

March 7, 1961

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2,973,752

TWO-STROKE INTERNAL COMBUSTION ENGINE

Filed Oct. 20, 1959

3 Sheets-Sheet 1

Fig. 1

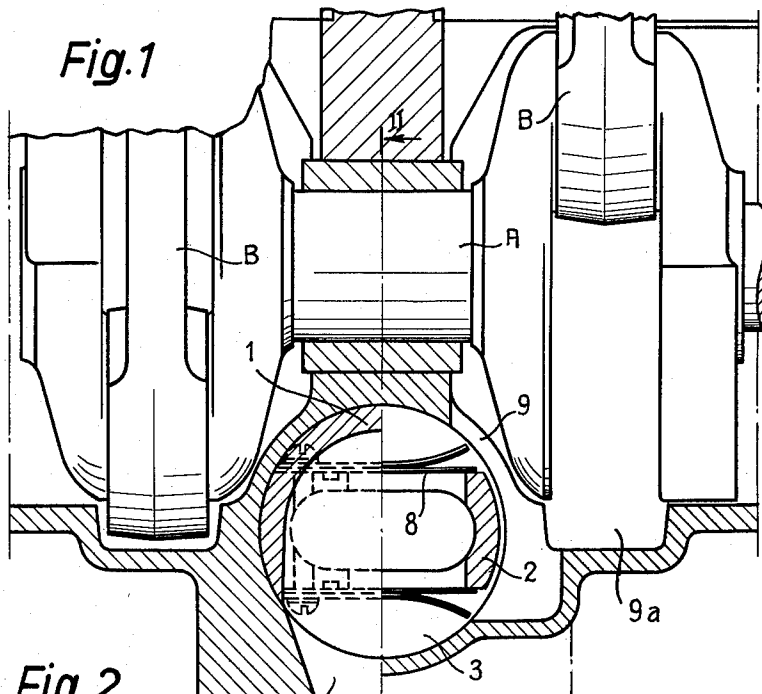
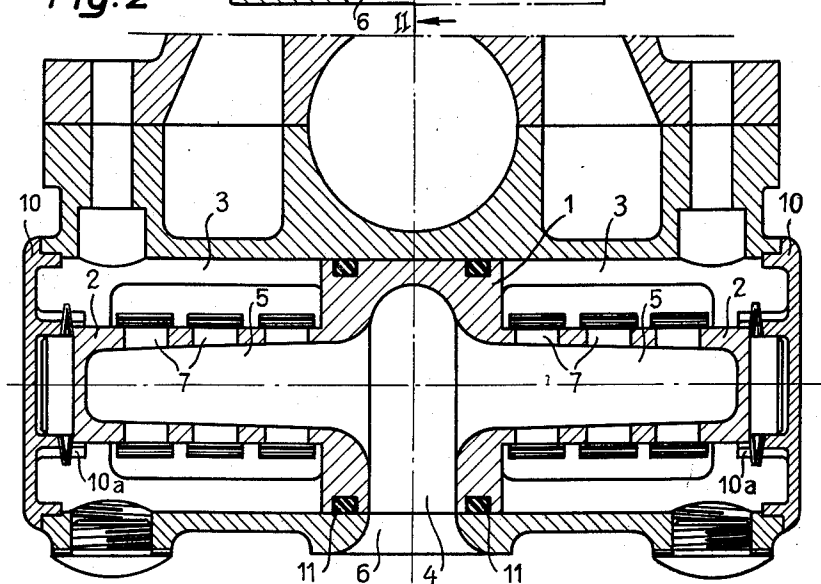


Fig. 2



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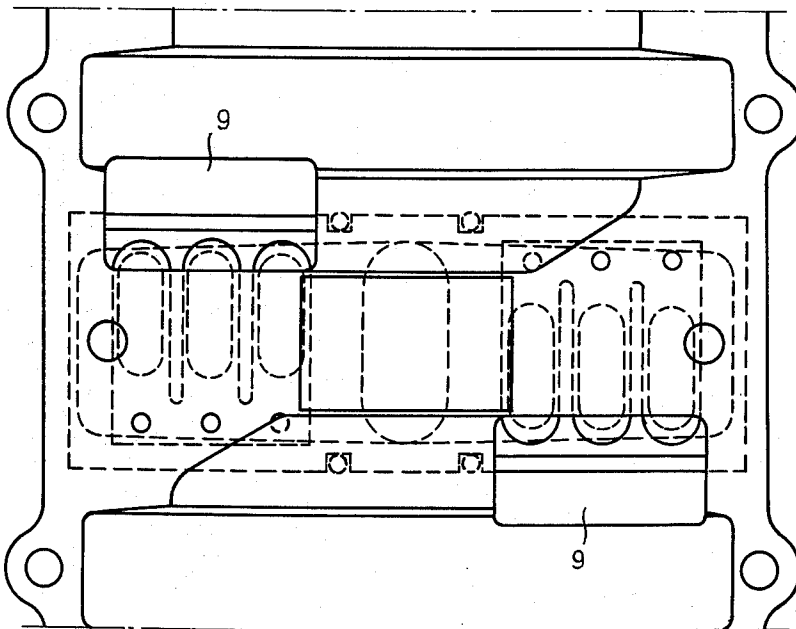
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Fig.3



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Fig. 4

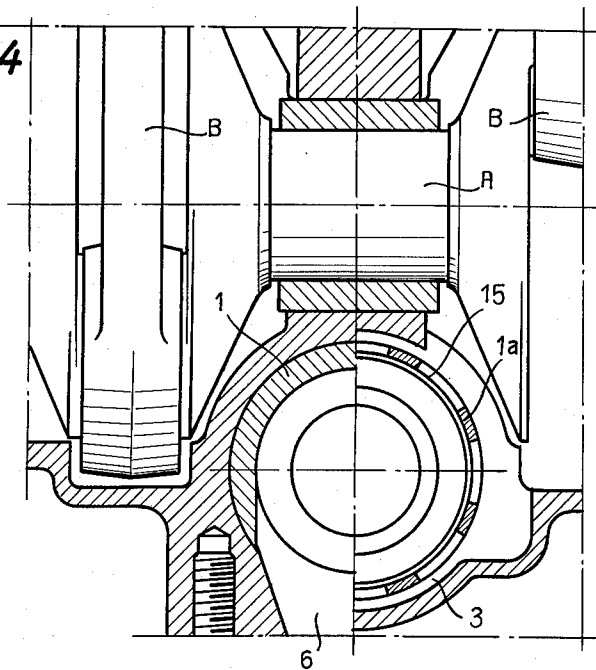
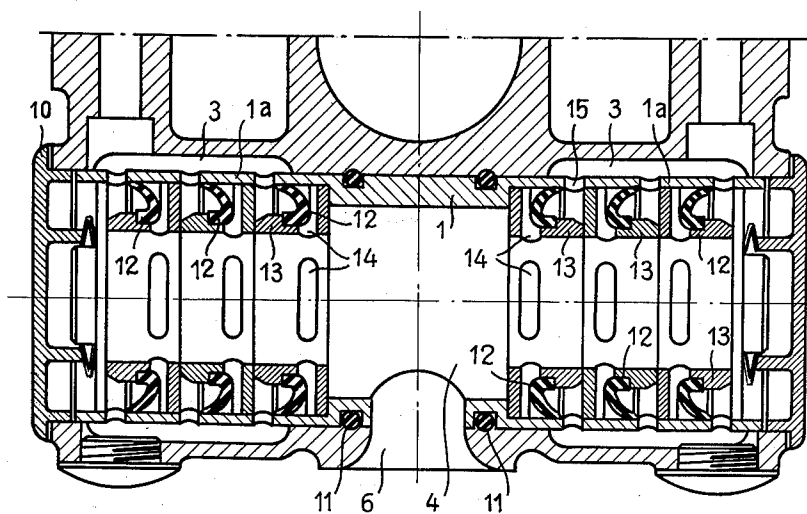


Fig. 5



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TWO-STROKE INTERNAL COMBUSTION ENGINE

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Claims priority, application Italy Nov. 29, 1958

3 Claims. (Cl. 123—59)

This invention relates to two-stroke internal combustion engines of the two-in line cylinder type.

An object of this invention is to provide an internal combustion engine of this type each cylinder of which has associated therewith a fuel mixture delivery control valve in the crank case the valves being incorporated by a valve block which is easily accessible and reduces dead spaces.

The improved valve block is accommodated by a seat formed in the crank case between the two cranks, said seat extending perpendicular to the crankshaft.

According to an embodiment of this invention the valve block is formed with a recess connecting centrally with the induction conduit of the carburetor and at its ends with the pre-compression chambers through valves.

Further characteristic features of this invention will be understood from the appended detailed description referring to the accompanying drawings which show by way of example embodiments thereof.

Figure 1 is a cross-sectional view of the valve block for a two-stroke engine of the two-in line cylinder type;

Figure 2 is a sectional view on line II—II of Figure 1;

Figure 3 is a plan view of the engine crank case accommodating the valve block and

Figures 4 and 5 show a modification of the valve block.

Referring to Figures 1 to 3, the valve in the crank case for controlling fuel mixture delivery comprises a valve block having a middle cylindrical body portion 1 and two prismatic end portions 2, accommodated by a cylindrical seat 3 formed in the motor crank case between the two cranks B beneath the journal bearing on the shaft A.

The valve block is formed with an inner hollow, the middle section 4 of which connects with the induction conduit 6 leading to the carburetor. The slightly tapered end portions 5 of the conduit 6 reach into the prismatic end portions 2 having ports 7 bored there-through, the ports 7 being controlled by metal plate valves 8.

The prismatic extensions 2 on the block each carry on their opposite flat faces two sets of three valves each.

The ends of the seat 3 accommodating the valve block connect through openings 9 with precompression chambers 9a for the two engine cylinders.

The valve block is held in position by cover plates 10 fitted laterally of the crank case, having dog-clutch teeth 10a cooperating with the ends of the prismatic extensions 2 on the valve block for holding the latter accurately in position and keeping it against rotation in its seat.

The cylindrical body portion 1 of the valve block is formed with two annular grooves in which O-rings 11 of rubber are located for sealing purposes, preventing interconnection of the two pre-compression chambers through the valve block seat.

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The valve block can be of one piece or divided, its two sections being then secured together or merely juxtaposed.

The valve block operates as follows:

5 Whenever an underpressure is set up in the pre-compression chambers 9a during the suction stroke, a differential pressure arises on the faces of the plate valves 8 which are thereby opened allowing flow of the gaseous mixture drawn from the carburetor through the conduit 6 and recess 4—5 in the valve block. The mixture flows to the pre-compression chambers through openings 9 after having passed the valve-controlled ports 7.

10 On completion of the suction stroke pressure rises in the pre-compression chambers, causing the plate valves to close and shut off the carburetor.

Referring to the modified construction shown in Figures 4 and 5, the valve block is formed with two cylindrical end portions 1a, which are made hollow and enclose valves 12 comprising annular rubber elements. The rubber rings are carried by associated metal mountings 13 which are likewise of annular shape and are accommodated by the cylindrical end portions 1a of the valve block.

25 The rubber rings 12 are arranged between radial bores 14 formed in the annular mountings and radial bores 15 formed in the end portions 1a.

The rubber rings are resiliently deformed to admit of flow of the gaseous mixture from the carburetor towards the pre-compression chambers in the engine during the suction stroke and are resiliently restored to their initial condition shutting off connection on completion of the suction stroke.

30 The chief advantages of the valve block described above are as follows:

35 Easy access to the valve block without requiring disassembly of any engine component,

40 Advantageous reduction of dead spaces on account of the fact that the valve block is directly associated with the engine pre-compression chambers,

Efficient heating of the valve block is enhanced, improving carburation more particularly at low engine speeds, The overall size of the engine is reduced.

45 What I claim is:

1. In a bi-cylindrical two-stroke internal combustion engine comprising a crankcase, a crankshaft including a pair of cranks with a supporting journal intermediate the cranks, and an intake valve unit in the crankcase at a location intermediate the cranks sub-dividing the crankcase into two fuel mixture chambers associated with their respective cylinders; the improvement comprising an open-ended cylindrical seat for the valve unit extending in the crankcase transversely of the crankshaft intermediate the cranks; the said valve unit comprising a hollow body section fluid-tight engaged by a section of the seat intermediate the length of the latter, a pair of hollow extensions on the body section extending from the latter towards the opposite ends of the seat, and a plurality of valve-controlled passages in each of the extensions for admitting fuel mixture to their respective chambers; a pair of cover plates fitted to their respective opposite seat ends including means locating the valve unit in the seat; and a fuel mixture inlet to the said hollow body section.

2. In a bi-cylindrical two-stroke internal combustion engine as claimed in claim 1, said extensions being of a flattened cross-sectional profile, said valve-controlled passages comprising non-return reed valves on the flattened sides of each extension, and said means for locating the valve unit in the seat including dogs on the

cover plates engaging their respective ends of the extensions.

3. In a bi-cylindrical two-stroke internal combustion engine as claimed in claim 1, a plurality of axially aligned annular valve-supporting members in each extension 5 associated with their respective passages, an annular non-return lip-valve of a resilient material carried by each valve-supporting member, and said cover plates axially

pressing together their respective valve-supporting members.

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