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END SHIELD FOR DYNAMOELECTRIC MACHINES

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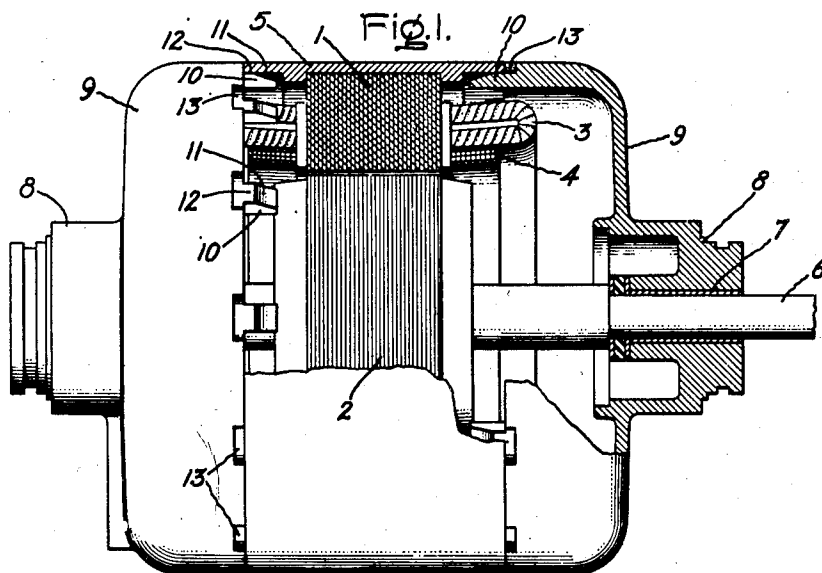


Fig. 2.

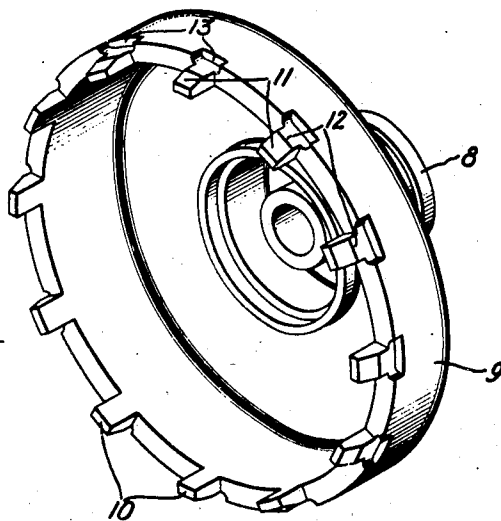
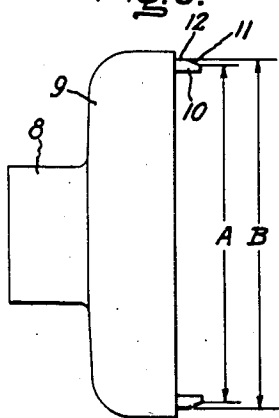


Fig. 3.



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END SHIELD FOR DYNAMOELECTRIC MACHINES

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This invention relates to end shields for dynamoelectric machines and more particularly to end shields adapted for a snap-in fit with the frame member of the machine.

It is customary in the manufacture of dynamoelectric machines, particularly in the fractional horse power frame sizes, to provide die cast end shields which are adapted for a snap-in or forced fit with the frame member of the machine. Such cast end shields are generally secured to the frame structure by use of a continuous rabbet on the outer periphery of the end shield which is mated with a shell portion of the frame. Since die casting cannot be performed within the tolerances required of such a rabbet fit, the rabbet on the end shield must ordinarily be machined to the proper dimensions after casting.

An object of this invention is to provide an improved end shield for a dynamoelectric machine.

Another object of this invention is to provide an improved die cast end shield for a dynamoelectric machine adapted for snap-in assembly.

A further object of this invention is to provide an improved die cast end shield for a dynamoelectric machine wherein no machining is necessary to permit a snap-in assembly of the end shield on the frame structure of the machine.

Further objects and advantages of this invention will become apparent and the invention will be better understood by reference to the following description and the accompanying drawing. The features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

A feature of this invention is the provision of a die cast end shield having a plurality of integral cast projections on the outer periphery which form an interrupted rabbet for securing the end shield to the shell of the dynamoelectric machine. These projections are formed with a tapered outer surface so that the diameter of the outer periphery of the ends of the projections is less than the inside diameter of the shell and the diameter of the outer periphery of the bases of the projections is equal or greater than the inside diameter of the shell. In this way, the necessary tolerances are within the practical range of die casting. When the end shield is assembled on the shell, the projections will spring inwardly a certain amount and the remainder of the interference between the outer surfaces of the projections and the shell is sheared away from the projections by the shell. To accommodate the chips produced by this shearing action, slots are provided in the outer periphery of the end shield at the base of each

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of the projections. The taper on the projections provides a self-centering and self-aligning fit of the end shield with the shell. Furthermore, since the fit is provided by a combination of a shearing and springing action, the end shield may be assembled and reassembled numerous times with the same tight fit retained. This is due to the fact that the springing action of the projections insures the proper fit after the excess material on the projections has been initially sheared off in the first assembly operation.

In the drawing, Fig. 1 is a side elevational view, partly in cross section, illustrating the improved end shield of this invention assembled on a dynamoelectric machine; Fig. 2 is a view in perspective of the improved end shield of Fig. 1; and Fig. 3 is a simplified side view of the improved end shield of this invention illustrating the tolerances involved.

Referring now to Fig. 1, there is shown a dynamoelectric machine, illustrated here as an induction motor of fractional horse power frame size, having a stator member 1 and rotor member 2. The stator is provided with appropriate field exciting windings such as a main or running winding 3 and a starting winding 4. The stator 1 is secured to a stationary frame structure which includes a cylindrical shell member 5 of suitable material, for instance, steel. The rotor 2 is secured to shaft 6 which is rotatably mounted in sleeve bearings 7, which are in turn mounted in hub portions 8 of the end shields 9. The end shields 9 are preferably die case of suitable material, such as a non-ferrous alloy, for instance aluminum. These end shields are adapted for a snap-in fit with the shell member 5 by the means now to be described.

The end shields 9 are provided with a plurality of integral cast projections 10. Each of these projections has a tapered outer surface 11 formed at its end and a substantially flat outer surface 12 at its base. These projections form an interrupted rabbet for securing a self-centering and self-aligning fit of the end shield 9 with the shell 5. In a conventional die cast end shield with a continuous rabbet, the dimensional requirements are represented by very close tolerances, for instance, plus .002", minus .000". In the present state of the die casting art, such tolerances are not practicable, however, with present die casting methods, it is possible to cast within .010". Referring now to Fig. 3, it will be seen that the minimum diameter of the outer periphery of the ends of the projections 10, shown as dimension A, need only be some value less than the inside diameter of the shell 5, while the diameter of the periphery of the bases 12, shown as dimension B, must only be equal or greater than the inside diameter of the shell 5. By keeping the parting line of the die above the

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rabbet face, i. e., base surfaces 12, all planes of the projections can be kept relative to the rabbet face. Thus, since die casting can be controlled to within .010" tolerance, the required tolerances are automatically met, the A dimension being always slightly less than the minimum mating rabbet and the B dimension from equal to, to .010" greater than the maximum mating rabbet. Thus, it is not necessary to machine the end shield in order to secure the desired snap-in fit with the shell member 5. On an end shield with a 6" diameter of the rabbet surface, twelve projections, 1/4" wide, were found to be satisfactory and to permit tolerances within the practical range of die casting.

If the diameter of the periphery of the surfaces 12 of the projections 10, after casting, is greater than the maximum mating rabbet, i. e., the inside diameter of shell 5, when the end shield is assembled on the shell, the fit will be provided by the projections springing inwardly a certain amount and the remainder of the interference is eliminated by the shearing off of the surface 12 by the steel shell 5. It has been found that regardless of the amount of interference up to .011", the projections will spring approximately 66% of that amount and the remaining 33% is removed by the shearing action. In order to permit accommodation of the chips produced by the shearing action, slots 13 are provided in the outer periphery of the end shield 9 at base of each projection. Thus, the chips will accumulate in the slots preventing wobble which might otherwise be caused.

It will now be readily apparent that the improved construction of this invention provides an end shield which can be cast to the desired tolerances for a snap-in fit without subsequent machining. The tapered surfaces of the projections which form the interrupted rabbet provide an automatic self-centering and self-aligning fit. Furthermore, since, as indicated above, approximately two-thirds of the interference between the outer surface of the projections and the shell member is accommodated by the springing action of the projections, the end shield can be freely disassembled and reassembled many times. In other words, the necessary machining of the rabbet is provided by the scraping action of the shell member with the outer surfaces of the projections when the end shield is initially assembled on the motor. Subsequent tight fits are insured by the springing action of the projections. It can be readily seen that there is here provided an improved end shield which is adapted for immediate use after casting without the necessity for costly machining operations, other than the bearing bore.

While there is illustrated and described a specific embodiment of this invention, further embodiments and modifications will become apparent to those skilled in the art. It is desired, therefore, that it be understood that this invention is not to be limited to the specific embodiments shown, and it is intended in the appended claims to cover all modifications which do not depart from the spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, an end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections on its outer periphery forming an interrupted rabbet for se-

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curing said end shield to said shell member, each of said projections having a tapered outer surface whereby a self-aligning and self-centering fit is provided between said end shield and said shell member.

2. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, an end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface whereby a self-aligning and self-centering fit is provided between said end shield and said shell member.

3. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, a cast end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface whereby a self-aligning and self-centering fit is provided between said end shield and said shell member.

4. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, a cast end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface at its end and a substantially flat outer surface at its base whereby a self-aligning and self-centering fit is provided between said end shield and said shell member.

5. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, a cast end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface, the diameter of the outer periphery of the ends of said projections being less than the inside diameter of said shell member, the diameter of the outer periphery of the bases of said projections being equal or greater than the inside diameter of said shell member whereby a self-aligning and self-centering fit is provided between said end shield and said shell member.

6. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, a cast end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface, the diameter of the outer periphery of the ends of said projections being less than the inside diameter of said shell member, the diameter of the outer periphery of the bases of said projections being equal or greater than the inside diameter of said shell member whereby a self-aligning and self-centering fit is provided between said end shield and said shell member, said end shield having slots formed in its outer periphery at the base

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of each of said projections for providing clearance for the material sheared away from said projections when said end shield is secured to said shell member.

7. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, a cast end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface whereby a self-aligning and self-centering fit is provided between said end shield and said shell member, said end shield having slots formed in its outer periphery at the base of each of said projections for providing clearance for the material sheared away from said projections when said end shield is secured to said shell member.

8. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, a cast end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface at its end and a substantially flat outer surface at its base, the diameter of the outer periphery of the ends of said projections being less than the inside diameter of said shell member, the diameter of the outer periphery of the bases of said projections being equal or greater than the inside diameter of said shell member whereby a self-aligning and self-centering fit is provided between said end shield and said shell member.

9. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, a cast end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface at its end and a substantially flat surface at its base, the diameter of the outer periphery of the ends of said projections being less than the inside diameter of said shell member, the diameter of the outer periphery of the bases of said projections being equal or greater than the inside diameter of said shell member whereby a self-aligning and self-centering fit is provided between said end shield and said shell member, said end shield having slots formed in its outer periphery at the base of each of said projections for providing clearance for the material sheared away from said projections when said end shield is secured to said shell member.

10. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, an end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface, the diameter of the outer periphery of the ends of said projections being less than the inside diameter of said shell member, the diameter of the outer periphery of the bases of said projections being equal or great-

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er than the inside diameter of said shell member whereby a self-aligned and self-centering fit is provided between said end shield and said shell member.

11. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, an end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface, the diameter of the outer periphery of the ends of said projections being less than the inside diameter of said shell member, the diameter of the outer periphery of the bases of said projections being equal or greater than the inside diameter of said shell member whereby a self-aligning and self-centering fit is provided between said end shield and said shell member, said end shield having slots formed in its outer periphery at the base of each of said projections for providing clearance for the material sheared away from said projections when said end shield is secured to said shell member.

12. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, a cast end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface, the diameter of the outer periphery of the ends of said projections being less than the inside diameter of said shell member and the diameter of the outer periphery of the base of said projections being equal or greater than the inside diameter of said shell member whereby a self-aligning and self-centering fit is provided between said end shield and said shell member, said projections being adapted to be sprung inwardly when said shell member is assembled thereon whereby said end shield is secured tightly in place.

13. In a dynamoelectric machine having a stationary frame structure including an outer cylindrical shell member, a cast end shield adapted for a snap-in fit with said shell member, said end shield having a plurality of projections formed integral therewith on its outer periphery forming an interrupted rabbet for securing said end shield to said shell member, each of said projections having a tapered outer surface, the diameter of the outer periphery of the ends of said projections being less than the inside diameter of said shell member and the diameter of the outer periphery of the base of said projections being equal or greater than the inside diameter of said shell member whereby a self-aligning and self-centering fit is provided between said end shield and said shell member, said projections being adapted to be sprung inwardly when said shell member is assembled thereon whereby said end shield is secured tightly in place, said end shield having slots formed in its outer periphery at the base of each said projection for providing clearance for the excess material sheared away from said projections when said end shield is secured to said shell member.

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No references cited.