July 5, 1966 J. GASSMANN 3,259,114

ROTARY PISTON INTERNAL COMBUSTION ENGINE CONSTRUCTION

Filed Nov. 16, 1962

FIG. 1

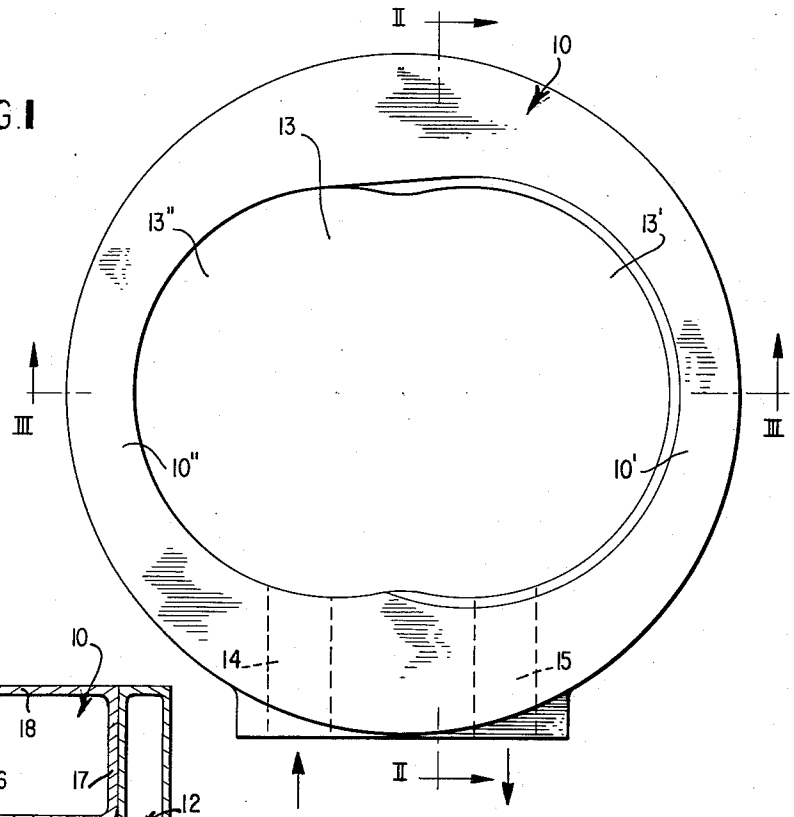
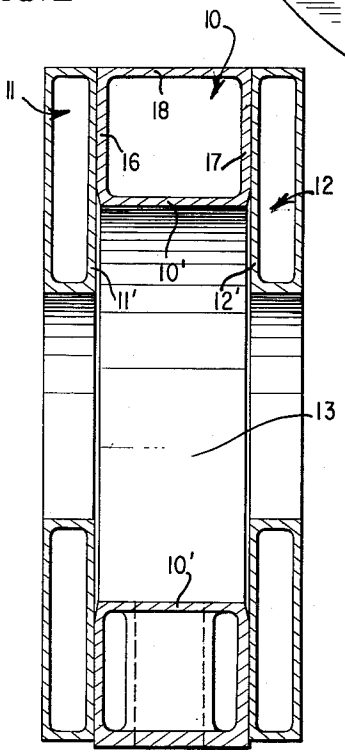


FIG. 2



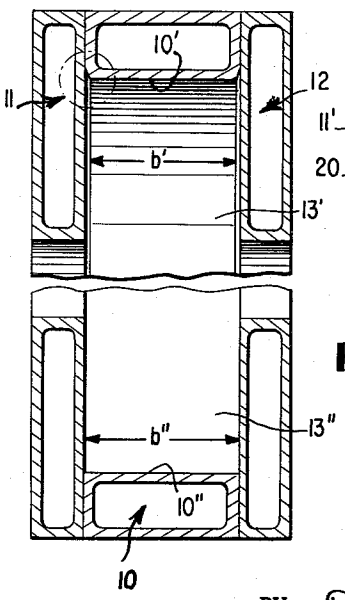


FIG. 4

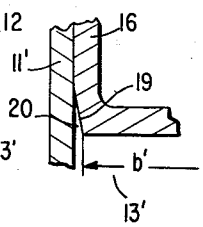


FIG. 3

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ROTARY PISTON INTERNAL COMBUSTION ENGINE CONSTRUCTION

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6 Claims. (Cl. 123—8)

The present invention relates to a housing for rotary piston internal combustion engines of trochidal construction which essentially consist of a center part and of side parts and which is provided with a multi-arched internal cam surface at the center part along which slides a polygonal piston with the radial seals arranged in a conventional manner at the piston corners.

Conditioned by the operations in the working chamber, trochoidally-shaped in cross section, of a rotary piston internal combustion engine, the housing thereof consisting of a center part and two side parts is subdivided into a relatively warmer section to which is coordinated substantially the combustion side of the working chamber, and into a relatively cooler section which is disposed on the suction side thereof. From the more or less one-sided or unilateral heating of the first section, caused by the combustion of the mixture or of the injected fuel, results a deformation of the internal wall of the housing center parts defining and limiting in the outward direction the working chamber on the combustion side thereof which deformation entails disadvantageous consequences. The length of the relatively warmer internal wall of the housing center part increases relatively strongly as compared to the relatively cooler inner wall of the housing center part which leads to sealing difficulties between the center part of the housing and the side parts of the housing.

The invention aims at avoiding the aforementioned disadvantages and at taking such measures that the relatively warmer section of the housing center part may expand independently of the relatively cooler section of the housing center part.

The present invention essentially consists in providing a housing in which the total effective length of the relatively warmer section of the internal walls of the housing center part is smaller, within slight limits, than the total effective length of the relatively cooler section thereof. The term "the total effective length" is used throughout the specification, including the claims, as defining the sum of the length, measured along the axis of the housing, excluding any gaps in the inner center wall portions, effective to sealingly engage the rotating piston. This is realized, for example, by inclining or bevelling the side wall portions of the housing center part, adjoining the relatively warmer section of the inner wall of the housing center part, in the direction toward the working chamber whereby the inclined or beveled part of the side wall portions of the housing center part forms, together with the housing side parts delimiting and sealing the working chamber in the outward direction, one gap each which widens in the direction toward the working chamber.

Accordingly, it is an object of the present invention to provide a housing construction for an internal combustion engine which effectively eliminates, by simple means, the shortcomings and inadequacies of the prior art constructions.

It is another object of the present invention to provide a housing for a rotary piston internal combustion engine which by its particular construction takes into consideration the differing thermal expansions in the wall portions defining the working chamber that occur within different parts of the engine.

Still another object of the present invention resides in the construction of a housing for rotary piston internal combustion engines which compensates for the differing degrees of expansions between the relatively cooler housing section within the area of the suction space and inlet channel and the relatively warmer housing section within the area of the combustion region.

Still another object of the present invention resides in the provision of a housing construction for rotary piston internal combustion engines which, by simple and inexpensive means, permits differing expansions in the center parts of the housing walls of the working chamber yet assures good seal of the working chamber.

These and other 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 an elevational view of a housing construction for a rotary piston internal combustion engine in accordance with the present invention whereby the housing side parts have been removed for sake of clarity;

FIGURE 2 is a cross sectional view taken along line II—II of FIGURE 1 through a housing construction in accordance with the present invention with the side parts of the housing secured to the center part thereof;

FIGURE 3 is a cross sectional view, taken along line III—III of FIGURE 1, of a housing construction in accordance with the present invention with the side parts of the housing again secured at the center part of the housing, and

FIGURE 4 is a partial cross sectional view, on an enlarged scale, illustrating certain details of the housing construction in accordance with the present invention.

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, reference numeral **10** generally designates therein the center part of the housing and reference numerals **11** and **12** generally designate therein the side parts of the housing of a rotary piston internal combustion engine having a working chamber **13** which is of trochoidal shape in cross section. The inlet and outlet bores **14** and **15** for the inflowing fuel-air mixture and the outflowing combustion gases, respectively, are provided in the center part **10** of the housing. The center part **10** of the housing consists essentially of the inner center wall portions **10'** and **10''** and of the lateral wall portions **16** and **17** as well as of an external wall portion **18** which together with the other wall portions **10'**, **10''**, **16** and **17** of the housing center part **10** form the cooling jacket for the working chamber **13**. The working chamber **13** is defined by the inner center wall portions **10'** and **10''** of the center part **10** and by the side wall portions **11'** and **12'** of the housing side parts **11** and **12**. The working chamber **13** is subdivided into a relatively warmer section **13'** and into a relatively cooler section **13''** whereby the section **13''** represents essentially the suction side and the section **13'** essentially the combustion side.

The inner wall portion **10'** of the relatively warmer section **13'** has a smaller total effective length b' (FIG. 3) than the inner wall portion **10'** of the relatively colder section **13''** of the center part **10**, which has a relatively larger total effective length b''.

The total effective length b' of the inner wall portion **10'** of the warmer section **13'** is formed by a bevelled-off portion **19** of the lateral wall portions **16** and **17** of the center part **10** in the direction toward the working chamber **13**. As a result of the beveling **19**, there is produced between the side wall portions **11'** and **12'** of the side parts **11** and **12** and the lateral wall portions **16** and **17** of the housing center part **10**, a gap **20** which widens in

the direction toward the working chamber **13**. By the existence of gap **20** is assured that the relatively warmer inner wall portion **10'** of the housing center part may expand sufficiently far during operation of the engine.

While I have shown and described one embodiment in accordance with the present invention, it is understood that the same is not limited thereto, but is susceptible of many changes and modifications within the spirit and scope thereof, 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.

I claim:

1. In a housing structure for rotary piston internal combustion engines, especially for those having working chambers of trochoidal shape in cross section, in which rotate pistons of polygonal shape having substantially arcuately formed working surfaces, and of which the working chambers are effectively subdivided into a relatively warmer section generally comprising the combustion and exhaust sections, and into a relatively cooler section generally comprising the intake and compression sections,

the improvement essentially consisting of inner wall means, generally disposed about on axis, defining at least in part said working chamber, the length, generally measured along said axis, of said inner wall means being slightly smaller within said relatively warmer section than the length thereof within the relatively cooler section.

2. A housing structure for rotary piston internal combustion engines, especially for those having working chambers trochoidally-shaped in cross section in which move pistons in the form of a polygon having curved working surfaces, and in which during operation of the engine exist relatively warmer and relatively colder sections, comprising a housing center part including an inner wall portion generally disposed about an axis and two lateral wall portions adjoining said inner wall portion,

and housing side parts on each side of the housing center part sealing the working chamber laterally thereof,

the length, generally measured along said axis, of the inner wall portion of the housing center part being slightly smaller within the relatively warmer section of the engine housing than the length within the relatively cooler section,

the smaller length of the internal wall portion of the center part being effectively formed by bevelling the lateral wall portions of the housing center part adjoining the relatively warmer center wall portion, whereby the bevelled portion of the lateral wall portions each forms, together with the corresponding housing side part, a gap that increases in the direction toward the working chamber.

3. A housing structure for rotary piston internal combustion engines, especially for those having working chambers trochoidally-shaped in cross section in which move pistons in the form of a triangle having curved working surfaces, comprising a housing center part including an internal wall portion generally disposed about

an axis, an external wall portion and two lateral wall portions joining said internal and external wall portions to form a cooling jacket,

and housing side parts on each side of the center part of the housing and including side wall portions secured to respective lateral wall portions of the center part and defining, together with the internal wall portion of the center part, the working chamber,

the length, generally measured along said axis of the internal wall portion of the housing center part being slightly larger within the relatively cooler section of the engine housing containing the inlet channel than within the area of the relatively warmer section in which takes place the combustion process,

the slightly smaller length of the internal wall portion of the center part being effectively formed by mutually inclined end sections in the lateral wall portions of the housing center part.

4. A housing for a rotary piston internal combustion engine of trochoidal construction, comprising:

a housing center part and housing side parts,

said housing center part being provided with a multi-arched internal surface means, generally disposed about an axis, along which slides the polygonal piston with the piston corners thereof,

said internal surface means being effectively subdivided into a relatively warmer section generally including the combustion and exhaust sections, and into a relatively cooler section generally including the intake and compression sections,

the length, generally measured along said axis, of said relatively warmer section of said internal surface means of the housing center part being slightly smaller than the length of the relatively cooler section of said internal surface means of the housing center part to enable differing thermal expansions.

5. A housing accordingly to claim **4**, wherein said housing center part is provided with lateral wall portions adjoining said internal surface means, said lateral wall portions being inclined relative to the adjoining housing side parts in such a manner that a gap results that increases in the direction toward the space defined by said internal surface means.

6. A housing according to claim **4**, wherein said length is the total effective length measured between said side parts, excluding any gap in said internal surface means.

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