Jan. 7, 1969 WOLF-DIETER BENSINGER ET AL 3,420,214

ROTARY PISTON ENGINE

Filed June 17, 1966

FIG. 1

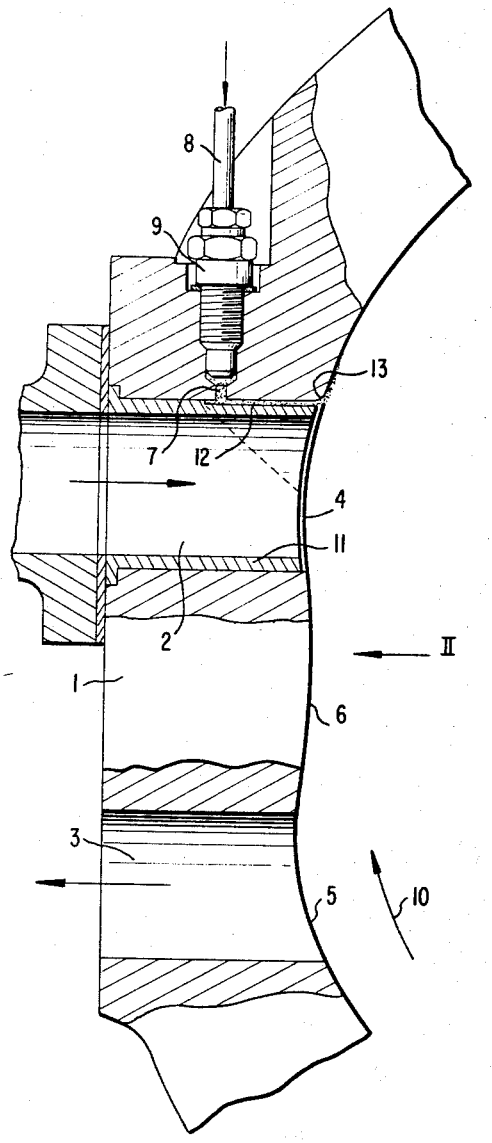
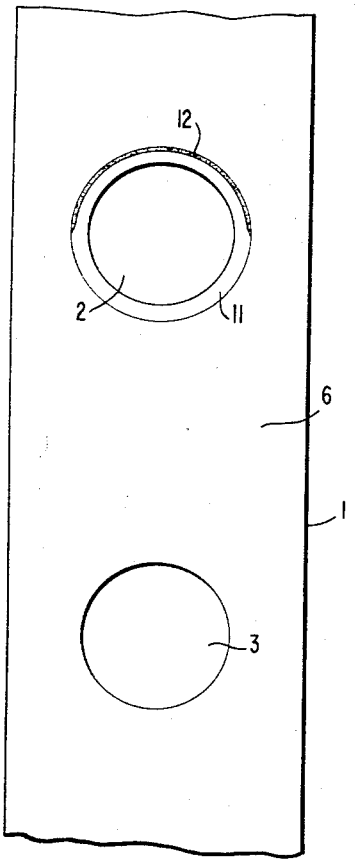


FIG. 2



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United States Patent Office

3,420,214
Patented Jan. 7, 1969

3,420,214

ROTARY PISTON ENGINE

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Filed June 17, 1966, Ser. No. 558,424
Claims priority, application Germany, June 19, 1965, D 47,551
U.S. Cl. 123—8 14 Claims
Int. Cl. F02b 53/04; F04c 29/02; F04d 29/06

ABSTRACT OF THE DISCLOSURE

A rotary piston internal combustion engine of trochoidal construction having an inlet channel in the housing whose control aperture lies in the contact surface thereof, and in which a lubricant supply aperture is arranged in the forward wall of the inlet channel in relation to the direction of piston rotation, and having an insert in the inlet channel forming a narrow gap with the forward wall extending from the lubricant supply aperture to the contact surface to shield the lubricant from the media flowing through the inlet channel.

The present invention relates to a rotary piston engine, especially to a rotary piston internal combustion engine of trochoidal construction, in which an inlet channel is provided within the housing case whose control window lies within the contact or cam surface of the housing case, and in which an aperture is arranged in that wall portion of the inlet channel which is disposed forwardly in relation to the normal direction of rotation of the piston, oil being supplied through this aperture for purposes of lubrication of the contact or cam surface of the case.

The present invention aims at improving the supply of lubricant to the contact or cam surface of the case. As solution to the underlying problems, the present invention essentially consists in that an insert is arranged in the inlet channel which forms with the forward wall portion of the aperture a narrow gap for the supply of oil up to contact or cam surface of the case.

In an advantageous construction of the inventive concept, the gap may become increasingly wider from the aperture for the supply of oil and may assume within the area of the control window of the inlet channel approximately half the circumference of the channel cross section.

For reasons of manufacturing ease the insert may consist of a bushing or the like lining the inlet channel in which the outer surface forming the gap is offset in the radial direction thereof.

By means of the formation of the narrow gap the oil is guided in such a manner that it is contacted neither by the air stream in the inlet channel nor by the fuel taken along in the inlet channel. The oil cannot be torn off and also cannot be washed off. The lubricating oil arrives unimpaired at the contact or cam surface of the case where by reason of the large length of the gap in relation to the circumference of the inlet channel it is distributed over the entire width of the contact or cam surface of the case. The oil supply to the contact or cam surface of the case takes place very evenly; any possible supply irregularities that may occur are at least lessened by the gap according to the present invention.

Accordingly, it is an object of the present invention to provide an improved lubricating system for the contact or cam surfaces of the housing case of a rotary piston engine, especially of a rotary piston internal combustion engine of trochoidal construction.

Another object of the present invention resides in a rotary piston internal combustion engine in which a uniform and adequate lubrication is assured for the contact or engaging surfaces of the housing under all operating conditions by extremely simple means that are reliable in operation.

A further object of the present invention resides in a rotary piston internal combustion engine having a lubricating system for the case contact surfaces which is so constructed and arranged that the lubricating oil is shielded from the combustion air as well as from the fuel taken along by the combustion air in order to prevent tearing off or washing off of the lubricant.

Still a further object of the present invention resides in a lubricating system for the contact surfaces of the case of rotary piston internal combustion engines of the type described above which may be manufactured in an extremely simple manner, involving relatively low costs and which can be readily assembled without great expenditures in time and labor.

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

FIGURE 1 is a partial transverse cross-sectional view through the housing case of a rotary piston internal combustion engine of trochoidal construction within the area of the inlet channel; and

FIGURE 2 is a partial plan view on the housing case taken in the direction of arrow II of FIGURE 1.

Referring now to the drawing wherein like reference numerals are used throughout the two views to designate like parts, reference numeral **1** designates therein the conventional housing case of a rotary piston internal combustion engine of trochoidal construction. The rotary piston internal combustion engine of trochoidal construction is not shown in detail since it is of conventional construction whose details form no part of the present invention. The inlet channel **2** and the outlet channel **3** are provided in the housing case **1** in the usual manner, and more particularly as is conventional within the zone of the multi-arched internal contact or cam surfaces **6** approaching the axis of the engine. Both the control aperture **4** of the inlet channel **2** as well as the control aperture **5** of the outlet channel **3** lie in the contact or cam surfaces **6** of the housing case **1** where they are controlled in a conventional manner by a polygonal piston rotating relative to the contact surfaces **6** in such a manner that the piston corners slide at all times along the contact surfaces **6**. Conventional control means in the form of a transmission or the like may be used to achieve the desired rotation of the piston on an eccentric relative to the eccentric shaft and the housing. Since such control means as well as the piston are well known in the art, they are not illustrated herein. The aperture **7** is provided in the inlet channel **2** for the lubrication of the case contact surfaces **6**. Oil supplied by means of a conventional metering pump (not shown) is conducted to the aperture **7** by way of the line **8** and the excess pressure valve **9**. The latter may also be of any conventional, known construction. The aperture **7** is disposed in the forward wall portion of the inlet channel **2** in relation to the normal direction of rotation of the piston indicated by the arrow **10**.

In order to guide the oil leaving the aperture **7** without contact with the air or with the fuel up to the case contact surface **6**, the bushing **11** is inserted into the inlet channel **2** which bushing extends close to the control aperture **4** in the cam surface **6**. Possibly the bushing **11** may also terminate flush with the contact surface **6**. The

outer surface of the bushing **11** is slightly offset in its radial dimension from the area of the aperture **7** up to the control aperture **4** so that the narrow gap **12** results. Within the area of the aperture **7**, the gap **12** is only slightly larger in the circumferential direction of the bushing **11** than the diameter of the aperture **7**. The gap **12** then continuously increases from the area of the aperture **7** in the direction toward the control aperture **4** and extends at the end of the bushing **11** over half the circumference of the inlet channel **2** (FIGURE 2). The depth of the gap **12** is so large that the product of depth times width within the area of the control aperture **4** of the inlet channel **2** is no larger than the cross section of the aperture **7**. The control aperture **4** of the inlet channel **2** is rounded off as indicated at **13** within the area of the gap **12** so that the oil leaving the gap **12** remains attached to or adheres at the case contact surfaces **6** and therewith covers the same over the entire width. The oil does not come into contact within the inlet channel itself with the air or fuel flowing through the inlet channel **2**. Consequently, the oil cannot be torn off or washed off within the inlet channel **2**.

Appropriately, the narrow gap can be produced in such a manner that a bushing is utilized whose outer diameter is smaller by the gap depth than the diameter of the inlet channel. Then, the area of the bushing which is to form a wall of the gap, is covered or masked and a galvanic material is applied to the remaining portion of the outer surface thereof until the diameter of the inlet channel is reached.

The insert could also be made in such a manner that it is punched out in the unwound form, the gap is produced by stamping or embossing and the shape of the insert is realized by rolling. The prestress necessary for the secure seating of the insert can then be taken into consideration during the rolling operation.

While we have shown and described one embodiment in accordance with the present invention, it is obvious that the same is not limited thereto but is susceptible of numerous changes and modifications as known to a person skilled in the art, and we 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.

We claim:

1. A rotary piston internal combustion engine, especially rotary piston internal combustion engine of trochoidal construction, comprising housing means including case means, said case means being provided with contact surface means, inlet channel means within said housing means with the control aperture of the inlet channel means being disposed substantially in the plane of the contact surface means, and means for lubricating said contact surface means including aperture means in the forward wall portion of the inlet channel means in relation to the normal direction of rotation of the piston through which oil is supplied for the lubrication of the contact surface means, and further means for shielding the lubricating oil supplied through said aperture means against the air and fuel flowing through said inlet channel means.

2. An engine according to claim **1**, wherein said further means includes insert means forming with the forward wall portion of the aperture means for the supply of lubricant a narrow gap extending up to within the area of the contact surface means.

3. A rotary piston engine according to claim **2**, wherein said gap becomes increasingly wider from said aperture means in the direction toward said contact surface means and assumes approximately half the circumference of the cross section of the inlet channel means within the area of the control aperture of said inlet channel means.

4. A rotary piston engine according to claim **3**, wherein said insert means consists of a bushing lining the inlet channel means in which the outer surface forming the gap is offset in the radial direction.

5. A rotary piston engine according to claim **2**, wherein said insert means consists of a bushing lining the inlet channel means in which the outer surface forming the gap is offset in the radial direction.

6. In a rotary piston internal combustion engine, especially a rotary piston internal combustion engine of trochoidal construction in which an inlet channel is provided in the housing whose control aperture lies in the contact surface thereof, and in which an aperture is arranged approximately in the forward wall portion of the inlet channel in relation to the direction of rotation of the piston through which lubricant is supplied to the case surface for purposes of lubrication thereof, the improvement essentially consisting of means in the inlet channel including an insert forming a narrow gap with the said forward wall portion from the aperture for the supply of lubricant up to the area of the case surface to effectively shield the lubricant from the media flowing through the inlet channel.

7. The combination according to claim **6**, wherein the gap becomes increasingly and continuously wider from said aperture in the direction toward said contact surface.

8. The combination according to claim **7**, wherein said gap assumes about half the circumference of the cross section of the inlet channel within the area of the control aperture.

9. The combination according to claim **7**, wherein said insert is constituted by a bushing lining the inlet channel, and in which the gap is formed by an offset portion of the external surfaces of the bushing in the radial direction thereof.

10. The combination according to claim **6**, wherein said insert is constituted by a bushing lining the inlet channel, and in which the gap is formed by an offset portion of the external surfaces of the bushing in the radial direction thereof.

11. A rotary piston internal combustion engine according to claim **1**, wherein said further means forms in effect a narrow gap extending up to within the area of the contact surface means.

12. A rotary piston internal combustion engine according to claim **11**, wherein said gap increases in width from said aperture means in the direction toward said contact surface means.

13. A rotary piston internal combustion engine according to claim **12**, wherein said gap assumes approximately half the circumference of the cross section of the inlet channel means within the area of the control aperture of said inlet channel means.

14. A rotary piston internal combustion engine according to claim **11**, wherein the product of depth times width of the gap within the area of the control aperture of the inlet channel means is at most equal to the cross section of said aperture means.

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AL LAWRENCE SMITH, *Primary Examiner.*

U.S. Cl. X.R.

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