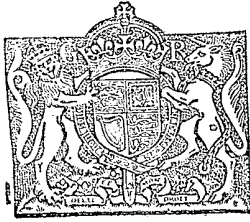


PATENT SPECIFICATION



Application Date: Jan. 16, 1935. No. 1479/35. 436,117

Complete Specification Accepted: Oct. 4, 1935.

COMPLETE SPECIFICATION

Improvements in or relating to Rotary Valves

I, ROLAND CLAUDE CROSS, a British subject, of 33, Midford Road, Odd Down, Bath, Somerset, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to improvements in or relating to cylindrical rotary valves particularly rotary valves for internal combustion engines, and has for its object to improve the cooling of valves working in liners fixed within the valve housing.

15 Housings for cylindrical rotary valves provided with a fixed bearing liner constructed with a hollow or hollows in its wall adapted to contain a coolant are according to the invention characterised 20 by the fact that the coolant is continuously circulated through the hollow-walled liner by means of passages extending through the housing of the valve and communicating with the said liner. The 25 circulated coolant may be water, or other suitable liquid medium having a boiling point higher than that of water, e.g. ethylene-glicol mixed with water or undiluted. The liner may be completely 30 cylindrical to embrace the valve entirely, or only partly cylindrical.

The circulatory cooling of the liner enables a cooler combustion chamber to be used in those designs in which the 35 liner protrudes into the cylinder head as is shown on the drawing of the embodiment described later. Secondly in those bushes utilising the springiness of the material in the liner for the purpose of 40 forming a sealing device as in the prior specification No. 373,660 (Cross), it enables the tensile strength of the metal to be maintained, as it does not allow the 45 liner material to reach a temperature which will permit it to temper out or become annealed. Thirdly it enables a liner to be used which can have a white metal lining upon which the valve can bear. Thus, the hollow liner can be 50 made from a material which is of high tensile strength, has good elasticity and resistance to fatigue, and yet by virtue of the white metal or other suitable bear-

ing metal coating it can be very suitable for the valve to bear against.

An embodiment of the invention as applied to an internal combustion engine will be described in greater detail with the aid of the accompanying drawings wherein:—

Figure 1 shows a vertical section depicting a rotary valve, its housing, and the top of a cylinder.

Figure 2 shows a transverse sectional elevation of a modification.

Referring to the drawings, in Figure 1 the valve housing is designated 1 and has secured therein a liner 2 by means of screws 3. The said liner 2 has a port 4 communicating with the cylinder 5. The lip 6 of the port may be a springy sealing lip as defined in prior specification No. 373,660 (Cross). In such an instance the cooling arrangement of the present invention serves very effectively for cooling, or for helping to cool, the said lip 6.

The rotary valve 7 is shown diagrammatically in outside elevation, and in the embodiment has an inlet for fuel mixture at the right-hand side and an exhaust outlet at the left-hand side, there being corresponding ports in the cylindrical wall adapted to register with the port 4.

The liner 2 is constructed as a hollow-walled cylinder with a chamber 8 (or plurality of chambers) to contain the coolant. This is supplied through the bore 9 in the top cap 10 of the housing which leads to an inlet conduit 11 passing through the water or other coolant jacket 12 of the housing 1, and thence to the liner chamber 8. The coolant circulates through the liner and passes out into the cylinder jacket 13 through suitable ducts 14.

Figure 2 shows an example differing from Figure 1 in that the liner is only partly cylindrical and does not entirely surround the valve 7. The liner 2a is semi-cylindrical and formed with a hollow wall having a coolant chamber 8. The top half of the valve bearing is formed by the housing head or cap 15, and both the cap 15 and the liner 2a are coated with a suitable soft bearing composition as for example white metal, lead

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bronze, or the like, (indicated by the numeral 16). The liner 2a is secured in the lower part of the housing by the screws 3 shown dotted. The element 17 is a component in a lubrication system not forming a part of the present invention. Coolant is circulated through the hollow 8 as in the previous example.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. Housings for cylindrical rotary valves provided with a fixed bearing liner constructed with a hollow or hollows in its wall adapted to contain a coolant, characterised in that coolant is continuously circulated through the hollow-walled liner by means of passages extending through the housing of the valve and communicating with the said liner.

2. Housings for rotary valves according to Claim 1 wherein the housing itself is hollow for the purpose of fluid cooling and an inlet conduit for cooling fluid is introduced through the hollow wall of the housing into the hollow wall of the liner.

3. Housings for rotary valves of internal combustion engines constructed according to Claim 2 wherein the hollow-walled liner communicates with a cooling

jacket, surrounding the cylinder of the engine over which the rotary valve and its housing are mounted.

4. Housings for cylindrical rotary valves constructed according to any one of the preceding claims wherein the hollow walled liner is formed with a springy-lipped port or ports as described in the specification of Patent No. 373,660 (Cross) and the chamber in the liner is extended into the lips of the ports so that the cooling fluid circulates therethrough.

5. Housings for rotary valves according to Claims 1, 2 or 3 wherein the fixed and hollow-walled bearing liner is a complete cylinder adapted to surround the valve entirely.

6. Housings for rotary valves according to Claims 1, 2 or 3 wherein the fixed and hollow-walled bearing liner is partly cylindrical (e.g. the semi-cylindrical form illustrated in Figure 2 of the accompanying drawings).

7. Housings for cylindrical rotary valves according to any one of the preceding claims, wherein the hollow walled liner has a coating of white metal, lead bronze or equivalent bearing material softer than the material of the liner.

Dated this 16th day of January, 1935.

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Agent for the Applicant.

[This Drawing is a reproduction of the Original on a reduced scale.]

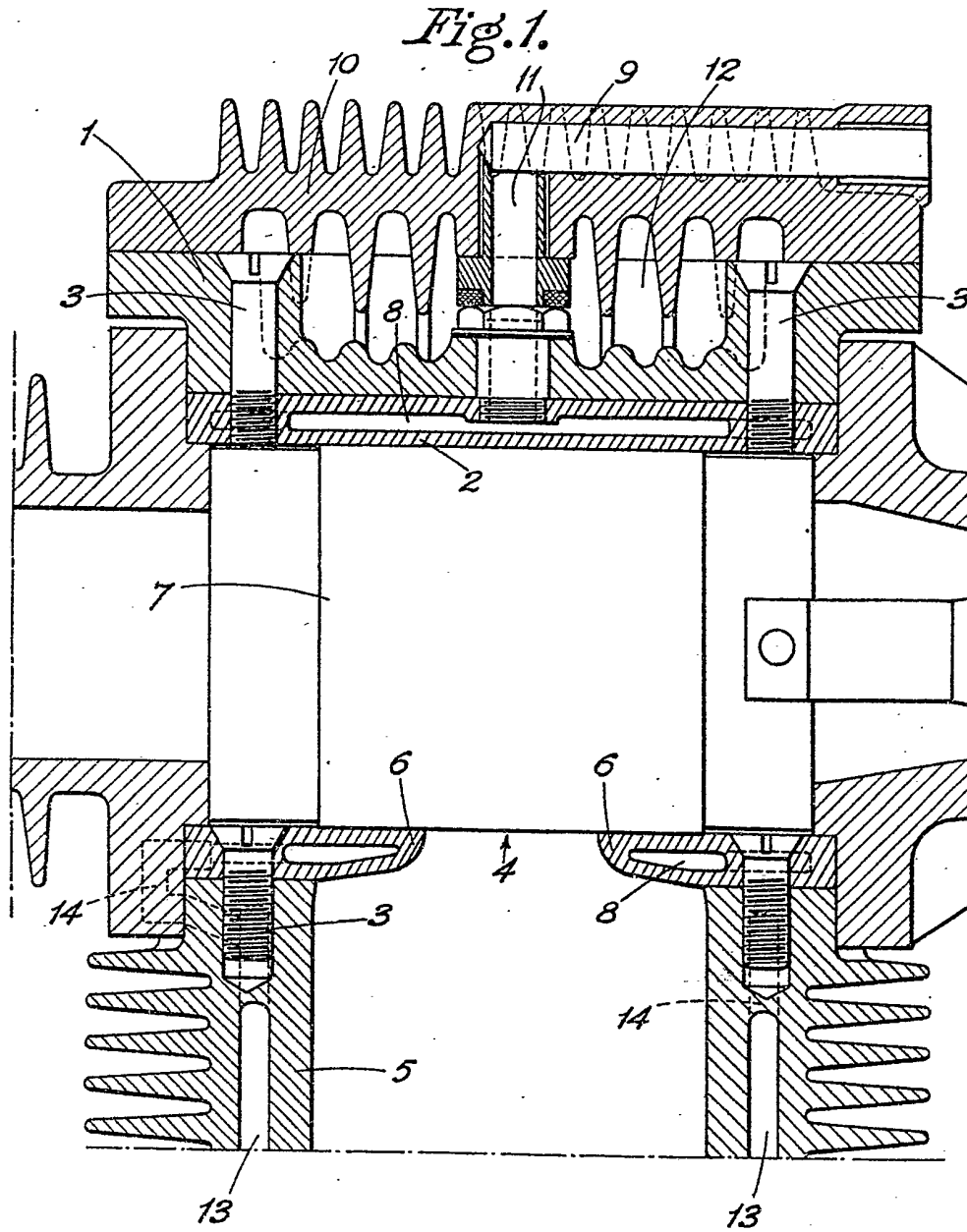


Fig. 2.

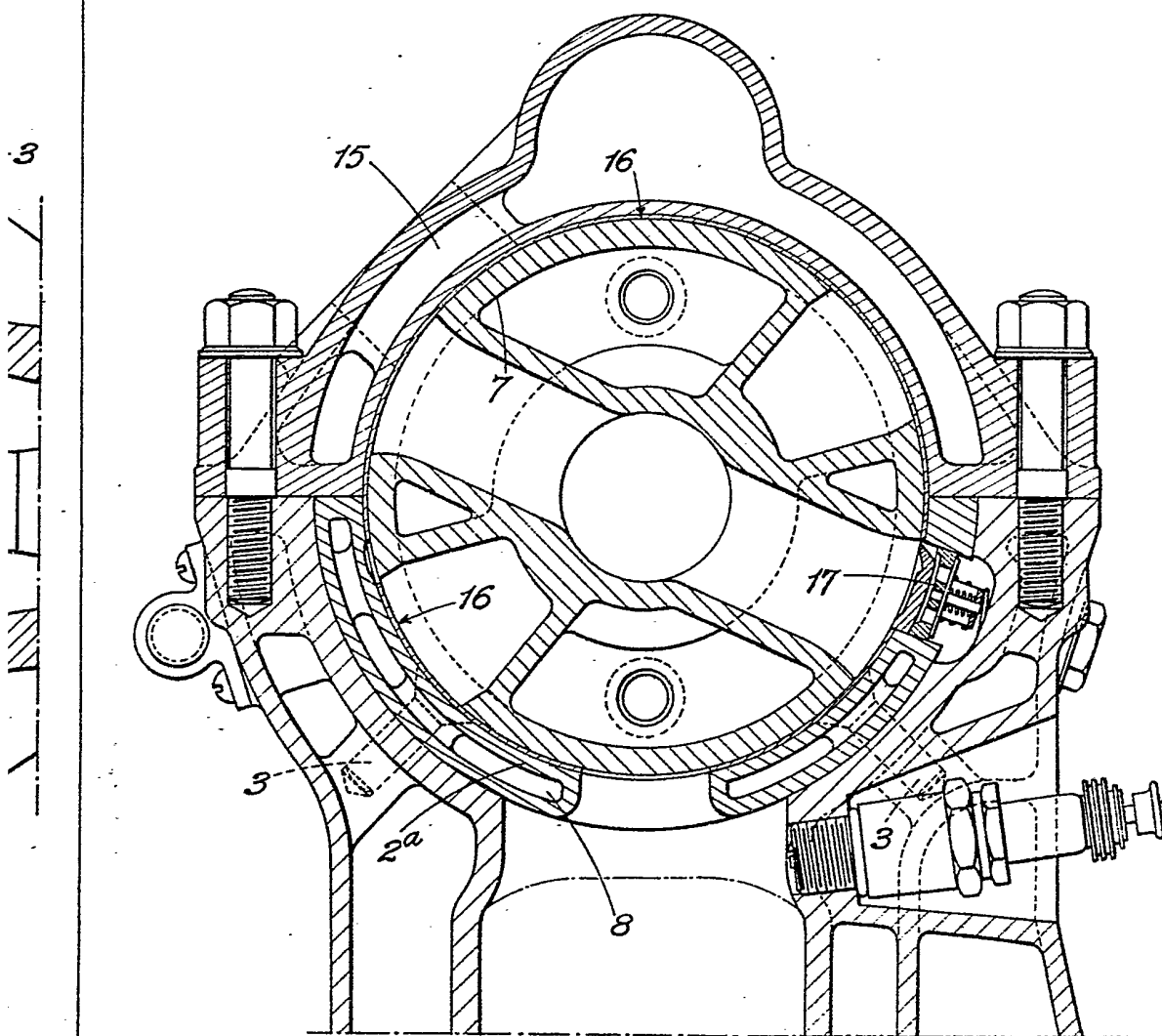


Fig. 1.

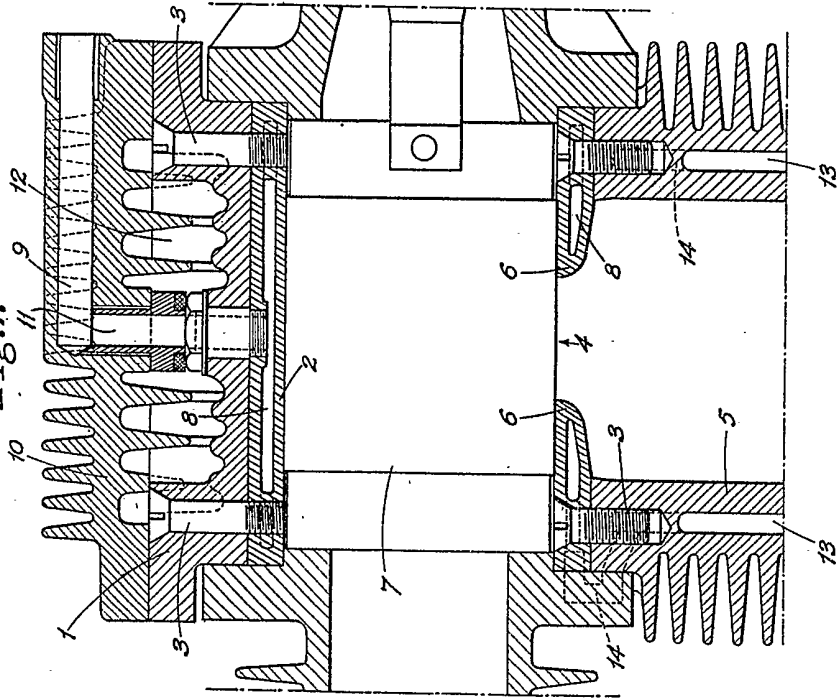
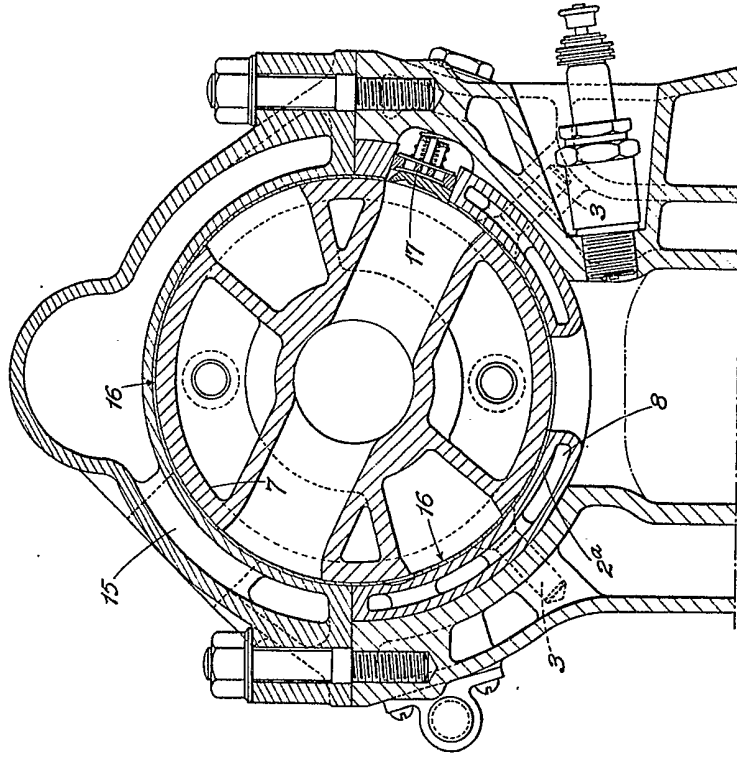


Fig. 2.



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