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ROTARY PISTON INTERNAL COMBUSTION ENGINE, ESPECIALLY CIRCULAR PISTON INTERNAL COMBUSTION ENGINE

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Fig. 1

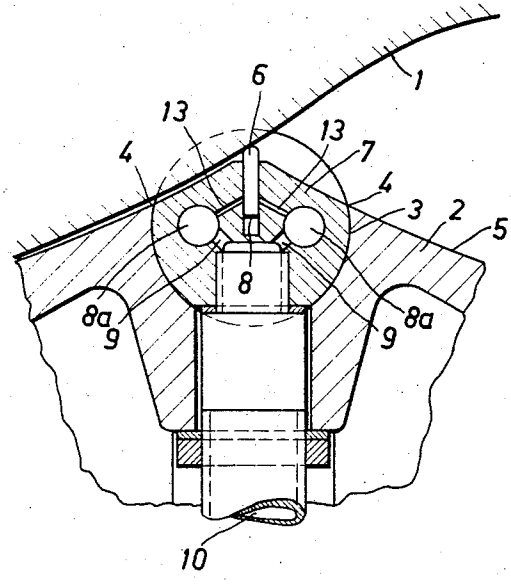
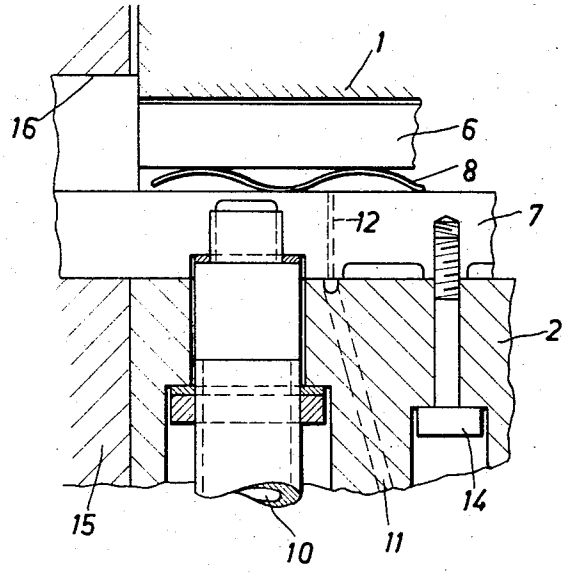


Fig. 2



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ROTARY PISTON INTERNAL COMBUSTION ENGINE, ESPECIALLY CIRCULAR PISTON INTERNAL COMBUSTION ENGINE

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14 Claims. (Cl. 230—145)

ABSTRACT OF THE DISCLOSURE

The present invention relates to a rotary piston internal combustion engine, especially circular piston internal combustion engine, in which the piston profile is formed by a trochoid while the adjacent housing surface is formed by an outer enveloping curve of said trochoid. The invention is characterized primarily, in that insert means carrying the sealing strip are provided in the lobe sections on the inside of said housing, said insert means being formed by longitudinal members having an outer cylindrical peripheral surface portion inserted in the housing and carrying the sealing strip means.

The present invention relates to a rotary piston internal combustion engine, especially circular piston internal combustion engine, in which the piston profile is determined by a trochoide, especially epitrochoide, and accordingly the housing profile follows the outer enveloping curve of the trochoide, while radial seals are arranged in the lobe areas of the inner wall surface of the housing.

Inasmuch as the radial sealing strips are highly sensitive structural elements, it is an object of the present invention to provide the groove receiving the sealing strips with high precision.

It is another object of this invention so to design the radial sealing strip that it can be produced with simple means.

It is a further object of this invention so to design the radial sealing strip that it will be highly wear resistant.

Still another object of this invention consists in providing an automatic cooling for the grooves which receive the sealing strips.

A still further object of this invention consists in so arranging the sealing strip that it can easily be removed without disassembling the engine.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawing, in which:

FIG. 1 is a partial cross section through a circular piston internal combustion engine according to the present invention.

FIG. 2 is a partial longitudinal section through the circular piston internal combustion engine of FIG. 1.

The rotary piston internal combustion engine according to the present invention is characterized primarily in that for purposes of guiding the sealing strips in the lobe area of the housing, there are provided inserts of a cross-sectional shape which can easily be realized, while the arrangement is such that said inserts are secured against turning and displacement. The invention is furthermore characterized in that the cross-sectional axis of said inserts is located in the radial plane through the center of the sealing strips while a portion of the crosssection within the range of the piston width is cut off in conformity with the outer enveloping curve.

To secure the inserts against rotation can easily be realized by screwing the inserts to the mantle surface at that side of the inserts which faces away from the sealing strip. It is of particular advantage to see to it that the connecting screws permit a free expansion of the inserts toward the sides of the engine.

For purposes of obtaining a good cooling of the sealing strip, cooling passages are provided in the inserts at both sides of the sealing strip. These cooling passages receive the cooling medium through correspondingly bored screws for connecting the inserts and are also able to discharge the cooling medium through the same passages. If the lubricant for the engine also serves as cooling medium for the inserts, lubricating bores may be provided in the inserts which lead from the cooling passages in the inserts to the sealing strips.

The inserts according to the present invention may, according to a further development of the invention advantageously be so designed that they form a connection to the end face seals. To this end, the inserts extend toward both sides beyond the mantle and extend into the side walls with full cylindrical cross section. The ends of the inserts may serve as connecting means between the end face seals arranged in the side walls.

Referring now to the drawing in detail, the circular piston internal combustion engine shown therein comprises a piston **1** movable in a housing **2**, the profile of said piston being determined by an epitrochoid. Accordingly, the profile of the housing **2** follows the outer enveloping curve of the epitrochoide. In the corners or the lobe sections of the housing **2** there are provided cylindrical openings **3** which are open toward the interior of the housing and the axes of which are located with regard to the engine axis outside a line which connects the intersecting edges **4** of the cylindrical opening **3** on the inner wall surface **5**. For purposes of guiding the sealing strips **6**, inserts **7** are inserted into said cylindrical openings **3**. The sealing strips **6** are pressed by spring elements **8** against the piston **1**. At both sides of the sealing strips **6** cooling passages **8***a* are provided in the inserts **7** which by means of passages **9** communicate with the feeding and discharge conduit means **10**. The feeding of the lubricant is effected according to the drawing from the outer periphery of the engine. However, it may also be advantageous to feed the cooling means through the end face of housing **2** axially with regard to the inserts.

The drawing shows one side only of the circular piston internal combustion engine. This side may serve for feeding or withdrawing the cooling medium. Accordingly, on the other side of the internal combustion engine there will be the withdrawal or the feeding conduit means for the cooling medium. However, it is also possible to provide the feeding conduit as well as the withdrawing conduit for the cooling medium on one and the same side. In such an instance the cooling passages are short-circuited on one side of the circular piston internal combustion engine and on the other side are separately connected to the feeding conduit for the cooling medium and the withdrawing conduit for the cooling medium.

The lubrication of the sealing strips **6** is effected by bores **11** and **12**. If the cooling medium simultaneously serves for lubricating the sealing strips, the lubrication of the sealing strips may also be effected through lubricating bores **13**.

The feeding and withdrawing conduits **10** for the cooling medium are advantageously provided in hollow screws which at the same time connect the inserts **7** to the housing. For purposes of permitting a heat expansion of the inserts, it is advantageous that they are secured against axial displacement at one end only. This can be effected independently of the conduit means for the cooling medium by a connecting screw **14**.

FIG. 2 furthermore shows that the inserts **7** with full cylindrical cross section extend into the side walls **15** of the housing **2**. These ends of the inserts may then serve

as connecting members between the end face seals arranged in the side walls. When the conduit means for the cooling medium and the connecting screws have been withdrawn, the inserts can be withdrawn from the engine laterally through the bores **16** without disassembling the engine.

It is, of course, to be understood that the present invention is, by no means, limited to the particular constructions shown in the drawing but also comprises any modifications within the scope of the appended claims. It is also to be understood that the invention is not limited to circular piston internal combustion engines but can also be employed for rotary piston internal combustion engines.

What I claim is:

1. A rotary piston internal combustion engine, especially a circular piston internal combustion engine, which comprises: a piston having a profile determined by a trochoid, a housing surrounding said piston, and having its inner profile following the outer enveloping curve of the said trochoid so as to have inner corner portions, insert means respectively located in said corner portions and provided with grooves extending in the direction of the axis of rotation of said piston, connecting means supported by said housing for securing said insert means against turning and displacement in said housing, sealing strip means respectively inserted in said grooves for sealing engagement with the periphery of said piston, and spring means continuously urging said sealing strip means into and holding the same in sealing engagement with said piston.

2. An engine according to claim **1**, in which the outer circumferential contour of said insert means along which the latter are mounted in said housing is cylindrical.

3. An engine according to claim **1**, in which those surface portions of the respective insert means which are located on the opposite side of said sealing strip means and face said piston have a contour following the enveloping curve of said trochoid.

4. An engine according to claim **1**, in which said housing comprises side walls on opposite sides of said piston, and in which at least one of said side walls is provided with passage means for receiving the respective adjacent end of said insert means.

5. An engine according to claim **4**, in which said passage means extend through the respective side wall to permit insertion of the respective insert means into and withdrawal of the respective insert means from said piston through said passage means.

6. An engine according to claim **1**, in which the circumferential contour of said insert means along which the latter is mounted in said housing forms part of a cylinder, the axis of which is, with regard to the axis of the engine, located outside a plane passing through the lines of intersection of the cylindrical contour of one and the same insert means with the respective adjacent inner surface of said housing.

7. An engine according to claim **1**, in which the connecting means for securing said insert means against turning and displacement in said housing are formed by screw bolts extending into said housing from that side thereof which is remote from said sealing strip means.

8. An engine according to claim **1**, in which said housing also comprises side walls located laterally of said piston, and which also comprises additional screw means for connecting the insert means to an area close to said side walls.

9. An engine according to claim **1**, which comprises means for securing the insert means only at one area thereof against axial displacement in the housing.

10. An engine according to claim **1**, in which said insert means are provided with cooling passages on opposite sides of the respective adjacent groove for receiving and discharging cooling fluid to cool said sealing strip means.

11. An engine according to claim **10**, in which at least a part of said cooling passages is formed by the connecting means.

12. An engine according to claim **10**, in which said engine is provided with lubricating passages communicating with said cooling passages.

13. An engine according to claim **1**, in which said insert means extend toward both sides of the inner housing portion and have their inner surface merging with the adjacent housing portion while protruding therebeyond toward said piston.

14. An engine according to claim **10**, in which said cooling passages extend in the longitudinal direction of said insert means.

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