

PATENT SPECIFICATION

Application Date: Oct. 31, 1935. No. 30087/35. 448.383

Complete Specification Accepted: June 8, 1936.



COMPLETE SPECIFICATION

Improvements in Rotary Valve Internal Combustion Engines and Pumps

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 relates to internal combustion engines and pumps of the type comprising a rotary cylindrical distributing valve mounted in a split housing which surmounts and is disposed at right angles to an axially slidable cylinder, the lower part of the housing being made rigid with the cylinder so as to have with the cylinder a certain amount of resilient movement in relation to the upper part of the housing. Engines of this type are exemplified in my co-pending applications Nos. 20382/35 (Serial No. 448,368) and 30088/35 (Serial No. 448,384), and the invention is particularly although not exclusively designed for use with such engines.

The object of the present invention is to provide means which ensures that the gas pressure is trapped in the upper part of the cylinder and can exert its full force to press the lower housing part tightly against the valve, and minimise the possibility of gas leakage to the top of the valve with consequential equalisation of pressure on either side of the valve which would nullify the advantages obtained by employing cylinders with axial play.

According to the invention an internal combustion engine or pump of the type defined is characterised in that the inner surface of the lower part of the housing is recessed longitudinally and from side to side so as to leave a raised annulus around the inlet port to the cylinder, said annulus constituting the only bearing surface for the valve between the inlet port and the longitudinal edges of the said lower housing part.

It has hitherto been proposed in the type of engine referred to, to surround the inlet port in the lower housing part with an annular leakage relief channel which communicates with the atmosphere by way of a split opening between the housing parts to permit the escape of any

gases that may leak into the channel which thereby limits the extent of any interfacial pressure and ensures that a firm contact is maintained between the valve and the zone between the port and the channel. Instead of the channel of annular form, it was also proposed to provide the lower housing part with a pair of leakage relief channels extending longitudinally one on each side of the inlet port, the said channels being connected during compression, explosion and expansion, by an arcuate drainage channel in the valve so as to form a flow barrier about the port for the reception of leakage of explosion gases. During exhaust the channels were in communication with the exhaust port to permit the escape of the entrapped gases.

The object of the present invention is achieved by an alternative method to that hitherto proposed, and although the invention can be used with advantage in both single and multi-cylinder engines, its use in a multi-cylinder engine especially when constructed with cylinders which are formed as a block in one casting (e.g. according to my co-pending application No. 30088/35 (Serial No. 448,384) above referred to) definitely ensures maximum efficiency being obtained from the engine, because if there is any tendency (due to distortions as a result of heat) for one or more of the respective lower housing parts at each cylinder head to come away from the valve, the raised annulus portion of the bearing surface around each inlet port serves to compensate for the distortion and retain port sealing.

In order that the invention may be more readily understood reference will now be made to the accompanying drawings, which show by way of example only, its application to a multi-cylinder engine of the type defined and as shown in the specification of my copending application No. 30088/35 (Serial No. 448,384), previously referred to.

Figure 1 is a vertical section through one cylinder; and

Figure 2 is a longitudinal section through the cylinder block.

[Price 1/-]

price 75p

Like parts are designated by the same reference numerals in both figures.

The housing of the rotary valve 1 is split longitudinally at right angles to the cylinder 2 to provide an upper part 3 and a lower part 4 which is cast integral with the cylinders, with thin and flexible portions 4a connecting the respective cylinders between them as described in the specification of my co-pending application No. 30088/35 (Serial No. 448,384).

Between the upper and lower housing parts and at the joint between the foot of the cylinder and the crank case 8 are inserted resilient packings 9 and 10 which not only provide for the resilient movement of the cylinders but ensure absolute gas tightness at these joints, as described in the specification of co-pending application No. 20382/35 (Serial No. 448,368), the joint between the housing parts having the ribs 6 interfitting the grooves 7.

When there is a rise of gas pressure in the cylinders, the lower housing part is forced up against the valve by the gases impinging against the suitably shaped and stiffened upper end of the cylinder as indicated, and in order to ensure that gas leakage cannot occur between the valve and its housing for any reason such as distortion due to heat, the bearing surface of the valve around each cylinder port 5 is provided with a raised annular 13 which is left by recessing the inner surface of the lower part 4 of the housing longitudinally and from side to side. The annulus 13 may be formed by slightly scraping away the metal of the lower housing part 4 by a few thousandths of an inch to leave a raised portion about the port; alternatively, the inner surface may be a coating of suitable bearing metal applied to the interior of the housing e.g. by spraying so as to be slightly thicker around the edges of the ports than at the remainder of the surface. In all cases the annulus 13 constitutes the only bearing surface for the valve between the inlet port 5 and the longitudinal edges of the

lower housing part 4. In the embodiment of the invention shown, the reference numeral 12 designates the distance pieces between the upper housing part 3 and the crank case 8; 14 and 15 are respectively flanges and resilient packing sealing the ends of the valve, and 16 are the bolts which pass through rubber bushes 17 and secure the side plates 18 of the cylinder 2. For a more detailed description of the construction and operation of these parts attention is directed to the co-pending applications previously referred to.

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. An internal combustion engine or pump of the type defined, characterised in that the inner surface of the lower part of the housing is recessed longitudinally and from side to side so as to leave a raised annulus around the inlet port constituting the only bearing surface for the valve between the inlet port and the longitudinal edges of the lower housing part.

2. An internal combustion engine according to Claim 1, wherein the lower part of the valve housing is recessed by scraping or other mechanical action to form the raised annulus about the inlet port.

3. An internal combustion engine according to Claim 1, wherein the bearing surface for the valve is formed by applying—e.g. by spraying—a coating of suitable bearing metal to the interior of the housing which is thickened around the port hole to provide the raised annulus.

4. A multi-cylinder internal combustion engine constructed substantially as herein described and as illustrated in the accompanying drawing.

Dated this 31st day of October, 1935.

EDWIN C. AXE, A.I.M.E.,
27, Chancery Lane, London W.C. 2,
Agent for the Applicant.

Fig.1.

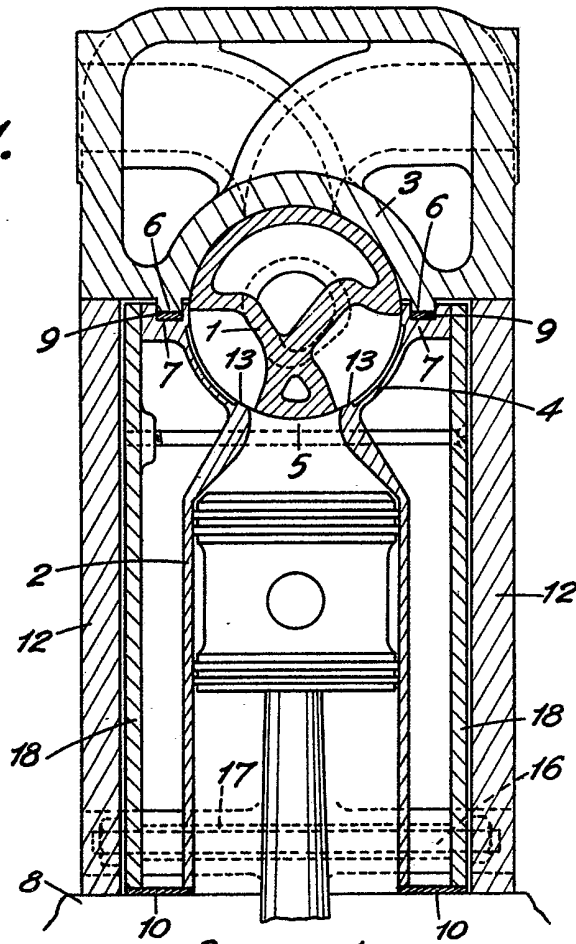
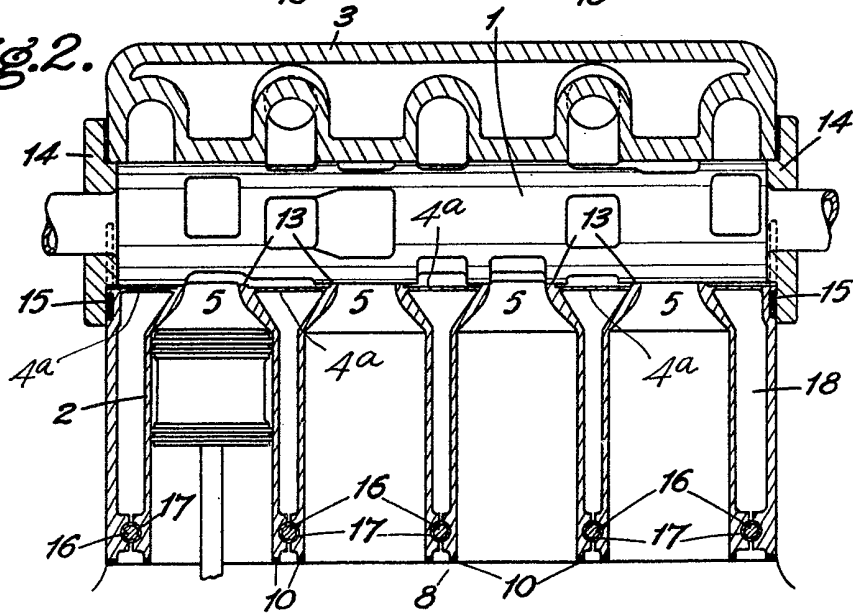


Fig.2.



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