

[54] **ROTARY PISTON INTERNAL COMBUSTION ENGINE**

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[30] **Foreign Application Priority Data**

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[51] Int. Cl..... **F16m 1/04**

[58] Field of Search 418/61, 149, 178, 179

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ABSTRACT

In a rotary piston engine, anti-wear treatment such as metal spray, etc., is provided on a fixing surface of a center housing and side housings and particularly the fastening surface around the plug hole, in order to prevent abnormal wear of the fastening surface and the consequent disadvantage caused by abnormal wear.

7 Claims, 3 Drawing Figures

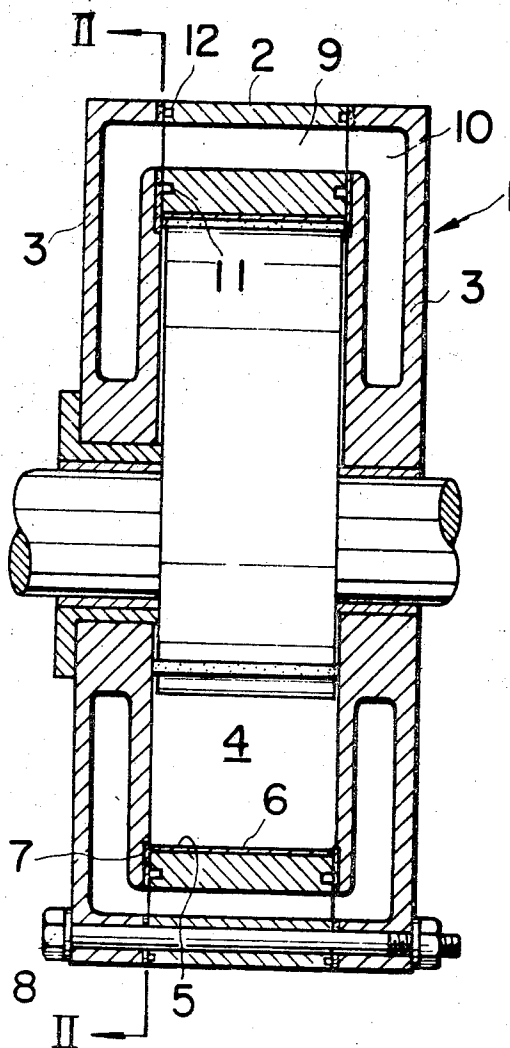


FIG. 1

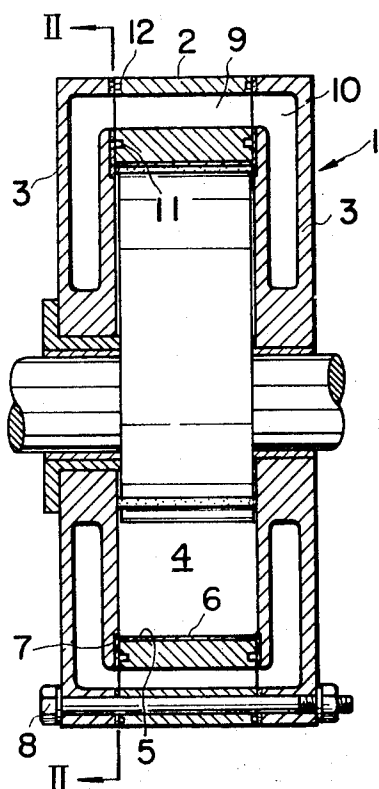


FIG. 2

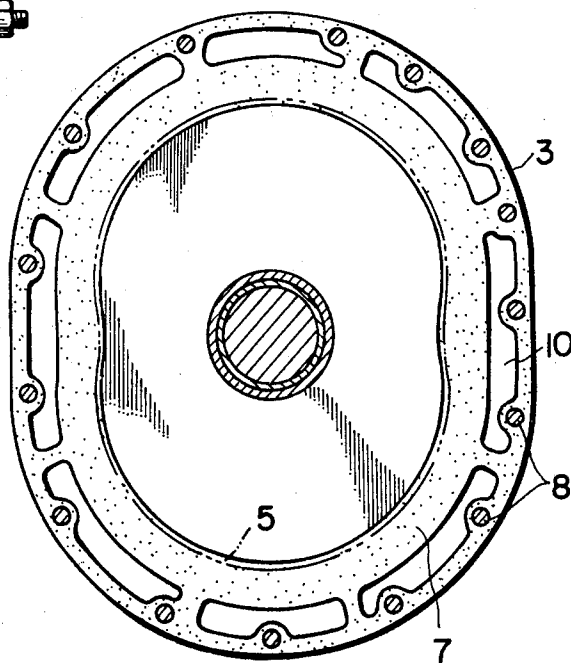
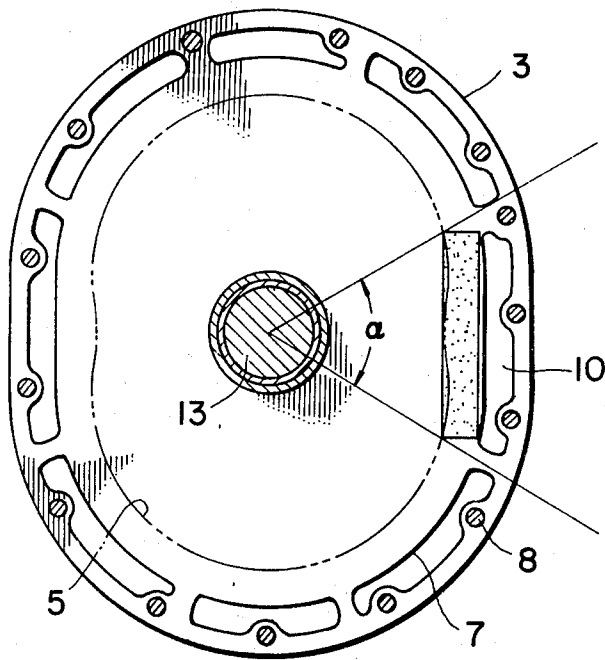


FIG. 3



ROTARY PISTON INTERNAL COMBUSTION ENGINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to improvements in a rotary piston internal combustion engine consisting of a center housing having a trochoidal inner surface and side housings disposed at both sides of the center housing, and especially to the rotary piston internal combustion engine applied anti-wear treatment on the fastening surfaces of the center housing and the side housings.

2. Description of the Prior Art

Generally, the basic structure of the rotary piston engine requires that the inner faces of the side housings have high dimensioned accuracy relative to each other and that coolant leakage from water jacket is securely prevented and therefore, the end face of each side housing and that of the center housing have been directly joined and firmly tightened with fastening bolts. Increasing tightness of application of torque to the fastening bolts is desirable for the prevention of coolant leakage, but it causes an undesirable, abnormal wear of the center housing and the side housings. Namely, due to the difference in thermal deformation resulting from rapid variation in the temperature of the engine owing to the difference in the shape and/or material of the side housings and the center housing, a correlative slide has been produced on the fastening surface of the side housings and the center housing. Consequently, increasing tightness by torque application through the fastening bolts has caused correlative slide between the side housings and the center housing against an excessive friction force on the fixing surface, which increases as a result of abnormal wear of the fixing surface. Besides, abnormal wear of the fixing surface around the plug hole of the center housing is exceedingly increased because of expansion by pressures of compression and explosion of air-fuel mixture, and by high temperatures around said plug hole.

Therefore, due to said abnormal wear, high temperature gas may enter the space between the fastening surface of the side housings and that of the center housing, thus causing premature deterioration of the "O" rings located inwardly from the water jacket, which results in coolant leakage from the water jacket to considerably shorten the endurance of the engine.

SUMMARY OF THE INVENTION

It is a purpose of this invention to apply anti-wear treatment such as metal spray etc., on the fastening surface of the center housing and the side housings of a rotary piston internal combustion engine.

Further purposes and advantages of this invention will be apparent from the following description and the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings show two embodiments related to this invention.

FIG. 1 is a vertical sectional view of a rotary piston, internal combustion engine showing one embodiment of this invention.

FIG. 2 is a front sectional view thereof along line II—II of FIG. 1.

FIG. 3 is a front sectional view of a rotary piston internal combustion engine showing another embodiment of this invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

To explain an embodiment of this invention in accordance with the drawings, a casing 1 has a space 4 formed by the center housing 2 made of aluminum material and the side housings 3 disposed at both sides of the center housing 2. The center housing 2 has a trochoidal sliding surface 5 formed by a chrome plated layer 6. The side housings 3 are made of cast iron and those surfaces fastened to the end face of the center housing 2 are coated by a sprayed metal layer 7 such as high carbon steel (0.8 percent carbon steel). As anti-wear treatment for the fastening surface, various means can be considered, but a metal spray is exceptionally effective because of its simple procedure and superior self-lubrication. This anti-wear treatment may be effected on either the side housings or center housing, or on both.

The center housing 2 and the side housings 3 are joined through said spray layer 7 and are firmly tightened by fastening bolts 8. Water passages 9 and 10 form a water jacket and "O" ring indicated by 11 and 12 seal the components.

FIG. 3 shows another embodiment of this invention with metal sprayed only around the plug hole of the side housings within a 60° rotating angle of eccentric shaft 13. At the fastening surface around the plug hole, abnormal wear is effected by high temperature and high pressures and is exceedingly increased. So, when the metal spray is treated on the fastening surface around the plug hole throughout at least a 60° rotating angle of eccentric shaft 13, it effects the same as when the metal spray is treated on all fastening surfaces. The nearer the fastening surface is to trochoidal sliding surface, the larger the abnormal wear. Accordingly, it is effective to provide the metal spray limited to a long and narrow situation and in parallel with trochoidal sliding surface 5.

This invention is constructed as mentioned above, and therefore, even where correlative slide is produced due to thermal deformation at the fixing surfaces between the center housing 2 and the side housings 3, the wear at the fastening surface is considerably decreased to prevent coolant leakage owing to abnormal wear of the fastening surface.

What is claimed is:

1. In a rotary piston internal combustion engine comprising a center housing having a trochoidal inner surface, side housings disposed at both sides of said center housing, fastening surfaces formed by mutually contacting surface portions of said housings, a rotary piston rotating planetarily through an eccentric shaft in a casing composed of said center housing and said side housings, the improvement wherein: said fastening surfaces only of at least one of said housings are provided with an anti-wear treatment.

2. A rotary piston internal combustion engine as claimed in claim 1, wherein anti-wear treatment is provided on at least said fastening surface only around the plug hole and extending over at least a 60° rotating angle of the eccentric shaft.

3. A rotary piston internal combustion engine as claimed in claim 2, wherein: said anti-wear treatment comprises a metal spray.

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4. A rotary piston internal combustion engine as claimed in claim 2, wherein: said anti-wear treatment is provided only on said fastening surface close to the combustion chamber and extends in long and narrow fashion, parallel with the trochoidal sliding surface.

5. A rotary piston internal combustion engine as claimed in claim 4, wherein: said anti-wear treatment is provided on said side housings.

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6. A rotary piston internal combustion engine as claimed in claim 2, wherein: said anti-wear treatment is provided over the complete fastening surface of said center housing.

7. A rotary piston internal combustion engine as claimed in claim 6, wherein said anti-wear treatment is further provided on said side housings.

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