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Lamm

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[54] **SEALING BAR FOR A ROTARY PISTON INTERNAL COMBUSTION ENGINE**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.**.....**418/122**

[51] **Int. Cl.**.....**F04c 27/00**

[58] **Field of Search**.....418/120, 121, 123, 418/122

[56] **References Cited**

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Primary Examiner—C. J. Husar
Attorney—Craig, Antonelli & Hill

[57] **ABSTRACT**

A sealing bar for a rotary piston internal combustin engine, especially of trochoidal construction, which is arranged radially movably in a piston groove provided with a spring and which sealingly slides with its head portion along a running surface in the housing casing of the internal combustion engine whereby two slide members, preferably constructed plate-shaped, are arranged along the longitudinal sides between the sealing bar and the piston groove.

24 Claims, 5 Drawing Figures

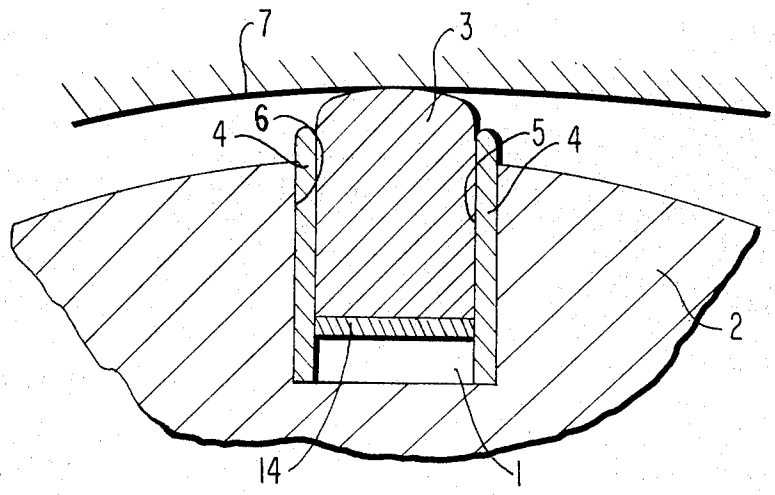


FIG. 1

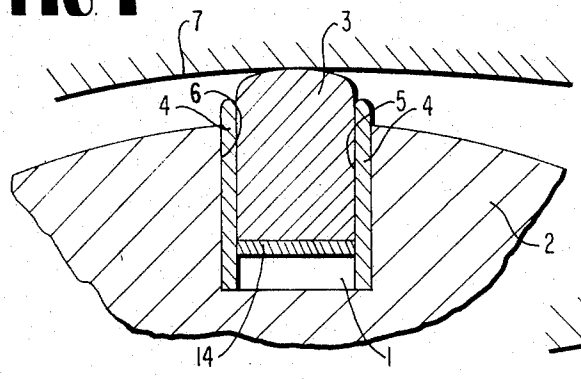


FIG. 2

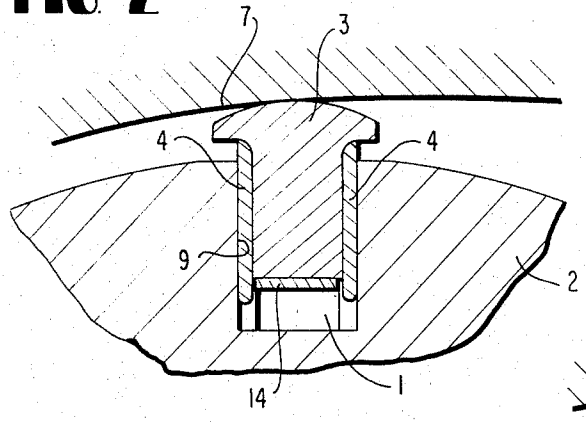


FIG. 3

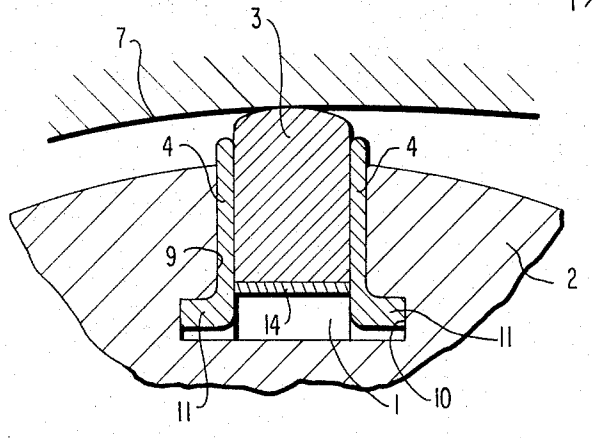


FIG. 4

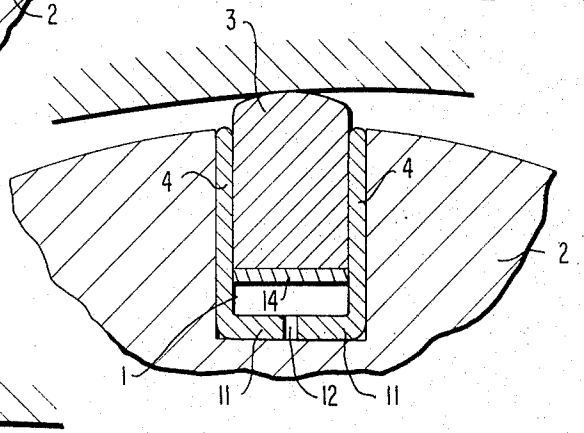
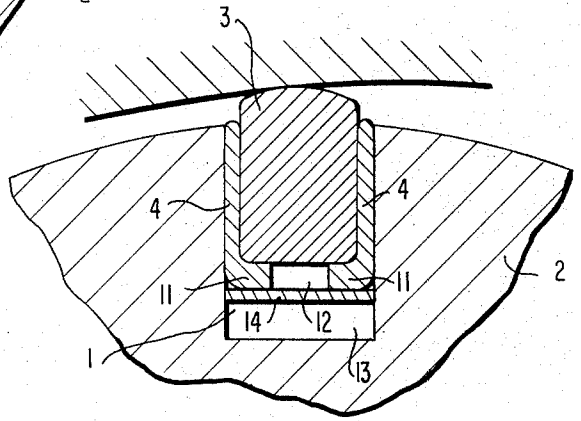


FIG. 5



SEALING BAR FOR A ROTARY PISTON INTERNAL COMBUSTION ENGINE

The present invention relates to a sealing bar for a rotary piston internal combustion engine, especially of trochoidal construction, which is arranged radially moveably in a piston groove provided with a spring and which with its head portion sealingly slides along a casing contact or running surface in the housing casing of the internal combustion engine.

Known sealing bars provided for the rotary piston internal combustion engine do not fully satisfy the present-day requirements. The materials used for the manufacture of these prior art sealing bars as regards wear, gas-tightness and sliding properties, are either not economical in the fabrication or they do not satisfy the required mechanical stresses over longer periods of time.

Also the sealing bars which consist of a support and of a wear portion whereby the wear portion constitutes about one third of the entire height, fulfill only partially their purposes because stresses occur on the inside of the sealing bars during the operation due to the differing expansion conditions.

Furthermore, it is known that by reason of an excessive friction occurring between sealing bar flank and piston groove wall a temporary lifting-off of the sealing bar head portion from the casing contact surface is caused. This operation effects a temporary blowing-through from chamber to chamber, a blowing-off and a combusting of the lubricating film along the top or head portion and therewith a poorer lubrication. The consequence is finally a wedging and jamming of the sealing bar in the piston groove.

The present invention is concerned with the task to avoid the aforementioned disadvantages. As solution to the underlying problems the present invention proposes that two sliding members are arranged along the longitudinal side between the sealing bar and piston groove.

According to the present invention the sliding members which are constructed plate-shaped, are supported either at the casing contact surface or at the groove bottom of the piston groove.

In an advantageous manner of the present invention the sealing bar may be constructed mushroom shaped in such a manner that the sliding members are supported at the bottom side of the mushroom head.

These and other embodiments to be described more fully hereinafter are favorable because the lubricants can reach more freely the top or head portion of the sealing bar.

In one advantageous embodiment the sliding members can be constructed L-shaped according to the present invention and may engage with their short legs in a respective recess provided in the longitudinal direction directly above the groove bottom.

As a further feature the short leg portions of the sliding members may be directed toward one another in such a manner that they form a slot.

Furthermore, the present invention provides that the sliding members abut with the short leg portions thereof either immovably at the groove bottom or at the sealing bar due to spring pressure.

According to the present invention the sliding members may carry out stroke movements in unison with the sealing bar.

Depending on the type of construction the present invention proposes to provide the sliding members either at a side facing the piston groove or at a side facing the sealing bar with a rough surface which may be roughened in any known manner whereas the opposite surface of the sliding member as well as possibly the corresponding counter surface may be fine-finished, for example, polished in any conventional manner.

Accordingly, it is an object of the present invention to provide a sealing bar for a rotary piston internal combustion engine which avoids by simple means the aforementioned shortcomings and drawbacks encountered in the prior art.

Another object of the present invention resides in a sealing bar for a rotary piston internal combustion engine which fully satisfies all present-day requirements.

A further object of the present invention resides in a sealing bar for a rotary piston internal combustion engine which not only fully satisfies all mechanical stress requirements over longer periods of time but can be economically fabricated.

A still further object of the present invention resides in a sealing bar for rotary piston internal combustion engines which avoids undesirable stresses on the inside of the sealing bar.

Another object of the present invention resides in a sealing bar which greatly improves the lubrication and the operation of the engine.

Still another object of the present invention resides in a sealing bar construction for rotary piston internal combustion engines which effectively precludes a jamming of the sealing bar in the piston groove.

These and further objects, features and advantages of the present invention will become more apparent from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, several embodiments in accordance with the present invention, and wherein

FIGS. **1** to **5** are, respectively, partial cross-sectional views through five embodiments of a rotary piston internal combustion engine of otherwise conventional construction provided with a sealing bar in accordance with the present invention which is arranged in a piston groove between sliding members.

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, and more particularly to FIG. **1**, a sealing bar **3** springily supported in a piston groove **1** of a piston **2**, is movably arranged in the radial direction between two plate-shaped sliding members **4**. These sliding members **4**, which abut with their smooth surface **5** at the sealing bar **3** and with their rough surface **6** at the piston groove **1**, are supported either at the groove bottom (as illustrated in FIG. **1**) or at the casing contact surface **7** of the housing casing **8** of the rotary piston internal combustion engine of otherwise conventional construction.

In order to render the sealing bar **3** as frictionless as possible between the sliding members **4**, the two surfaces of the piston groove and of the sliding member, which come in contact with one another, may be rough-machined or treated in such a manner that they are somewhat anchored one into the other.

The sealing bar **3** according to FIG. **2** is constructed mushroom-shaped. The mushroom head is disposed outside the piston groove **1**, against the bottom side of

which are supported the sliding members 4 which are also constructed as plates. These slide members 4 carry out stroke movements in unison with the sealing bar 3. In that embodiment, as contrasted to the first embodiment the contact surfaces of sealing bar-slide members 4 are roughened and the counter surface of the slide members 4 and the flanks 9 of the piston groove are polished by conventional means.

The sealing bar 3 illustrated in FIG. 3 is arranged in a piston groove 1 which is slightly more costly as to construction thereof. The groove bottom is constructed wider than the remaining part of the piston groove 1 in such a manner that at the flanks 9, one recess 10 each is provided directly above the groove bottom, into which engage the L-shaped slide members 4 with their short legs 11. The recesses 10 are so dimensioned in their size that a certain stroke play of the slide members 4 in the piston groove 1 exists.

The L-shaped slide members 4 illustrated in FIGS. 4 and 5 are, in contradistinction to the slide members illustrated in FIG. 3, directed toward one another with their short legs 11 whereby the legs 11 form a more or less large slot 12.

The fixing of the slide members 4 according to FIG. 4 takes place by the sealing bar spring 14 and the gas pressure which effect that the slide members 4 are forced against the groove bottom. In order that a large gas engaging surface is present, the slot 12 formed by the short leg portions 11 should be constructed small. With this embodiment a rough surface exists between piston groove 1 and slide member 4 and a smooth surface between slide member 4 and sealing bar 3.

It is important with this arrangement that no gas can reach between piston groove and slide member underneath the short leg portion.

In the embodiment illustrated in FIG. 5 both slide members 4 partake in the entire stroke movement of the sealing bar 3.

The short leg portions 11 of the slide members 4 abutting at the bottom of the sealing bar 3 due to the spring and gas pressure form a wide slot 12. Additionally recesses are provided at the short leg portions 11 which enable a rapid penetration of the gas into the spring space 13 because the gas is able to reach in the downward direction between sealing bar 3 and slide member 4 as also between slide member 4 and piston groove 1.

In all embodiments described hereinabove corresponding known measures are taken, for example, gas grooves, bores, slots, conicity of piston groove and/or sealing bar, etc., in order to guide the gas completely satisfactorily and without delay into the spring space 13 provided with a flat spring 14 of conventional construction.

While I have shown and described several embodiments in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of numerous changes and modifications as known to those skilled in the art and I therefore do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

What I claim is:

1. A sealing bar for a rotary piston internal combustion engine which is arranged radially movable in a piston groove provided with a spring means, and which sealingly slides with its head portion at a casing contact surface in a housing casing of the internal combustion engine, characterized by slide means which are arranged in the longitudinal direction of the sealing bar between the sealing bar and the piston groove.

2. A sealing bar according to claim 1, characterized in that two slide members are provided, of which one each is arranged along a respective longitudinal side of a sealing bar between the latter and the piston groove.

3. A sealing bar according to claim 2, characterized in that the rotary piston internal combustion engine is of trochoidal construction.

4. A sealing bar according to claim 2, characterized in that the slide members are constructed plate-shaped.

5. A sealing bar according to claim 4, characterized in that the slide members are supported at the casing contact surface.

6. A sealing bar according to claim 4, characterized in that the slide members are supported at the groove bottom of the piston groove.

7. A sealing bar according to claim 2, characterized in that the sealing bar is constructed mushroom shaped with its head portion.

8. A sealing bar according to claim 7, characterized in that the slide members are supported against the bottom side of a sealing bar head portion.

9. A sealing bar according to claim 2, characterized in that the slide members are constructed L-shaped.

10. A sealing bar according to claim 9, characterized in that the slide members engage with the short leg portions thereof into recesses extending in the longitudinal direction and arranged directly above the groove bottom.

11. A sealing bar according to claim 9, characterized in that the short leg portions of the slide members are directed against one another in such a manner that they form a slot.

12. A sealing bar according to claim 9, characterized in that the slide members abut with the short leg portions thereof immovably against the groove bottom.

13. A sealing bar according to claim 9, characterized in that the short leg portions of the slide members abut at the sealing bar under spring pressure.

14. A sealing bar according to claim 13, characterized in that the slide members carry out stroke movements substantially in unison with the sealing bar.

15. A sealing bar according to claim 2, characterized in that the slide members are provided with a rough surface on a side facing the piston groove.

16. A sealing bar according to claim 2, characterized in that the slide members are roughened at the side facing the sealing bar.

17. A sealing bar according to claim 2, characterized in that the slide members are supported at the casing contact surface.

18. A sealing bar according to claim 2, characterized in that the slide members are supported at the groove bottom of the piston groove.

19. A sealing bar according to claim 2, characterized in that the slide members are supported against the bottom side of a sealing bar head portion.

20. A sealing bar according to claim 2, characterized in that the slide members engage with short leg portions thereof into recesses extending in the longitudinal direction and arranged directly above the groove bottom.

21. A sealing bar according to claim 2, characterized in that short leg portions of the slide members are directed against one another in such a manner that they form a slot.

22. A sealing bar according to claim 2, characterized in that the slide members abut with short leg portions thereof immovably against the groove bottom.

23. A sealing bar according to claim 2, characterized in that short leg portions of the slide members abut at the sealing bar under spring pressure.

24. A sealing bar according to claim 2, characterized in that the slide members carry out stroke movements substantially in unison with the sealing bar.

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