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ELECTRIC MOTOR FRAME CONSTRUCTION

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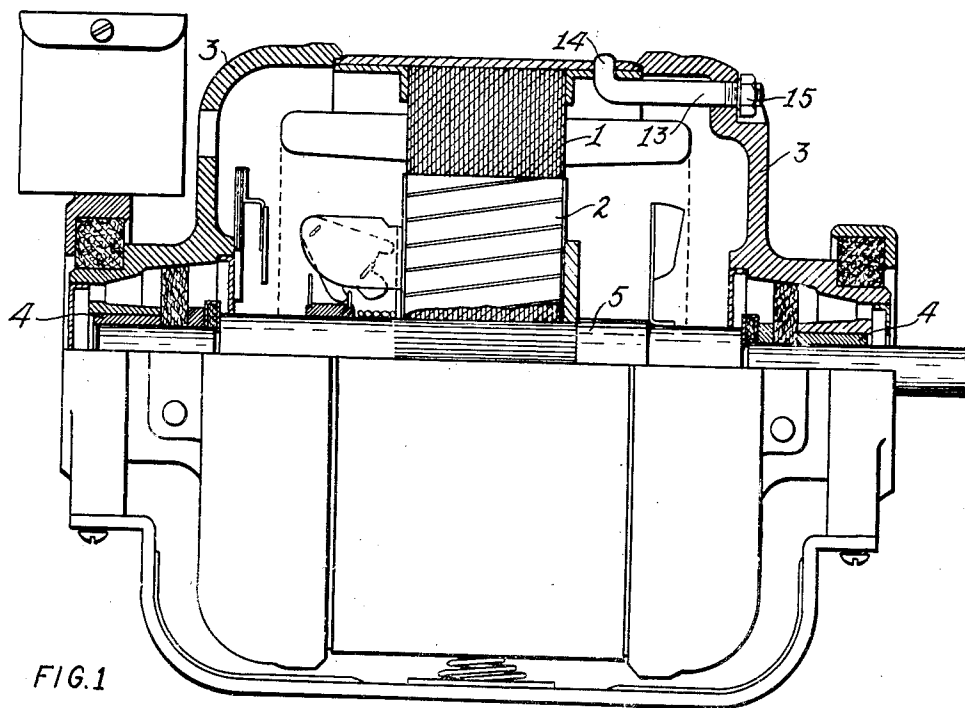


FIG. 1

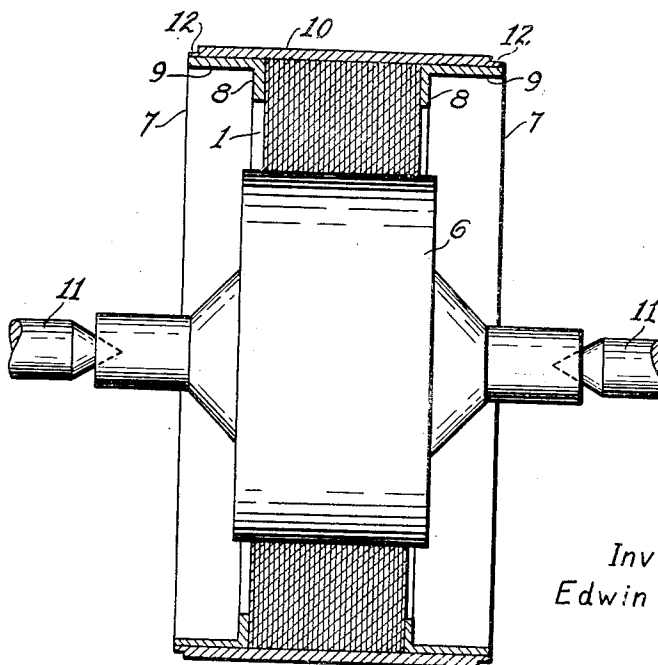


FIG. 2

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ELECTRIC MOTOR FRAME CONSTRUCTION

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1 Claim. (Cl. 171-252)

This invention pertains to electric motor construction and more particularly to small motors.

In small motors of the fractional horse power type the frames are usually constructed of cast iron or made of heavy formed steel. These are invariably subject to inaccuracies in machining and as they form the support for sheet steel laminations which make up the core iron and such laminations are small and more or less flimsy, the inaccuracies of the frame are impressed upon the core iron with the result that the stator bore comes out of shape by being eccentric or out of round.

One of the objects of this invention therefore is to provide a motor construction for supporting the core laminations such as to enable said laminations to be assembled in accurate relation to one another and to the bore of the assembled core.

Another object is to provide a construction which shall be inexpensive and yet rigid and durable in service.

Another object is to provide such a construction whereby the core may be properly compressed and maintained in compressed relation.

Another object is to provide a construction whereby the machined surfaces which support the end plates may be such as to align the motor bearings accurately with the bore of the stator core.

Further objects will appear from the following description taken in connection with the accompanying drawing in which:

Figure 1 is a partial sectional view in longitudinal section of a motor embodying this invention, and

Figure 2 is a sectional view of the core assembly mounted upon the mandrel upon which the core is assembled with said mandrel mounted in machine centers.

Referring to the drawing, 1 designates the stator core and 2 the rotor core. The end plates of the motor are indicated at 3 and these are equipped with bearings 4 in which is journaled the motor shaft 5 which carries the rotor core 2.

In accordance with this invention the separate laminations of the stator core are assembled on a mandrel 6 having an outside diameter exactly equal to the inside diameter of the core laminations. When a sufficient number of laminations have been assembled on the mandrel 6 to form a complete core, clamping end rings 7 are assembled at opposite ends of the core. These end rings may be constructed in any suitable manner but are preferably drawn from sheet

steel in such form as to provide each with a radial flange 8 and a circumferential flange 9. The flanges 8 are assembled against the ends of the stator core and the entire assembly is then placed in a suitable jig, not shown, in which the laminations are compressed. While held under pressure in this jig the motor frame, in the form of a sheet steel band or barrel 10 is assembled around the punchings and the end rings 7. The barrel 10 may be formed of a strip of sheet steel or other suitable metal formed into a hoop or ring and having its adjoining edges welded or otherwise permanently secured together. When this barrel has been assembled upon the stator as shown in Figure 2, the end rings 7 are spot welded thereto at a number of points around its circumference so as to permanently secure the rings to the barrel in such a manner as to maintain their clamping pressure upon the stator core. This puts the barrel in tension in its axial direction so as to render it stiff against distortion even when made of light metal.

With the assembled core thus in place upon the mandrel 6 the latter may now be mounted in lathe centers 11 as shown in Figure 2 and the barrel 10 may then be turned to form the alining surfaces 12 upon which the end plates 3 are alined. By this procedure the surfaces 12 are formed upon the same axis as the bore of the stator core. As a result therefore, the bearings carried by the end plates 3 will be alined by engagement of said end plates with the surfaces 12 with their axes accurately coinciding with the axis of the stator bore.

In order to secure the end plate 3 in place upon the frame 10, fastening bolts 13 are provided. These bolts are attached to the frame after the end rings 7 have been assembled. Each bolt 13 is provided with a hooked end 14 passing through a radial hole in the frame. This hooked end may be drilled or split or otherwise rendered deformable so that after being located in the hole in the frame it may be peened over or staked or otherwise deformed so as to secure it firmly in its socket, a suitable jig being used if necessary to locate and align the bolt 13 during the staking operation. The end plates 3 are provided with suitable holes to receive the bolts 13 and are secured in place by nuts 15. The bolts may be spaced about the circumference of the frame in any desired manner.

It has been found practical to wind the stator before the bolts 13 are assembled thereon. When this is done the winding operation is not inter-

ferred with by the bolts and the latter may be mounted after the winding is complete.

It will be seen that this invention provides a simple and rigid construction for stators of small motors. In motors of fractional horse power sizes where the stator core is assembled in accordance with previous practice the inaccuracy of the frame is impressed upon the core laminations and such inaccuracy, although small, is relatively large when considered in comparison with the overall dimension of the machine. Inaccuracies which would be inappreciable in a large motor produce a serious distortion in case of such a small motor. Accordingly, the construction and method of assembly provided by this invention not only provide a rigid structure but also make it possible to construct a motor with accuracy so that the rotor may be properly aligned. The method provides for assembling the core punchings on a mandrel and keeping them on this mandrel while the end plate aligning surfaces are machined so that such surfaces may be accurately formed upon the same axis as the stator bore. The form of the end ring 7 and the barrel 16 is such that these parts may be constructed of sheet iron or steel, which material lends itself readily to fabrication in any form, and such sheet metal parts or easily attached to one another by spot welding so that a permanent assembly is easily obtained at a low cost.

The term "spot welded," as used herein and in the appended claims, is intended to designate that form of weld which results from pressing to-

gether the sheets to be joined, under heavy pressure, and passing the heating current through the point of contact whereby the metal is heated to welding heat and welded at the spot where the pressure is applied. This is the generally accepted technical meaning of this term in the art.

While the invention has been described as applied to a unitary machine it will be understood, of course that individual features or sub-combinations of either the mechanical elements or the steps in the procedure of the process, may be useful by themselves without regard to other features or to the complete combination. It is understood, therefore, that the employment of such individual features or sub-combinations is contemplated by this invention and within the scope of the appended claim.

It is obvious that various changes may be made, within the scope of the appended claim, in the details of construction without departing from the spirit of this invention; it is understood, therefore, that the invention is not limited to the specific details shown or described.

Having thus described the invention, what is claimed is:

In the art of making motors of the character described, the method comprising, assembling a laminated core on a mandrel, compressing said core between end rings, welding the end rings to a surrounding frame barrel, rotating the assembly on the mandrel axis, and machining an aligning surface on the barrel on said axis.

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