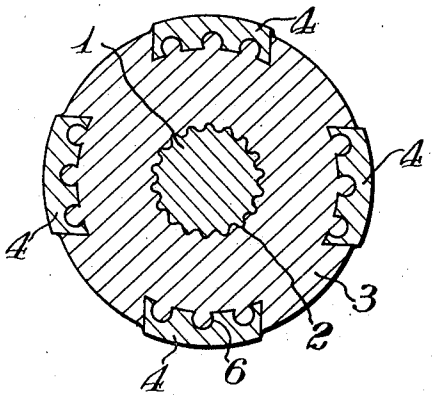


Fig. 3



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MAGNETO GENERATOR

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3 Claims. (Cl. 171—209)

The present invention relates to magneto generators and more particularly to a magneto rotor and the method of making the same.

Magnetic alloys composed principally of aluminum, nickel and iron have recently been developed which permit the construction of permanent magnets having very high unit coercive force. Advantage has been taken of the magnetic properties of these alloys to construct rotors for ignition magnetos in which the magnets are arcuate in shape and form a ring having projecting pole pieces, no larger in diameter than the conventional magneto rotor using U-shaped magnets of cobalt or chrome steel.

Permanent magnet alloys are in general too hard for any machining operations other than grinding, so that it is customary to cast the magnets in approximately their final form and thereafter grind them to size and shape. It has been found that the aluminum, nickel and iron alloys of the type above referred to have the property of requiring comparatively little heat treatment subsequent to casting in order to secure the desired magnetic properties.

It is an object of the present invention to utilize the characteristics of the aluminum, nickel, iron alloys in the production of a novel magneto rotor which is effective in action while simple and rigid in construction.

It is another object to provide such a rotor the parts whereof are unified into a single integral structure.

It is a further object to provide such a device in which the only parts requiring any machine work are the shaft and pole pieces which are formed of soft metal.

It is another object to provide such a device in which the pole pieces and shaft are welded to the permanent magnets so as to provide a magnetic path of least resistance and a structure of maximum rigidity.

It is another object of this invention to provide a novel method of constructing a magneto rotor of the above type which is simple, rapid, economical and efficient.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawing in which:

Fig. 1 is a side view partly in vertical section of a preferred embodiment of the invention;

Fig. 2 is a vertical section taken substantially on the line 2—2 of Fig. 1; and

Fig. 3 is a view similar to Fig. 2 of a rotor embodying four pole shoes instead of two.

Referring to Fig. 1 of the drawing, there is illustrated a shaft 1 of conventional form and material which is adapted to be mounted in a magneto frame and rotated by suitable coupling means, not illustrated since they form no part of the present invention. An intermediate portion of the shaft 1 is preferably knurled or fluted as illustrated at 2, and a mass of permanent magnetic alloy 3 is cast thereon forming a ring in which soft iron pole pieces 4 are embedded. The pole pieces are preferably bevelled at their ends as indicated at 5 so as to dovetail into the magnet ring 3, and may further be provided with serrations or grooves 6 on their inner surfaces in order to positively interlock with the material of the magnetic ring.

According to the present invention, the rotor is built up by placing the shaft 1 in a suitable mold with the pole pieces 4 spaced circumferentially and radially thereabout. Suitable flux is then applied to the external surface of the shaft and the internal surfaces of the pole pieces, and the aluminum, nickel, iron alloy which has been heated just sufficiently to cause it to flow is then poured into the mold so as to surround the shaft and flow into and around the pole pieces. Since the melting point of the alloy is not greatly removed from the melting points of the shaft and pole pieces, the surfaces of the shaft and pole pieces are raised to a welding temperature by the molten alloy whereby upon cooling, the parts are welded together to form an integral unit.

Since the magnetic properties of the aluminum, nickel, iron alloy are not destroyed by the casting operation, intensive heat treatment of the rotor to restore its magnetic properties is unnecessary. However, it is within the purview of the present invention to chill the mold immediately subsequent to the casting operation, or even to re-heat and quench the rotor if such be deemed desirable, and it will be clear that such treatment cannot cause the rotor to disintegrate inasmuch as it has been welded into a completely unified structure.

After the rotor has cooled, the magnetic ring is charged by placing the pole pieces 4 thereof in a magnetic circuit of high intensity whereby the permanent magnetic material becomes highly magnetized.

This method of manufacture is equally well adapted for rotors having two poles as illustrated in Fig. 2 or a larger number as shown in Fig. 3, the number of poles and dimensions of the parts being determined by the dimensions and

characteristics of the magneto in which the rotor is to be incorporated.

It will be understood that various changes may be made in the design and dimensions of the parts, and in the precise steps used in manufacturing the device without departing from the spirit of the invention as defined in the claims appended hereto.

What is claimed is:

1. In a magneto rotor a shaft, pole pieces arranged circumferentially about the shaft, and a permanent magnet filling the space between the shaft and pole pieces and bonded thereto so as to form an integral structure.

2. A method of making a magneto rotor comprising the steps of placing a shaft and a plurality of pole pieces in a mold which holds the pole pieces circularly and radially about the shaft, applying flux to the shaft and pole pieces, pouring in said mold a permanent magnetic alloy which has been heated just sufficiently to cause it to flow and weld with the shaft and pole pieces, chilling said mold to condition the magnetic alloy, and thereafter charging the magnetic ring.

3. In a magneto rotor a shaft, pole pieces arranged circumferentially about the shaft, and a permanent magnet filling the space between the shaft and pole pieces, said shaft and pole pieces being provided with protrusions and recesses, and said magnet being provided with recesses and protrusions interfitting therewith and welded thereto to form an integral structure.

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