United States Patent [19]

Ruf et al.

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[45] **Apr. 9, 1974**

[54] **ROTOR FOR ROTARY COMBUSTION ENGINES**

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[22] Filed: **Mar. 7, 1973**

[21] Appl. No.: **339,022**

[30] **Foreign Application Priority Data**

Mar. 11, 1972 Germany 2211960

[52] **U.S. Cl.** ..... **418/113,** 418/142, 29/156.4 R, 164/111

[51] **Int. Cl.** **F01c 19/02,** F04c 27/00, B22d 19/00

[58] **Field of Search** ..... 418/61 A, 113, 119–124, 418/142; 29/156.4 R; 164/111, 332

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Primary Examiner—Carlton R. Croyle
Assistant Examiner—John J. Vrablik
Attorney, Agent, or Firm—Kane, Dalsimer, Kane, Sullivan and Kurucz

[57] **ABSTRACT**

This invention refers to a multi-apex rotor for rotary combustion engines of the trochoidal type which rotor carries at its apexes radially movable sealing strips arranged in radial grooves in the rotor apexes; and at its end faces axially movable sealing strips which are arranged in grooves in the rotor endfaces, the sealing cooperation between the radial and the axial sealing strips being obtained by sealing pins which are axially movably arranged in the rotor end faces.

4 Claims, 3 Drawing Figures

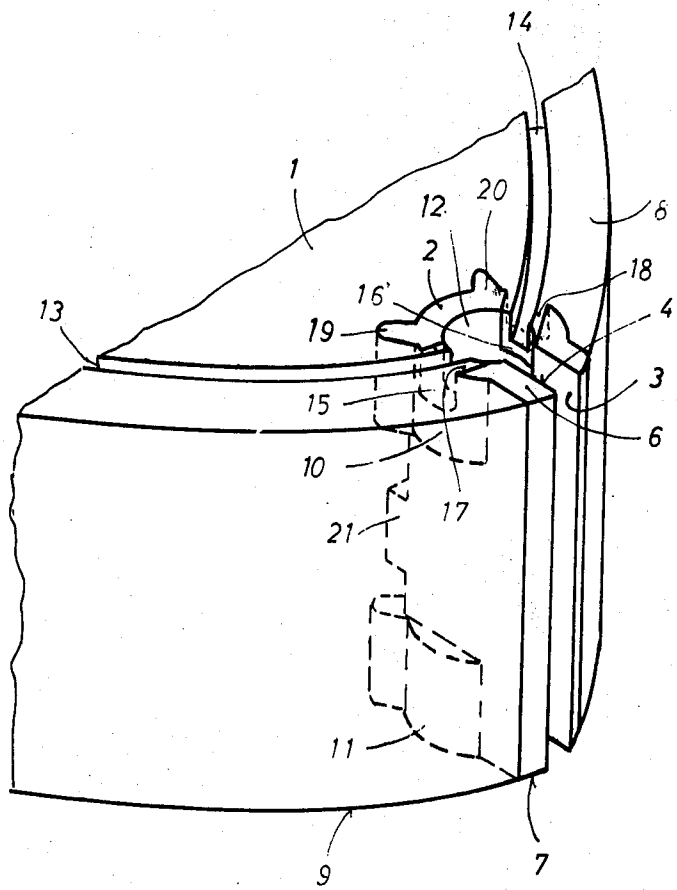
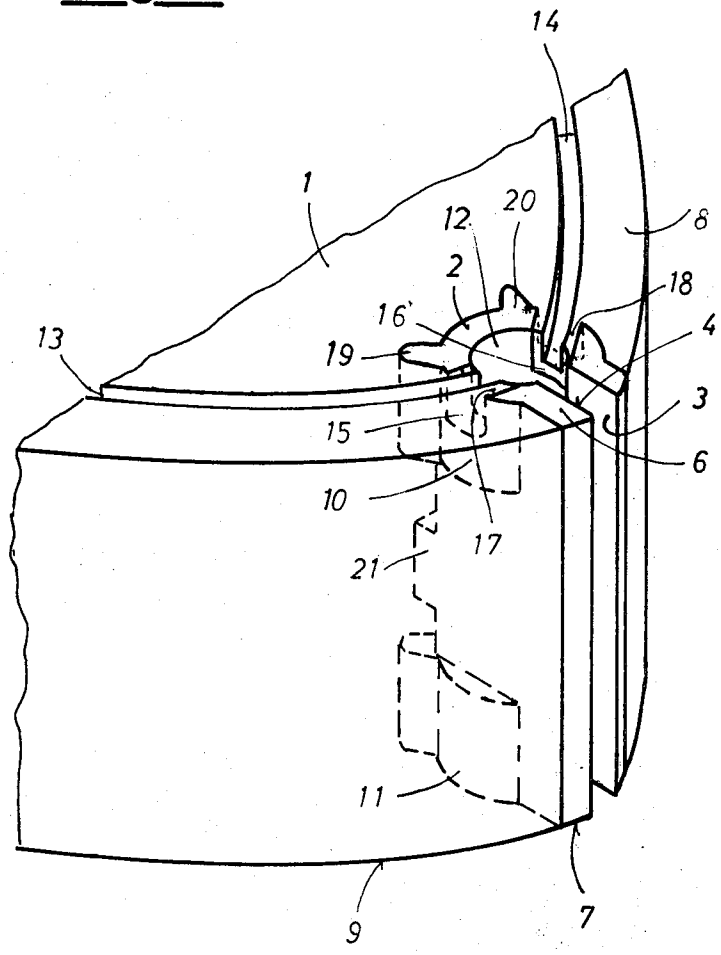


Fig. 1



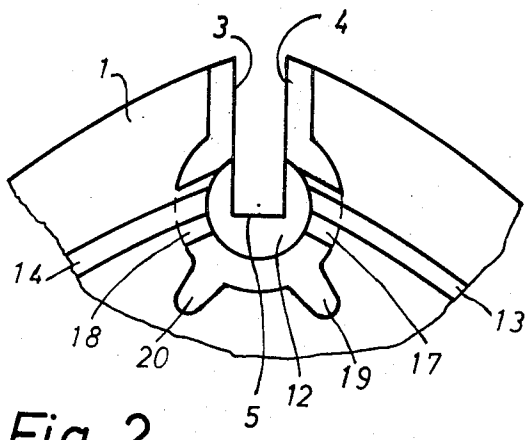
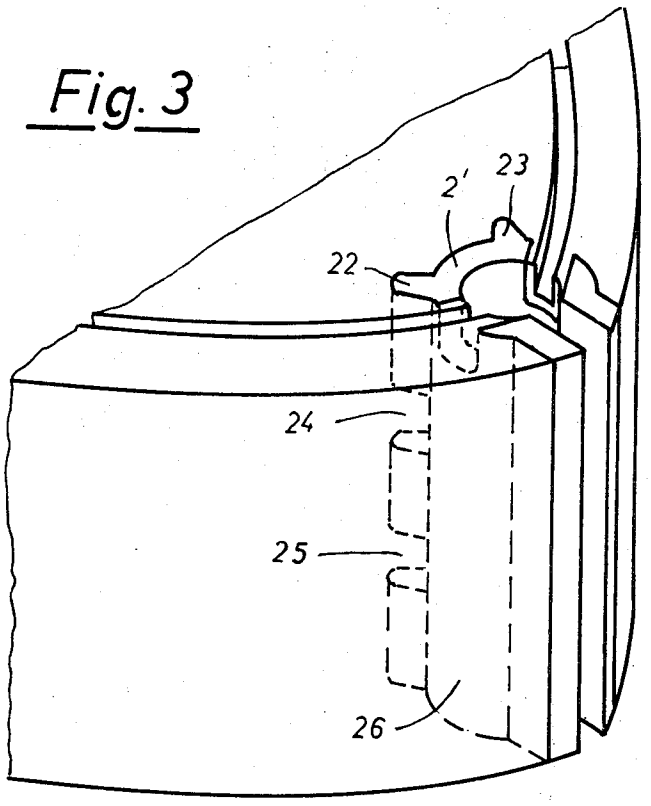


Fig. 2

Fig. 3



ROTOR FOR ROTARY COMBUSTION ENGINES

BACKGROUND OF INVENTION

In known rotor constructions the radial grooves which accommodate the radial sealing strips are cut in the rotor apexes. If a low strength light metal such as aluminum alloy is used for the rotor these grooves have only limited strength with the result that their side walls will be damaged by the sealing strips which are normally of a harder material than the groove side walls.

SUMMARY OF INVENTION

Therefore it is an object of the present invention to provide a rotor of a light metal wherein damaging of the side walls of the rotor grooves by the sealing strips is prevented. According to the invention there is cast in each rotor apex a prefabricated armour of wear-resistant material defining axial and radial anchoring means. This material extends over the whole axial width of the rotor up to its endfaces and includes at its axial ends, axial bores for accommodating sealing pins. The wall of each of the bores have recesses which form extension of the grooves in the respective rotor endface accommodating the axial sealing strips. The said recesses are open towards the adjacent rotor endface and have a cross-sectional area larger than the cross-sectional area of the grooves in the rotor endfaces. The recesses are also lined by the rotor material up to the width of the grooves in the rotor endfaces.

In this way it is possible to arrange the radial sealing strips and the sealing pins in wear-resistant guides and to provide the grooves of the axial sealing strips over their whole length in the same material i.e. the rotor material so that the tool cutting that groove is not stressed by transition from one material to another much harder material such as the material from which the armour is made.

The armour may be manufactured as a precision casting or a continuous casting, and the axial anchoring means can be cut in after the casting.

The armour can also be manufactured by sintering.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings two embodiments of the invention are shown by way of example.

FIG. 1 is a perspective view of a rotor apex with grooved armour in the form of a precision casting or of a sintered part;

FIG. 2 is a plan view of the rotor apex shown in FIG. 1;

FIG. 3 is a view similar to FIG. 1 of a rotor apex with grooved armour in the form of a continuous casting.

DETAILED DESCRIPTION

FIGS. 1 and 2 show an apex of a rotor 1 of a rotary combustion engine of the trochoidal type with grooves armour 2 which is cast or sintered from a wear resistant material such as cast iron, especially austenitic cast iron with lamellar graphite having a coefficient of thermal expansion similar to aluminum alloys. The armour 2 has a substantially U-shaped cross-section and its inner side walls 3 and 4 serve as a guide for a radial seal strip (not shown).

The armour 2 extends over the whole axial width of the rotor 1 and its axial end faces 6 and 7 are flush with the rotor endfaces 8 and 9. The end portions 10 and 11 of the armour 2 are cylindrical and comprise axial bores 12 for accommodating seal pins (not shown). The wall of each bore 12 is provided with recesses 15 and 16 which are continuations of the grooves 13 and 14 provided in the adjacent rotor endface and serve to accommodate axial sealing strips (not shown). These recesses 15 and 16 are open towards the adjacent rotor endface 8 and 9, respectively, and their cross-sectional areas are larger than the cross-sectional area of the grooves 13 and 14.

The armours 2 are placed into the casting mold for the rotor 1 prior to the casting process, and when the light metal is cast into the mold it also fills the recesses 15 and 16. When the grooves 13 and 14 are cut into the endfaces of the casting the cutting tool works in the light metal over the whole length of the grooves including their extension within the armours 2. As can be seen from the drawings the light metal provides a liner 17 and 18, respectively, of the recesses 15 and 16.

On the bottom side of the armour 2 fins 19, 20 and 21 are provided which, together with the cylindrical end portions 10 and 11, serve as axial and radial anchoring means for anchoring the armour 2 within the rotor material.

FIG. 3 shows a modification of the armour of FIG. 1 and 2. This armour 2' is manufactured in a continuous casting process whereby its continually extending fins 22, 23 are subdivided by interruptions 24 and 25 in order to obtain axial anchoring in the rotor material. The radial anchoring of armour 2 is mainly effected by the cylindrical part 26 extending over the whole length of the armour 2.

The armour 2' could also be manufactured by an extrusion process, for instance through the use of f.i. a copper cobalt-beryllium alloy.

What is claimed is:

1. A multi-apex rotor for rotary combustion engines of the trochoidal type, having at its apexes radial grooves for accommodating radially movable sealing strips, and having at its endfaces axial grooves for accommodating axially movable sealing strips as well as axial bores for accommodating sealing pins that form a sealing interconnection between the axial and radial sealing strips, comprises a prefabricated grooved armour having radial and axial anchoring means and made of a wear-resistant material in each rotor apex, said armour extending over substantially the whole axial width of the rotor and having at each of its axial ends a bore for accommodating a sealing pin, the wall of each bore being provided with recesses which are in continuation of the grooves in the rotor endface for accommodating the axial sealing strips, said recesses being open towards the adjacent rotor endface and having a cross-sectional area larger than said grooves in the rotor endface.

2. A rotor according to claim 1, wherein the prefabricated armour is manufactured as a precision casting.

3. A rotor according to claim 1, wherein the prefabricated armour is manufactured as a continuous casting, the axial anchoring means being provided after casting.

4. A rotor according to claim 1 wherein the armour is manufactured by sintering.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,802,811 Dated April 9, 1974

Inventor(s) Max Ruf, Johannes Steinwart

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

The name of the assignee was omitted, please insert

--Audi NSU Auto Union Aktiengesellschaft and

Wankel GmbH of Lindau/Bondensee, Germany

Signed and sealed this 3rd day of December 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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