July 23, 1957 W. A. ERNST 2,800,374

OIL PAD RETAINER CONNECTION TO AN ELECTRIC MOTOR SHELL CASING

Filed March 18, 1954

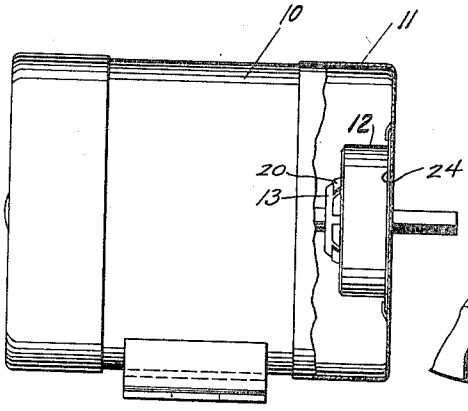


FIG. 1

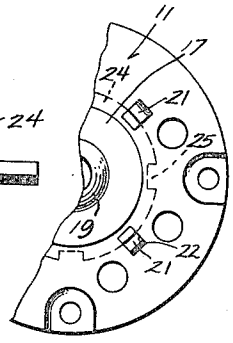


FIG. 2

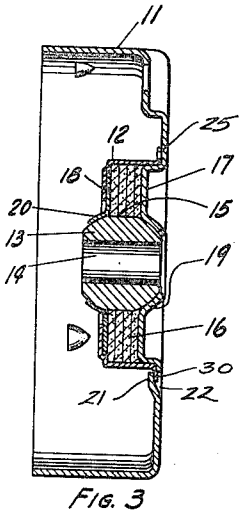


FIG. 3

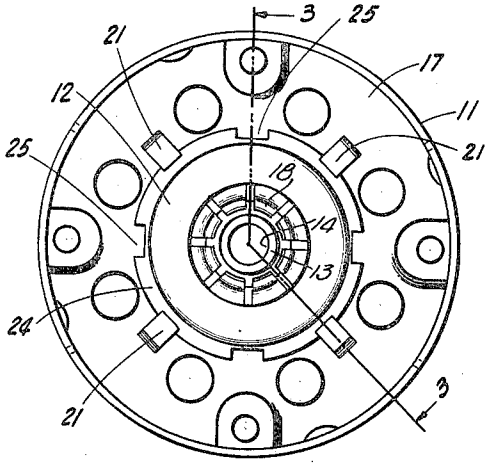


FIG. 4

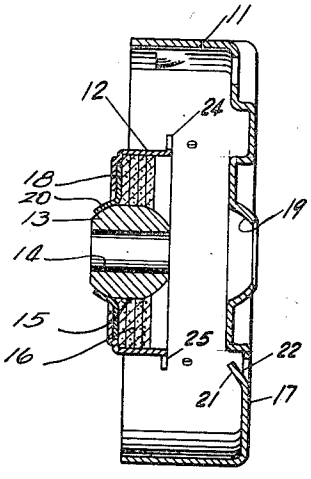


FIG. 5

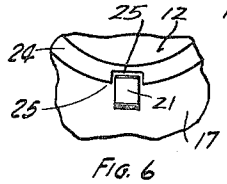


FIG. 6

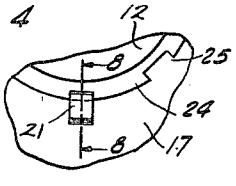


FIG. 7

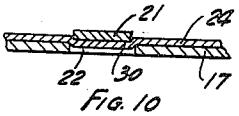


FIG. 10

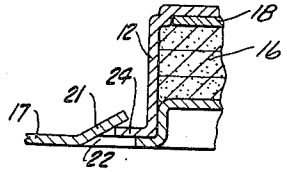


FIG. 8

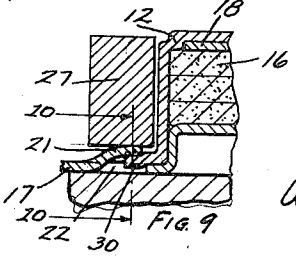


FIG. 9

INVENTOR.
W. ARTHUR ERNST
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS

United States Patent Office 2,800,374 Patented July 23, 1957

2,800,374

OIL PAD RETAINER CONNECTION TO AN ELECTRIC MOTOR SHELL CASING

W. Arthur Ernst, Racine, Wis., assignor to Howard Industries, Inc., Racine, Wis., a corporation of Illinois

Application March 18, 1954, Serial No. 417,195

4 Claims. (Cl. 308—132)

This invention relates to an oil pad retainer connection to an electric motor shell casing and other like assemblies.

In the past oil pad retainers have been mounted on the end closures of electric motor casing shells by riveting or welding. The present invention substantially reduces the cost of manufacture by providing a connection between the parts which not only uses mutually interlocked portions of the end closure and retainer to preclude separation of the parts but further uses the interlocked portions of the parts to prevent their relative rotation.

The surface of one piece of metal is sheared to provide tongues which are offset sufficiently to permit of the interengagement of the parts in the manner of a bayonet joint. Thereafter, the offset tongues are subjected to such pressure against the underlying metal of the other part as to deform the intervening metal into the notch from which the tongue was cut, thus keying the parts aaginst rotative movement. This precludes any possibility of separation of the parts such as otherwise might be effected by rotation in a direction which is the converse of the rotation which preliminarily joined the parts.

In the drawings:

Fig. 1 is a view in side elevation of an electric motor shell selected to exemplify the invention, portions being broken waay to expose the oil pad retainer within the end closure.

Fig. 2 is a fragmentary view in end elevation of the motor shell closure shown in Fig. 1.

Fig. 3 is an enlarged detail view of the motor shell closure and oil pad retainer taken in section on the line 3—3 of Fig. 4.

Fig. 4 is an enlarged elevation of the interior of the assembly of the shell closure and retainer.

Fig. 5 is a view taken on a section comparable to that of Fig. 3 showing the parts preliminary to assembly.

Fig. 6 is a fragmentary detail view in plan showing the first step in the assembly of the retainer to the shell closure.

Fig. 7 is a similar fragmentary view showing in plan the relative positions of the parts in a second step of assembly.

Fig. 8 is a fragmentary detail view taken in section on the line 8—8 of Fig. 7.

Fig. 9 is a fragmentary detail view on the same section as Fig. 8 showing the final operation of assembly.

Fig. 10 is a detail view taken in cross section on line 10—10 of Fig. 9.

It will be understood that from a method standpoint the invention is not necessarily limited to the production of an assembly of a motor casing end closure and oil retainer. However, the method is of particular utility to produce such an assembly and the assembly is novel per se. Accordingly, such an assembly has been illustrated as a preferred exemplification.

The motor shell **10** has a cup-shaped end closure **11** which is separately illustrated in Figs. 3 and 4 in assembly with the bearing and oil pad retainer **12**. The bearing

13 is a self-adjusting spherical segment having a shaft receiving bore at **14**. A portion of its periphery is cylindrical at **15** and is surrounded by an annular felt pad **16** which may comprise more than one ply if desired. The bearing **13** and the pad **16** are confined between the end wall **17** of closure **11** and a complementary annulus **18** confined within the retainer **12**. The annulus **18** and the end wall **17** are desirably provided with spherically concave portions **19** and **20** respectively within which the spherical bearing **13** is seated.

The present invention is concerned principally with the means of connecting the retainer **12** to the end wall **17** of closure **11**. As a first step, the end wall is die cut to form tongues **21** which are pressed out of the plane of the end wall to leave openings therein at **22** as shown in Fig. 5. Any desired number of such tongues may be provided, according to the required strength of the connection between the retainer and the wall. In the device shown, four tongues are illustrated.

The retainer **12** is provided with a flange **24** which is notched at **25** as shown in Fig. 4 and Fig. 6. The notches are so placed and of such dimensions that when the retainer is moved from the position of Fig. 5 into association with the end wall **17** as shown in Fig. 6, each tongue will be received in a notch **25** in the retainer flange **24**. Thereupon a relative rotation of the retainer from the position of Fig. 6 to that of Fig. 7 and Fig. 4 will move unnotched portions of the flange **24** beneath each of the tongues **21** of wall **17** to effect a preliminary connection of the parts which will preclude any axial separation but still leaves them free for relative rotation. Fig. 8 shows a cross section of the parts in this relative position, the unnotched flange **24** of retainer **12** being engaged beneath the tongue **21**. The said unnotched portion of flange **24** spans the opening **22** in end wall **17** from which tongue **21** was originally pressed.

In the final operation, an annular punch or other means shown at **27** is engaged with the several tongues **21** under sufficient pressure to flatten these and to force an intervening portion **30** of the flange **24** into the opening **22**, thereby keying the flange **24** to the end wall **17** in the manner shown in Fig. 10 to preclude relative rotation of the parts. Since the initial preliminary connection of the parts was effected by relative rotation from the position of Fig. 6 to that of Fig. 7, and since relative rotation in any direction is now made impossible by the deformation of a part **30** of flange **24** into its aperture **22**, it will be apparent that the parts cannot be disengaged except by exerting sufficient force upon them to bend the retaining tongues **21**. Since the tongues **21** will be sufficient in number and strength to resist any forces to which the parts may be subject in normal use, the connection is permanent for all practical purposes. Moreover, the operations of preliminary connection and final engagement are single operations, regardless of the number of tongues, and no separate connecting screws, rivets or welds are required. Thus considerable savings in cost are achieved.

I claim:

1. A method of assembling a radially flanged oil retainer ring having arcuately spaced peripheral notches in its flange to a motor shell end closure having tongues complementary to the notches and anchored at a radius greater than the flange and projecting inwardly and offset from the motor shell end wall to leave holes beneath the tongues, such method consisting in the application of the retainer to the interior of the closure end wall to receive the tongues through the respective notches of the flange, the relative rotation of the retainer and closure to effect a preliminary bayonet joint connection of the retainer and closure and to locate unnotched portions of the flange

beneath the tongues and spanning the openings, and the subsequent application of pressure to the several tongues in a direction to urge them toward the openings from which they were formed, thereby deforming underlying parts of the flange into said openings, whereby to key the retainer to the closure against relative movement in any direction.

2. An assembly of a motor shell closure and oil pad retainer which comprises the combination of a closure having an annular series of openings each of which is partially spanned by an integral tongue portion of the closure offset to form the respective opening, said tongues projecting inwardly from the outside of respective openings, and an annular oil pad retainer having a portion spaced from the end wall of the closure and having another portion engaged with such end wall and constituting an annulus having marginal portions continuous beneath the respective tongues and having parts thereof deformed to enter respective openings beneath the tongues, the tongues having thrust engagement with such parts to maintain the retainer and closure end wall in keyed connection against relative movement.

3. The device of claim 2 in which the end wall of the shell closure has a bearing receiving pocket in further combination with a self-aligning bearing engaged in the pocket and a bearing confining ring having an opposing pocket portion engaged with the bearing, said ring being confined within the retainer, and an oil retaining washer disposed between the ring and the closure end wall within the

retainer and concentric with said pockets and with the tongues and openings aforesaid.

4. A coupling for parts respectively having an annular flange and a seat for said flange, said coupling comprising said flange having an annular series of arcuately spaced peripheral notches and said seat having tongues anchored at their outer ends and having inwardly projecting inner ends struck integrally therefrom to leave holes therein, said tongues being thereby offset above said holes, the tongues being arranged in annular series complementary to the flange notches whereby said flange may be positioned against said seat by aligning the flange notches with the seat tongues and thereafter rotating the flange in a plane beneath said tongues to bring unnotched flange portions in registry with the tongues, said tongues and underlying unnotched flange portions being offset toward the holes underlying the tongues and thereby interlocked.

References Cited in the file of this patent

UNITED STATES PATENTS

1,532,891	Draper	Apr. 7, 1925
2,160,598	Melrath	May 30, 1939
2,192,434	Critchfield	Mar. 5, 1940
2,233,242	Burke	Feb. 25, 1941
2,316,693	Hoddy	Apr. 13, 1943
2,427,393	Eckel	Sept. 16, 1947

FOREIGN PATENTS

170,206	Switzerland	Sept. 1, 1934