

PATENT SPECIFICATION

Application Date: June 11, 1937. No. 16284/37.

474521

(Patent of Addition to No. 451,917: dated Feb. 21, 1936.)

Complete Specification Accepted: Nov. 2, 1937.



COMPLETE SPECIFICATION

Improvements in Rotary Valve Internal Combustion or other Engines or Pumps

I, ROLAND CLAUDE CROSS, a British subject, of 33, Midford Road, Combe 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 relates to rotary valve internal combustion or other engines or pumps, of the kind including a two part housing for the valve and wherein the pressure in the engine cylinder is utilised for loading the housing parts in their application to the valve member with a view to providing a fluid tight seal therebetween.

In this specification the term "floating" denotes that the member so described is yieldable in relation to other parts so as to be capable of transmitting varying pressures applied thereto to another member contacting therewith, whether the said floating member be actually displaced or not. The term "stationary" where applied to a part denotes that that part is non-floating in the above sense. Further for simplicity, it will be assumed that the engine cylinder is vertically disposed and the rotary valve surmounts it, the valve housing being split in a substantially horizontal plane to form an upper and a lower housing member. Where the arrangement differs the correspondence of parts will be obvious to those skilled in the art.

It is known to provide a rotary valve internal combustion engine with a floating lower valve housing member and stationary upper valve housing member, the full force of the pressure in the cylinder being applied to the lower housing member and transmitted thereby to the valve member. Examples of such constructions are to be seen in my prior specifications Nos. 448,368, 448,383 and 448,384. This pressure on the valve member has been found in certain circumstances to be excessive, particularly at high engine speeds.

In my prior specification No. 451,917, there is a rotary valve internal combustion engine with floating lower and upper valve housing members, wherein the pressure in

the cylinder is applied to the lower housing member and part of the pressure is transmitted from said lower housing part to the upper valve housing member through a reducing lever system. Thus, the pressure exerted by the housing member upon the valve member is less than the pressure in the cylinder, and the lever system may, of course, be so arranged as to obtain the most suitable pressure on the valve member.

The present invention concerns a modification of the invention set forth in the aforesaid prior specification No. 451,917.

In many cases an advantageous design according to this prior invention is to form the lower valve housing member integral with the cylinder so that they float as a solid unit, and examples of this design are described and illustrated in the said parent specification No. 451,917, and also in the specification of the subsequent co-pending application No. 467,620.

According to the present invention a rotary internal combustion engine or pump is formed with floating lower and upper valve housing members, the pressure in the cylinder being applied to the lower housing member and part of the pressure being transmitted from said lower member to the upper member through a reducing lever system, and the lower housing member is yieldingly mounted in or on the cylinder. This modification is useful in certain engine designs and particularly where the invention according to the parent specification No. 451,917 is to be applied to existing cylinder blocks. In such an adaptation of an existing design, the cylinder block can remain stationary.

Embodiments of the invention are illustrated in the accompanying drawings by way of example, and in said drawings:—

Figure 1 is a diagram representing a cross-section through a valve and its two housing members;

Figure 2 is a longitudinal sectional view through the valves of part of a multi-cylinder engine;

Figure 3 is a cross-section on the line III—III of Figure 2; and

Figure 4 is a cross-section on the line

IV—IV of Figure 2.

Referring to the drawings, the valve 1 is mounted in a housing comprising a lower floating part 2 and an upper floating part 3.

5 The lower part 2 is spigotted at 4 either directly in the cylinder block 5 as shown, or in a foundation plate adapted to be fixed to the cylinder block. The lower housing part 2 can therefore exert sealing pressure
10 on the valve 1 when it is itself pressed by the force of the varying pressures generated in the cylinder, the inner wall 6 being suitably shaped to receive the cylinder pressure. The housing part 2
15 is initially and resiliently pressed to the valve by the springs 7 disposed either in the block 5 (Figures 2—4) or in the housing 2 (Figure 1) or in both.

The spigot 4 is preferably furnished
20 with sealing rings and may extend any suitable distance into the cylinder block 5. In an alternative construction (not illustrated), the spigot is formed with a depending skirt projecting well down into
25 the block and constituting a liner in which the piston runs.

The upper housing element 3 is made as a two armed lever fulcrummed on the reaction member 8. This member 8 is
30 shown fixed to a stationary frame 9 in Figure 1, whilst in Figures 2—4 it is mounted immovably in the blocks 10 which form part of the stationary structure 15 of the engine. Each upper housing
35 member 3 in accordance with the design in Figures 2—4 is joined to the reaction member 8 by reaction blocks 21. Pressure applied upwardly from the lower housing 2, through the steel pin 11, on
40 to one side or arm of the housing element 3, is transmitted with reduction on to the valve 1 through the other arm. A resilient packing strip 12 is interposed between the two housing parts 2 and 3 diametrically
45 opposite the pressure pin 11. The degree of pressure reaching the valve and originating from gas pressure in the cylinder is controlled or determined mechanically by the leverage resulting from the position-
50 ing of the fulcrum 8.

Embodiments of this particular lever system are described with more detail in my aforesaid prior specification No. 467,620 to which reference may be had.

55 In the type of engine depicted in Figures 2—4 the inlet for the mixture is shown at 13 and the exhaust at 14. An oil feed 16

and oil scraper 17 leading to the return pipe 18 are in accordance with my prior specification No. 423,474. Water (or other
60 coolant) in the cylinder jacket has free circulation up into and through the housing members 2 and 3 (see the resilient connections 19) and thence into the hollow tube constituting the reaction member
65 8, this latter thus serving also as the top water pipe of the engine, connected at 20 to the radiator.

Any other suitable method of transmitting part of the pressure from the lower housing member 2 to the upper member 3 through a reducing lever system may be employed for the purpose of the present invention.

70 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. A modification of the rotary valve
80 internal combustion engine or pump comprising floating lower and upper valve housing members wherein the pressure in the cylinder is applied to the lower housing member and part of the pressure
85 is transmitted from said lower member to the upper member through a reducing lever system as claimed in the parent specification No. 451,917, characterised by the said lower housing member being
90 yieldingly mounted in or on the engine or pump cylinder.

2. A rotary valve internal combustion engine or pump as claimed in Claim 1 wherein the lower housing member is
95 spigotted in the cylinder block or in a part fixed thereto.

3. A rotary valve internal combustion engine according to the preceding Claims, wherein a lower housing member spigotted
100 in the cylinder block or part thereof presses on to the upper housing member through a solid connection between both housing members, the upper member working as a two armed lever by means
105 of a fixed fulcrum whereby the pressure applied thereto is transmitted with reduction to the valve.

Dated this 11th day of June, 1937.
EDWIN C. AXE, A.I.M.E.,
27, Chancery Lane, London,
W.C.2,
Agent for the Applicant.

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

FIG. 1.

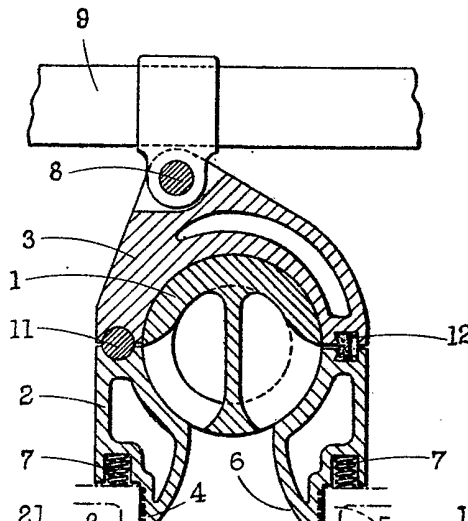


FIG. 2.

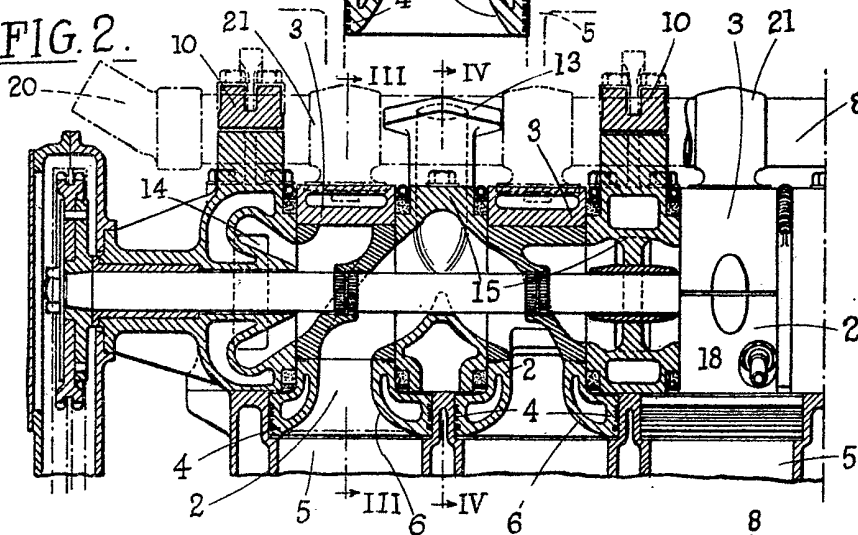


FIG. 3.

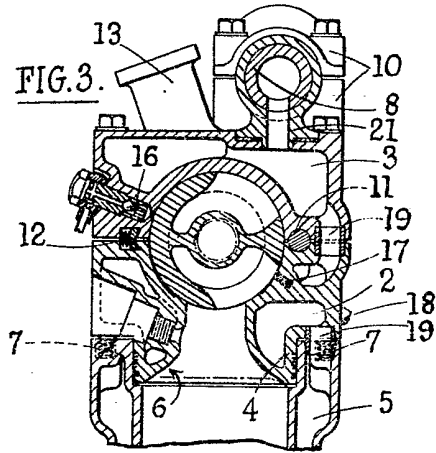


FIG. 4.

