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Neishi

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[54] **END WALL CONSTRUCTION FOR A ROTARY PISTON INTERNAL COMBUSION ENGINE**

[72] Inventor: **Kiyosou Neishi**, Hiroshima, Japan

[73] Assignee: **Toyo Kogyo Co., Ltd.**, Hiroshima, Japan

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[52] **U.S. Cl.**.....**123/193 C**, 123/8.01, 418/179

[51] **Int. Cl.**.....**F02f 1/20**

[58] **Field of Search**.....123/8.01, 197 A, 193 C, 193 CP; 418/178, 142, 179; 184/1 E, 6 R

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Primary Examiner—William E. Wayner

Attorney—Sughrue, Rothwell, Mion, Zinn & Macpeak

[57] **ABSTRACT**

A rotary piston internal combustion engine has a casing including a center wall having trochoidal inner peripheral surface and end walls disposed on both sides thereof. Said end walls are porous at the inner surface at the inside of the outer envelope line of a sliding trace drawn by a ring-shaped oil seal member disposed on the side face of the rotary piston.

4 Claims, 4 Drawing Figures

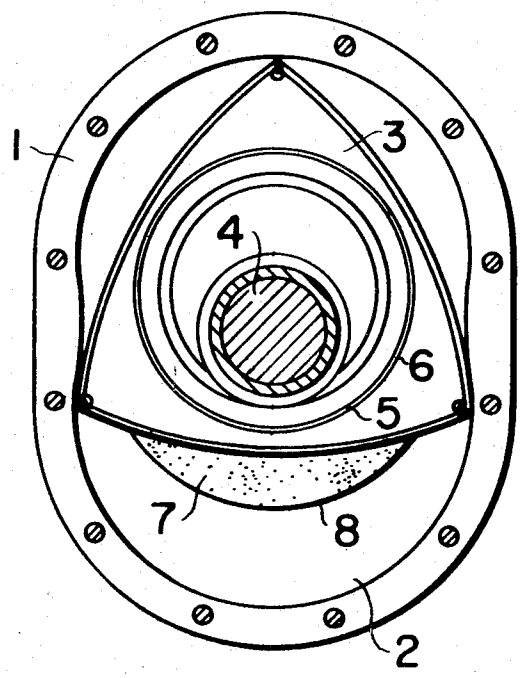


FIG . 1

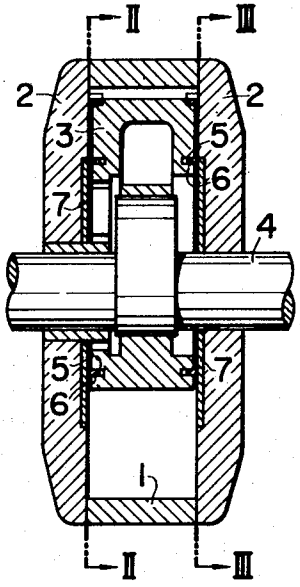


FIG . 2

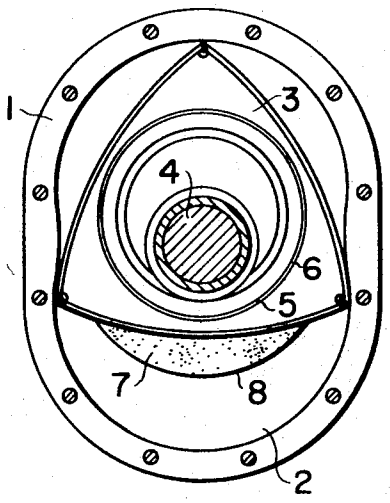


FIG . 3

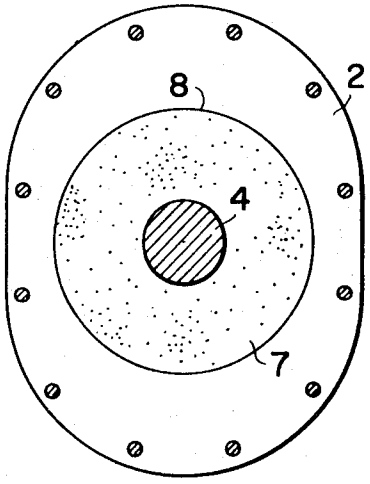
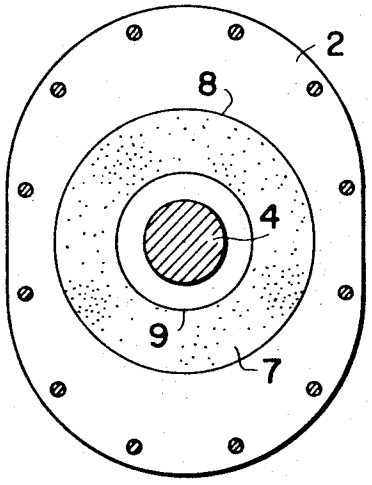


FIG . 4



INVENTOR.
KIYOSOU HEISHI
BY Sughrue, Rothwell, Mion, Zinn & Macpeak
ATTORNEYS

END WALL CONSTRUCTION FOR A ROTARY PISTON INTERNAL COMBUSION ENGINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an improvement in the end walls of the casing of a rotary piston internal combustion engine disposed on both sides of a center wall having two or more lobed, inner peripheral surfaces.

2. Description of the Prior Art

It is well known that a rotary piston internal combustion engine has a polygonal rotary piston having three or more apexes supported on an eccentric shaft in a casing having a center wall with two or more lobed inner surfaces and end walls disposed on both sides of the center wall which moves in a planetary motion to perform the intake, compression, explosion, expansion and exhaust of the mixture gas in sequence. Oil seal members of ring shape engage both side faces of the rotary piston of the rotary piston internal combustion engine so that these oil seal members are in pressure contact on the inner surface of the end wall by a spring to prevent lubricating oil from entering the combustion chamber between the side face of the rotary piston and the inner surface of the end wall. However, in order that these oil seal members scrape the lubricating oil on the inner surface of the end wall, its ends are sharpened and since they move in a planetary motion together with the rotary piston, the end of the oil seal members and the inner surface of the end wall contacting the oil seal members are extremely worn. They do not endure long operation while maintaining a sufficient sealing function with the result that lubricating oil tends to leak toward the combustion chamber, so called "oil rising" occurring. For this reason, it has been suggested to shape the oil seal member to improve the quality of material thereof, but sufficient improved results could not be obtained. In order to eliminate these disadvantages, it has been proposed that a hard metal such as molybdenum, high carbon steel be sprayed on the inner surface of the end wall or that a porous hard chrome plating be applied thereto resulting in extremely decreasing the wear.

However, if the hard metal is sprayed uniformly on the inner surface of the end wall or if porous hard chrome plating is effected, lubricating oil tends to rise to the combustion chamber, because the metal sprayed layer and porous hard chrome plated layer are both porous and contain plenty of oil with the result that the oil contained in the layer material is diffused toward the combustion chamber.

SUMMARY OF THE INVENTION

It is, therefore, an object of the present invention to provide porous end walls for a rotary piston internal combustion engine so as to hold oil on the inner surface of the end wall at the inside of the outer envelope line of the trace that the oil seal member of ring shape oil seal member mounted on the side face of the rotary piston draws on the inner surface of the end wall by the planetary motion of the rotary piston, in order to eliminate waste oil and to remove the wear of the inner surface of the oil seal member and end wall.

It is another object of the present invention to provide end walls for a rotary piston internal combustion engine which are porous at an annular portion of the inner surface of the end wall surrounded by the outer and inner envelope lines of the sliding traces of the oil seal members so as to eliminate the aforesaid disadvantages.

It is further the object of the present invention to provide end walls for a rotary piston internal combustion engine formed by spraying hard metal so as to form a porous inner surface of the end wall.

It is still another object of the present invention to provide end walls for a rotary piston internal combustion engine treated with a porous chrome plating layer so as to form porous end wall inner surface.

The other objects, features and advantages of the present invention will become apparent from the following description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical sectional, side view of a rotary piston internal combustion engine provided end walls according to the present invention;

FIG. 2 is a front view in section taken along the line II — II in FIG. 1;

FIG. 3 is a sectional front view of the engine taken along the line III — III in FIG. 1 and

FIG. 4 is a sectional front view taken along the line III — III of another embodiment of the present invention.

Reference is now made to the drawings, reference numeral 1 illustrates a center wall having a two or more lobed inner peripheral surface. End walls 2 are disposed at both sides of the center wall 1. A polygonal rotary piston 3 having three or more apexes is supported on an eccentric shaft 4. This rotary piston 3 is adapted to move in a planetary motion in a casing formed by the center wall 1 and end walls 2. An oil seal groove 5 of ring shape 5 provided on each side face of the rotary piston 3. An oil seal member 6 of ring shape engages the oil seal groove 5, and the end of the oil seal member is always in pressure contact with the inner surface of the end wall 2 by a spring disposed into the oil seal groove 5. A metal sprayed layer 7 of hard metal or porous hard chrome plated layer is formed on a part of the inner surface of the end wall 2. This metal sprayed layer or plated layer 7 is only provided to the inside of the outer envelope line 8 of a trace drawn on the inner surface of the end wall 2 by the planetary motion of the ring shaped oil seal member 6 within the side face of the rotary piston 3.

It should be understood from the foregoing description that since the present invention is provided with the metal sprayed hard metal layer or a porous hard chrome plated layer 7 on the inner surface of the end wall inside the outer envelope line 8 of the trace drawn by the planetary motion of the oil seal member 6, the inner surface of the end wall at the portion sliding in contact with the oil seal member 6 contains plenty of oil supplied by the metal sprayed layer or porous plated layer so as to provide good lubrication and extremely reduce the wear of the oil seal member.

On the other hand, since the metal sprayed layer or porous plated layer 7 does not lie outside the outer envelope line 8, lubricating oil never enters the combustion chamber through these porous layers by diffusion.

Reference is now made to FIG. 4, which shows another embodiment of the present invention. Since oil seal member does not slide on the inner surface of the end wall radially inside the inner envelope line 9 of the sliding trace of the oil seal member, even if the metal sprayed layer or porous chrome plated layer lies on only the annular part of the inner face of the end wall surrounded by the outer and inner envelope lines 8 and 9 of the sliding trace of the oil seal member, a similar effect may be provided.

In order to prevent the edge of the oil seal from sliding on the boundary line between the porous portion and nonporous portion of the inner surface of each end wall, the metal sprayed layer and plated layer may extend slightly in a radial direction outside the outer envelope line of the sliding trace of the oil seal to such an extent that the lubricating oil does not diffuse into the combustion chamber. If thus provided, it may be as effective on the oil waste, and this applies similarly to the inner envelope line.

If a plurality of oil seal members are provided, the outermost determines the outer envelope line and the innermost one determines the inner envelope line.

Further, the aforesaid metal spray and plated layers may be provided in striped state in projecting direction with respect to the center of rotation of the rotary piston.

It should also be understood that since the metal sprayed layer of hard metal or porous hard chrome plated layer on the end walls is only provided inside of the outer envelope, it is manufactured less expensively in comparison with a conventional one provided on the whole surface of the end wall and it prevents earlier wear of the oil seal member and holds sufficient sealing function over long period while preventing the oil rising to the combustion chamber.

What is claimed is:

1. In an end wall construction for a rotary piston internal combustion engine comprising: a casing formed by a center wall having a trochoidal inner peripheral surface and end walls disposed at both sides of the center wall, and a polygonal rotary piston having two or more apexes supported on an eccentric shaft to move in a planetary motion within said casing, said rotary piston having a ring shaped oil seal member on each thrust surface, the improvement comprising: said inner surface of said end walls having a porous layer lying generally inside the outer envelope of the sliding trace drawn by the planetary motion of the oil seal member.

2. The end wall construction for a rotary piston internal combustion engine as set forth in claim 1, wherein the inner surface layer of said walls is porous generally within an annular portion surrounded by the outer and inner sliding traces of the oil seal member by the planetary motion of the rotary piston.

3. The end wall construction for a rotary piston internal combustion engine as set forth in claim 1, wherein the inner porous surface layer of said end walls is formed by spraying hard metal thereon.

4. An end wall for a rotary piston internal combustion engine as set forth in claim 1, wherein the inner porous surface layer of said end wall is formed by hard chromium plating the same.

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