

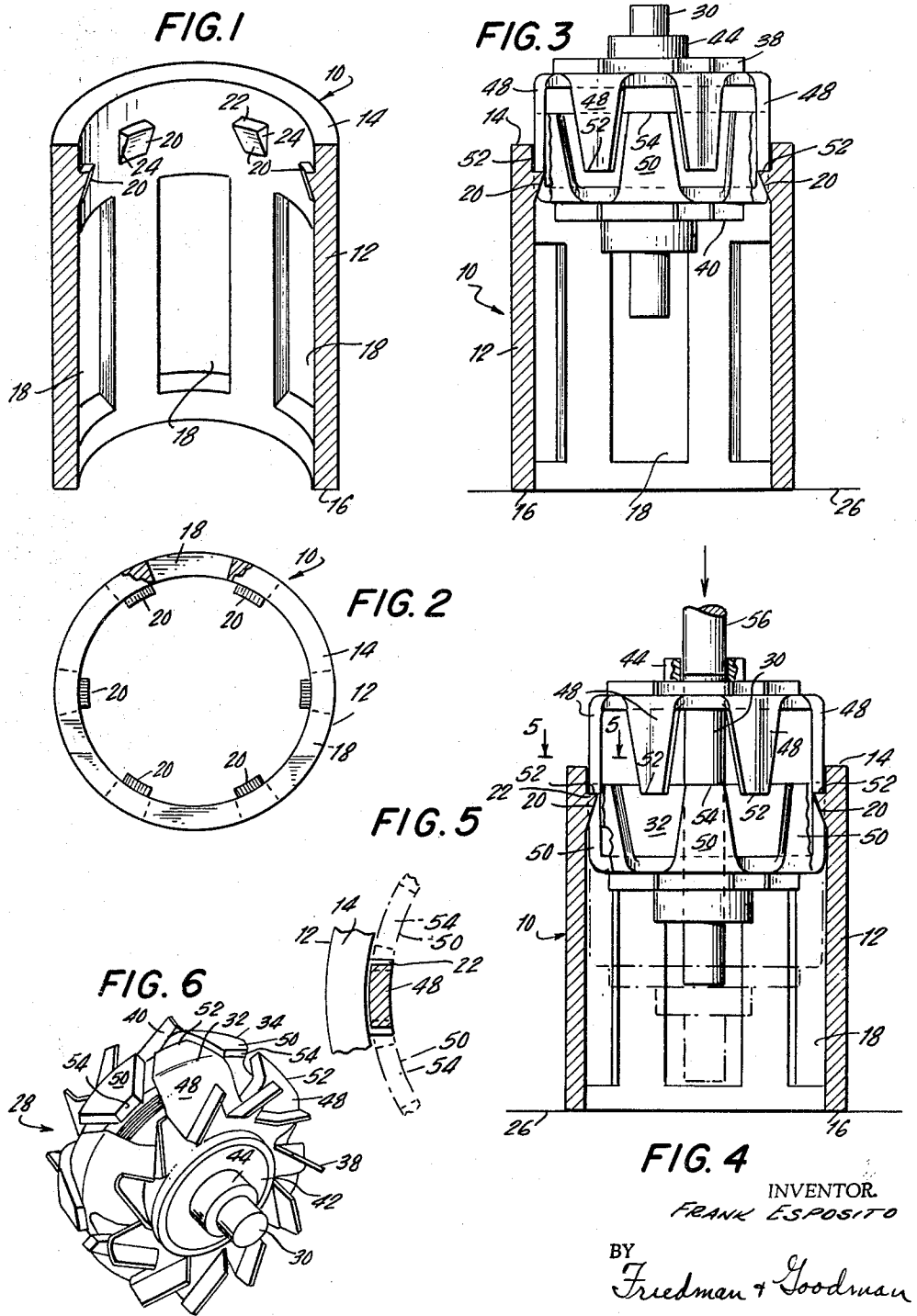
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ALTERNATOR FIELD ROTOR SEPARATING TOOL

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ALTERNATOR FIELD ROTOR SEPARATING TOOL
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Alternators are presently in extensive use in the battery charging circuits of automotive ignition systems. The alternator differs from the conventional D.C. shunt generator in that the armature comprises a stator or stationary member while the field comprises the rotor or rotating member. In the usual construction of such generators, the rotor consists of a circular field coil encased between fingered, interleaved or overlapped sections which comprise pole pieces. The pole pieces are mounted on a common shaft for rotation therewith. In servicing devices of this type, it is often necessary to gain access to the space defined by said pole pieces particularly for the purpose of servicing the field coil and its associated circuitry. In view of the tight frictional engagement between the pole pieces and their mounting shaft, separation of the pole pieces has heretofore been difficult and time consuming.

It is therefore an object of this invention to provide a simple, efficient and inexpensive tool for the purpose of permitting the separation of the pole pieces of an alternator type electrical generator.

It is a further object of this invention to provide a device of the character indicated wherein the release of at least one of the pole pieces from its frictional engagement with its associated shaft is accomplished with a minimum amount of expenditure of time and effort and wherein the possibility of damaging or distorting the rotor or its component parts during the course of such separation or release is minimized, if not entirely eliminated.

Other and further objects and advantages of the present invention will be readily apparent to those skilled in the art from a consideration of the following specification taken in connection with the appended drawings which illustrate the best mode presently contemplated for carrying out the invention.

In the accompanying drawings:

FIGURE 1 is a perspective view of a tool in accordance with the present invention shown in section;

FIGURE 2 is a top plan view of the tool partly broken away to show the weight reducing openings formed therein;

FIGURE 3 is a longitudinal sectional view of a tool in accordance with the present invention showing an alternator field rotor in position thereon ready for accomplishing the release or separation of the pole pieces;

FIGURE 4 is a view similar to FIGURE 3 showing the separation of the pole pieces being accomplished as by the application of pressure upon the rotor shaft by means of the descent of the arbor of a press;

FIGURE 5 is a fragmentary sectional view taken along line 5-5 of FIGURE 4; and

FIGURE 6 is a perspective view showing the general type of alternator generator field rotor in conjunction with which the instant tool is useful.

As may be seen from FIGURES 1 and 2, the embodiment of the invention herein illustrated comprises a tool 10 comprising a shell or hollow enclosure 12. The shell 12 is advantageously of hollow cylindrical form, although it will be understood that shells of differing cross-sectional form such as square or hexagonal, may be utilized with varying degrees of advantage. The shell 12 comprises a circumferential wall having upper and lower edge faces 14 and 16 respectively. The shell 12 may be formed as

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a casting or it may be fabricated from tubing having a suitable cross-sectional configuration. Openings 18 extending through the shell walls are advantageously provided for the purpose of reducing the weight of the tool in order to render it more readily portable.

A plurality of rests 20 are provided along the interior surface of the cylindrical shell wall. The rests 20 are circumferentially spaced and project into the space defined by the shell wall. Each of the rests 20 is provided with a planar upper surface or seat 22 and a wedge shaped supporting body 24. The upper surfaces of the rests 20 defining the seats 22 lie in a common plane and the rests are disposed spaced a small distance below the upper edge face 14 of the shell 12 and a considerably greater distance from the lower edge face 16 thereof. The rest elements 22 may be formed integrally with the shell as by casting or machining or they may be independently formed and secured in position by suitable means. The tool 10 is intended to be disposed with its lower edge face 16 resting upon any suitable supporting surface 26 such as a workbench or the like.

As heretofore indicated, the tool comprising the present invention is intended to be used for the purpose of separation of the pole pieces of an alternator rotor assembly. A typical rotor of this type is illustrated in FIGURE 6 and designated generally by the numeral 28. A rotor of this type generally comprises a central shaft 30 which has fixedly secured thereto a field coil 32 which is disposed between a pair of pole pieces 34 and 36. Disposed along the exterior surface of each of said pole pieces are fan bladed plates 38 and 40 respectively. Slip rings 42 and 44 are provided for current carrying purposes. The entire rotor assembly is intended to be rotated as a unit. It will be noted that each of the pole pieces 34, 36 comprise spider-like elements in the form of a central or hub section 46 from which a plurality of finger sections 48 and 50 radiate.

The finger sections 48 are of generally trapezoidal outline having flat apexes 52 and 54. The terminal portions of the fingers 48 and 50 are deflected at right angles with respect to the plane of the hubs and disposed in interleaved or interdigitated relation so as to form a cage or enclosure for the field coil 32. It will be noted that the finger sections of the respective pole pieces are disposed in spaced relation so as to define a tortuous or sinuous space therebetween as indicated at 50. The pole pieces and associated fan plates and slip rings are held in tight frictional engagement with the body of the shaft 30 so that considerable difficulty is encountered when it is desired to separate the pole pieces and gain access to the interior space.

The instant tool provides a particularly convenient and efficient arrangement for accomplishing the foregoing separation with a minimum amount of effort or possibility of damage to the rotor assembly. As shown in FIGURES 3 and 4, the initial step in utilizing the tool comprising the instant invention for the purpose of accomplishing such separation is the placement of the rotor in axial orientation with respect to the shell. It will be noted that the diameter of the shell 12 is slightly larger than the rotor diameter and that the rests 20 are disposed in circumferentially spaced relation corresponding to the spacing of the terminal portions of the fingers of one of the pole pieces.

When the rotor 28 is disposed within the shell 12 as shown in FIGURE 3 the truncated apexes of the finger sections 48 of the upper pole piece rest upon the seats of the inwardly projecting rest elements 20. The rest elements enter the interdigital spaces of the lower pole piece so as to engage the apexes or ends of the fingers of the upper pole piece and serve as a rest therefor as may also

be seen from FIGURE 5. The rest elements 20 thus support the entire rotor assembly in spaced relation to the lower edge 16 of the shell and in axial alignment therewith. Although a shell with six rest elements is shown, it will be understood that the number of rests may be reduced so long as adequate support for the rotor is provided at spaced points along its circumference. It has however been found particularly advantageous to provide the rests in corresponding number to the number of finger sections of a pole piece so as to prevent any distortion of the pole piece or shaft as pressure is applied to effectuate a separation. As may be seen from FIGURE 4, the actual separation is accomplished by the application of pressure to the exposed end of shaft 30. This may be readily accomplished by use of an arbor press or similar device which will not damage the shaft end. When an arbor press is used, the tool is disposed upon the press bed and the press arbor 56 descends, the necessary pressure is applied to the end of shaft 30. The shaft 30 together with the lower pole piece 34 and the field coil disposed therein are thus forced downwardly while the upper pole piece remains stationary upon the rests as may be seen from FIGURE 4. The further application of pressure by the arbor will cause the lower pole piece, shaft and coil to drop free completely if desired as shown by the broken lines of said FIGURE 4.

In view of the foregoing, it will be apparent that pursuant to the present invention there has been provided a highly novel and efficient arrangement for an alternator field rotor separating tool of the type which is described. It will be understood that various changes and modifications may be made therein without however departing from the inventive concept thereof as set forth in the appended claims.

I claim:

1. A tool for facilitating the separation of the fingered pole pieces of an alternator field rotor comprising a hollow shell, a plurality of inwardly projecting integral generally wedge shaped seat elements having planar surfaces disposed in circumferentially spaced relation along the interior of the wall of said shell for engagement with the fingers only of one of said pole pieces whereby said pole piece is supported during the application of a separating force to a portion of said rotor to effectuate the separation of said pole pieces from each other and thereby disassemble said pole pieces from an alternator field rotor.

2. A tool for supporting the field rotor of an alternator to facilitate the application of a force for separating the pole pieces thereof, said rotor including a pair of shaft mounted pole pieces having spaced interdigitated finger sections having free ends, said tool comprising a hollow cylindrical shell having upper and lower face edges, a plurality of inwardly directed rest elements disposed in circumferentially spaced relation along the interior wall of said shell, said rests being formed with planar seats disposed in the same horizontal plane, said rests being located and dimensioned to enter the interdigital spaces in one of said pole pieces and to engage the free ends of the other of said pole pieces whereby a rotor may be supported within said shell solely by engagement with the fingers of the other of said pole pieces, said rests being disposed a sufficient distance above the lower edge face of said shell to provide a clearance between the end of a rotor shaft and a supporting surface for said tool to permit the descent of said shaft as a separating force is applied thereto.

3. A tool for facilitating the separation of a pair of the digitated pole pieces of an alternator field rotor com-

prising a hollow cylindrical shell, a plurality of projections carried by the interior wall of said shell, said projections being disposed in circumferentially spaced relation along said interior wall for engagement with the terminal portions of the digital members of one of said pole pieces whereby said rotor may be supported exclusively by means of one of said pole pieces within said shell in spaced relation to a supporting surface for the tool during the application of a separating force to a portion of said rotor, said projections being provided with planar surfaces in confronting relation to the digital elements of said one pole piece.

4. A tool for facilitating the separation of a pair of the digitated pole pieces of an alternator field rotor comprising a hollow cylindrical shell, a plurality of projections carried by the interior wall of said shell, said projections being disposed in circumferentially spaced relation along said interior wall for engagement with the terminal portions of the digital members of one of said pole pieces whereby said rotor may be supported exclusively by means of one of said pole pieces within said shell in spaced relation to a supporting surface for the tool during the application of a separating force to a portion of said rotor, said projections being provided with planar surfaces in confronting relation to the digital elements of said one pole piece, said projections being wedge shaped in longitudinal section.

5. A tool for facilitating the separation of a pair of the digitated pole pieces of an alternator field rotor comprising a hollow cylindrical shell, a plurality of projections carried by the interior wall of said shell, said projections being disposed in circumferentially spaced relation along said interior wall for engagement with the terminal portions of the digital members of one of said pole pieces whereby said rotor may be supported exclusively by means of one of said pole pieces within said shell in spaced relation to a supporting surface for the tool during the application of a separating force to a portion of said rotor, said projections being dimensioned to enter the interdigital spaces of the other of said pole pieces.

6. A tool for facilitating the separation of a pair of the digitated pole pieces of an alternator field rotor comprising a hollow cylindrical shell, a plurality of projections carried by the interior wall of said shell, said projections being disposed in circumferentially spaced relation along said interior wall for engagement with the terminal portions of the digital members of one of said pole pieces whereby said rotor may be supported exclusively by means of one of said pole pieces within said shell in spaced relation to a supporting surface for the tool during the application of a separating force to a portion of said rotor, said shell being provided with upper and lower face edges and said projections being disposed within said shell in spaced relation immediately below the upper face edge of the shell and spaced a substantially greater distance from said lower face edge whereby a rotor may be retained in stable condition during the separation of its pole pieces and sufficient clearance is provided below said rotor to permit separation.

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