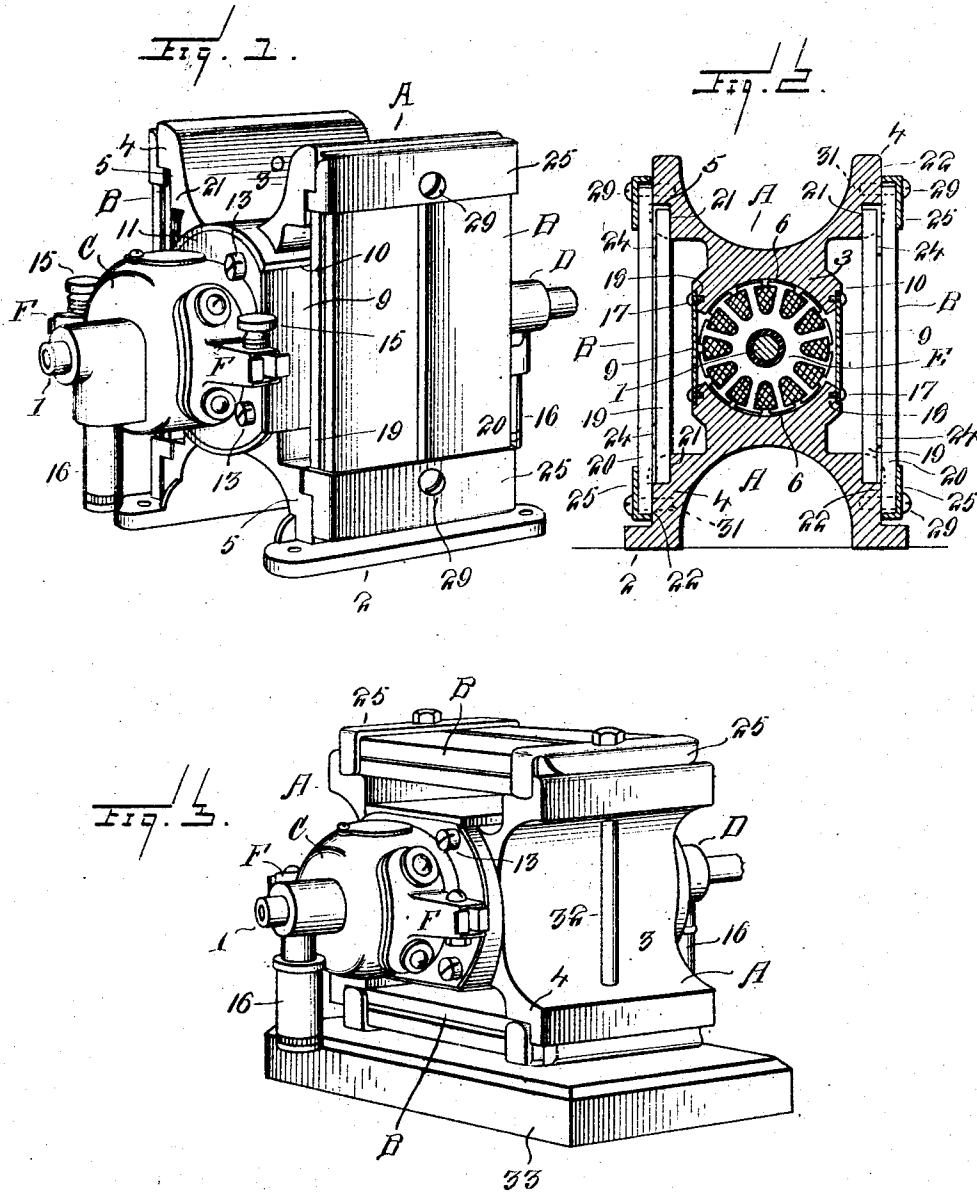


E. PODLEŠÁK.
ELECTRIC GENERATOR FOR IGNITION SYSTEMS.
APPLICATION FILED JUNE 10, 1911.

1,098,753.

Patented June 2, 1914.

2 SHEETS—SHEET 1.



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Fig. 4.

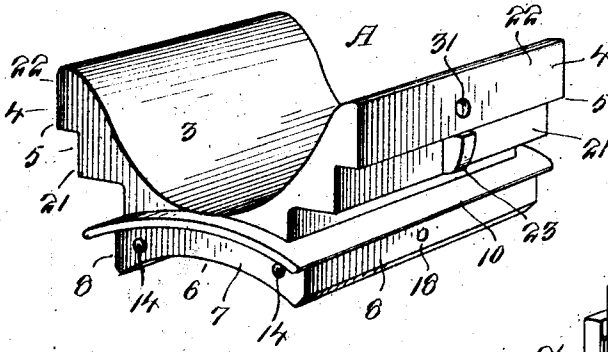


Fig. 5.

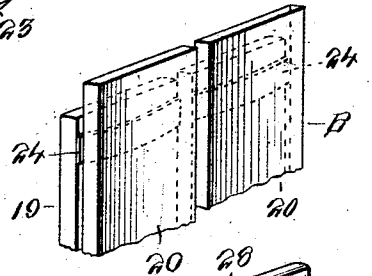


Fig. 7.

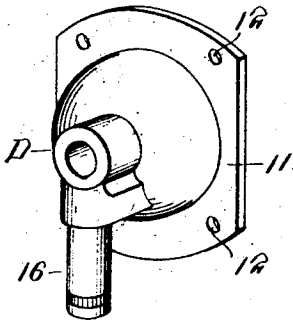


Fig. 8.

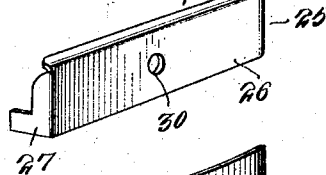


Fig. 9.

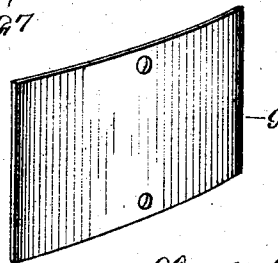


Fig. 10.

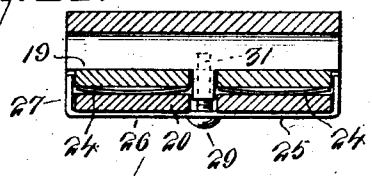


Fig. 11.

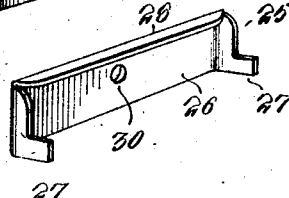
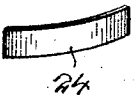


Fig. 12.



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ELECTRIC GENERATOR FOR IGNITION SYSTEMS.

1,098.753.

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To all whom it may concern:

Be it known that I, EMIL PODLEŠÁK, a citizen of the United States, residing at Tiffin, in the county of Seneca and State of Ohio, have invented certain new and useful Improvements in Electric Generators for Ignition Systems, of which the following is a specification.

This invention relates to a current generator of the magneto type for use in ignition systems for internal combustion engines.

The invention has for one of its objects to improve the construction of dynamo electric machines of this type so that reliable and efficient ignition can be obtained and at the same time a simple, compact and strong structure produced wherein the magnetic field is of such a character that not only will the current be effective for producing ignition while the magneto is driven at regular speed by the engine, but also when starting or cranking the engine, so that in actual practice batteries can be dispensed with for generating the starting current.

Another object of the invention is to improve the mechanical design of the field structure so that the individual parts can be manufactured and assembled at a minimum cost.

Another object is to provide a machine in which the armature is thoroughly incased so as to be strictly oil, dust and waterproof, and in which large bearings for the armature shaft are provided and excessive wear of the bearings is reduced to a minimum by effective lubrication and because of the comparative low speed of rotation of the armature, the effective speed being between 1,200 and 1,500 R. P. M., as compared with 2,000 to 3,000 R. P. M. of other machines of the same type.

With these objects in view and others, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawings, Figure 1 is a perspective view of the machine. Fig. 2 is a vertical section thereof taken transversely to the armature. Fig. 3 is a front view of a horizontal type of machine wherein the magnets are horizontal instead of being vertical, as in the vertical type shown in Fig. 1. Fig. 4 is a perspective view of one

of the pole pieces. Fig. 5 is a perspective view of the upper ends of one group of permanent bar magnets. Fig. 6 is a perspective view of one of the clips for clamping the bar magnets to the pole pieces. Fig. 7 is a perspective view of the rear shaft bearing. Fig. 8 is a perspective view of one of the plates that cooperate with the pole pieces and bearings for incasing the armature. Fig. 9 is an inner perspective view of the clip shown in Fig. 6. Fig. 10 is a sectional view through one group of magnets and adjacent pole piece, showing the manner of fastening the said parts together by the clip shown in Figs. 6 and 9. Fig. 11 is a perspective view of one of the spacing springs between juxtaposed magnets.

Similar reference characters are employed to designate corresponding parts throughout the views.

Referring to the drawings, A designates the pole pieces of the field structure, and B, the magnets thereof which are clamped to the pole pieces to form the complete magnetic field. The pole pieces are rigidly fastened together by the front and rear bearings C and D in which rotates the shaft 1 of the armature E which is of the commutator type and of any approved construction.

The pole pieces in Figs. 1 and 2 are substantially the same except that the bottom pole piece has feet extensions 2 through which bolts can be passed for fastening the machine to a supporting base. Each pole piece consists of a casting of magnetic material and is in the form of an arcuate body 3 which has outwardly-extending flanges or projections 4 extending parallel to each other and having their outer faces of stepped formation, at 5, for receiving the ends of the magnets. The arms or projections 4 constitute with the body 3 a U-shaped structure, the hollow side of which is external with respect to the frame or field of the machine. The concaved surface 6 of each pole piece is concentric with the armature E and is separated therefrom by a minimum clearance. The end faces 7 of the pole pieces are plain or flat so that the bearings can be snugly fitted thereto, and the side edges 8 of the pole pieces are also flat or straight in order that the closure plates 9 can be fitted thereto to complete with the pole pieces and bearing the housing or casing for the armature. Entirely around the pole piece is a bead or flange 10 which overhangs the joints be-

tween the pole pieces and bearings at the ends and between the pole pieces and plates 9 at the sides, so that a comparatively water, dust and oil tight casing is obtained.

5 The bearings C and D are formed with flat plate-like base portions 11 that fit against the end faces 7 of the pole pieces, and the base portions 11 of the bearings have apertures 12 through which pass bolts
10 or screws 13 that are threaded in tapped openings 14 in the pole pieces. The front bearing C, particularly, is chambered so as to receive the commutator of an armature, and at opposite sides of the bearing are fastened brush holders F which form no part
15 of the present invention, and hence need not be specifically described, the brush holders having binding posts or terminals 15 by which the wires of the ignition circuit are connected with the magneto. Each bearing
20 has an oil cup 16 of the wick type for lubricating the shaft. The plates 9 are preferably of brass and of such length as to extend from the front to the rear bearing and of such width as to extend from one
25 pole piece to the other, the ends of the plates 9 overlapping the side edges of the base portions 11 of the bearings. Each plate 9, as shown in Fig. 8, has central openings adjacent its upper and lower edges, through
30 which pass screws 17, Fig. 2, that are threaded in tapped openings 18 in the pole pieces. The plates 9 are slightly bowed outwardly at the center so that when the screws 17
35 are drawn home, the plates will be straightened out and held under tension against the pole pieces and bearings so that rattling will not occur with only two screws securing the plates in place.

40 Each group of magnets B consists of a plurality of sets of magnetic bars, such as tungsten steel, the bars 19 and 20 of each set being of different lengths. Although only two bars are shown in each set, it is obvious that any other number may be employed. The shorter bars 19 are innermost
45 and the ends bear on the surfaces or steps 21 while the longer bars 20 bear on the surfaces or steps 22 of the pole pieces. On the step 21 is an ear or lug 23 that serves to space the sets of bar magnets from each other. Between the bars of each set are bowed spacing springs 24 which are placed
50 under compression when the fastening clips 25 are secured to the ends of the magnets. These clips, as shown in Figs. 6 and 9, are preferably made of sheet metal punched and stamped so as to consist of a flat body portion 26, end flanges or lugs 27, and an edge
55 flange 28, all of which flanges are at approximate right angles to the body portion 26. These clips are applied to the ends of the magnets as shown clearly in Figs. 1 and 2, the end flanges 27 extending across the
60 outer edges of the magnets while the flanges

28 extend over the ends of the longer magnets. Each clip is held in place by a single screw 29 that passes through a central opening 30 in the clip and screws into a tapped opening 31 in the center of each
70 step 22 of the pole pieces. In other words, the screws 29 pass between the two sets of magnets at each side of the machine, so that the magnets will not have to be bored. As the screws are driven home, the bowed
75 spacing springs 24 are placed under compression, so that the vibration of the machine will not produce rattling or other noise, as would be the case without the bowed springs or other equivalents.

80 In the horizontal type of machine shown in Fig. 3, the magnets are clamped to the pole pieces by through bolts 32, which are of such length as to extend entirely across the pole pieces through the clips and into a
85 base plate 33 so that the bolts 32 secure the machine as a unit to a base plate and fasten the magnets in place.

90 By the peculiar construction of the pole pieces, it is possible to obtain a large output of current, especially for starting the engine, so that a battery can be dispensed with. This desirable result is attributable to the shape of the magnetic paths, as apparently
95 the extra large area of leakage surfaces at the sides of the pole pieces enables the armature to become rapidly deenergized when the circuit is broken after each ignition spark.

100 From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the
105 invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

Having thus described the invention, what I claim as new, is:—

1. A generator comprising an armature, 110 pole pieces having stepped surfaces, sets of long and short permanent magnets bearing on the steps of said surfaces, clamping means applied to the ends of the magnets, fastenings extending through said means and between the sets of magnets and secured to the pole pieces, and compressible means between the magnets.

2. A generator comprising a rotor, oppositely-disposed arcuate pole pieces each having flanges extending outwardly from the outer face of the pole piece adjacent the sides thereof, the outer faces of the flanges being stepped, lugs on the stepped faces of the flanges, sets of magnets of different 120

lengths clamped to the stepped faces of the flanges and separated from each other by the said lugs, clips applied to the ends of the magnets, and fastenings passing through the clips and between the sets of magnets and connecting with the pole pieces.

3. A field structure for a generator comprising a pole piece having extensions provided with flat surfaces, permanent bar magnets bearing on the flat surfaces, said bars being arranged in sets, yielding elements between the magnets of each set, and means for clamping the magnets to the pole pieces and placing the elements under tension.

4. A field structure for a generator including a pole piece, a plurality of magnets bearing on the pole piece, a bowed spring interposed between the magnets, a clip embracing the ends of the magnets and holding the same, and a fastening for securing the clip to the pole piece and holding the said spring under tension.

5. A field structure for a generator including a pole piece, a plurality of sets of bar magnets bearing on the pole piece, bowed springs between the magnets of each set, a single clip embracing the ends of the sets of magnets, and means for securing the clip to the pole piece and holding the springs under tension.

6. A field structure for a generator including a pole piece having a stepped surface, a plurality of sets of magnets having their ends bearing on the stepped surface, a clip extending over the ends of the magnets and having flanges for engaging the sides and ends of the magnets of all the sets, and a fastening passing through the clip and between the sets of magnets for securing the latter to the pole piece.

7. A field structure including a pole piece having a stepped surface, a lug on one of the steps of the said surface, a set of long and short magnets at opposite sides of the lug and bearing on the steps of the said surface, a clip applied to the ends of the magnets, a fastening extending through the clip and between the sets of magnets and connected with the pole piece, and compressible elements between the magnets of each set.

8. A pole piece comprising an arcuate body having approximately radial flanges formed with stepped outer surfaces, the stepped magnet bearing surface of one flange being parallel with that of the other flange, said body having straight end and

side surfaces, and a water-shedding flange on the pole piece projecting from the end and side surfaces.

9. A generator comprising a rotor, oppositely disposed pole pieces, bearings secured to the pole pieces, plates secured to the sides of the pole pieces to cooperate with the latter and bearings to form a closed housing for the rotor, and sets of bar magnets secured to the pole pieces disposed at opposite sides of and arranged with their middle portions nearest to the rotor and having their extremities bearing on the pole pieces.

10. A generator comprising an armature, oppositely disposed pole pieces, bearings securing the pole pieces together and rotatably supporting the armature, plates closing the space between the pole pieces and between the bearings, means for fastening the plates to the pole pieces, flanges on the pole pieces overhanging the edges of the bearings and plates, and magnets connecting the pole pieces.

11. A generator comprising an armature, oppositely-disposed pole pieces having flat end and side surfaces, bearings fastened to the end surfaces for securing the pole pieces together and rotatably supporting the armature, plates bearing on the side surfaces and bridging the gaps between the pole pieces and cooperating with the bearings and pole pieces to form a closed chamber for the armature, bar magnets extending from one pole piece to the other and disposed with their middle portions nearest the gaps between the pole pieces, and means for securing the magnets to opposite sides of the pole pieces.

12. A generator comprising an armature, oppositely-disposed pole pieces having flat end and side surfaces, bearings fastened to the end surfaces for securing the pole pieces together and rotatably supporting the armature, plates bearing on the side surfaces of the pole pieces and cooperating with the bearings and pole pieces to form a closed chamber for the armature, the said plates having a tendency to bow outwardly at their middle portions, and fastenings securing the plates to the pole pieces and holding them flat against the latter and against the bearings.

In testimony whereof I affix my signature in presence of two witnesses.

EMIL PODLEŠÁK.

Witnesses:

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H. W. MICHAELS.