July 6, 1948. J. C. DE LA RIESTRA ET AL 2,444,696

ROTARY VALVE FOR INTERNAL-COMBUSTION ENGINES

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Fig. 1.

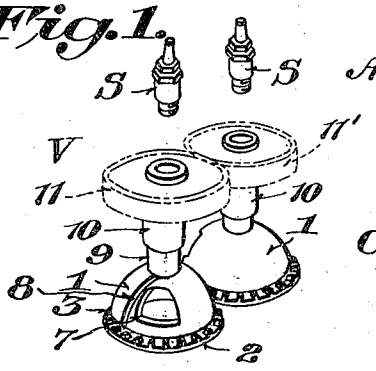


Fig. 4.

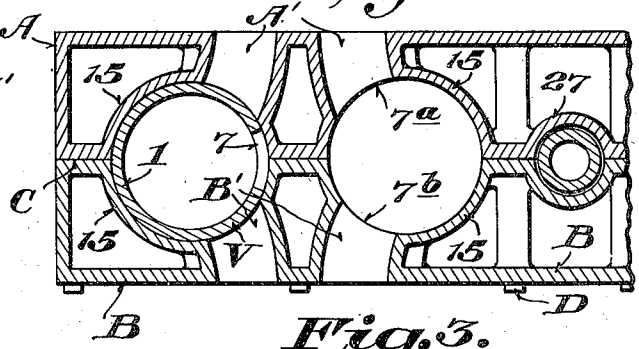


Fig. 2.

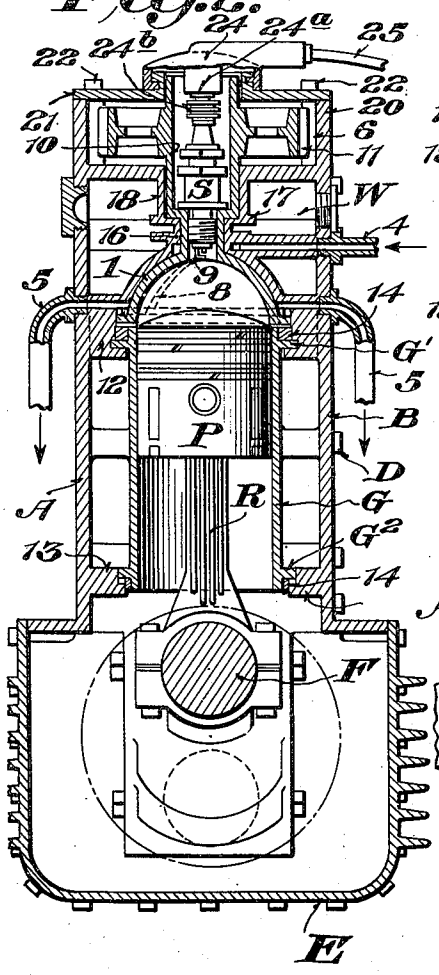
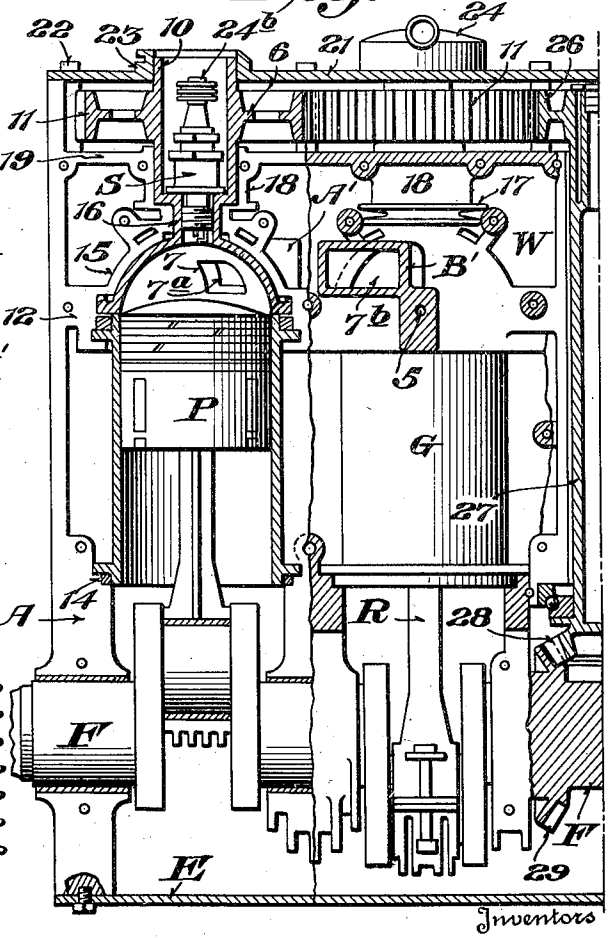


Fig. 3.



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ROTARY VALVE FOR INTERNAL-COMBUSTION ENGINES

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1 Claim. (Cl. 123—190)

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This invention relates to internal combustion engines and more particularly to an improved rotary valve.

One of the objects of the invention is to provide a rotary valve so formed as to support a standard type spark plug and also carry its operating gear which constitutes a unit of the timing gear train, while, at the same time, the valve assembly is so constructed that it may be readily clamped in operating position between the complemental halves or sections of a longitudinally divided motor block. In that connection, the invention also contemplates special features of the block which cooperate with the valve mounting to radiate or dissipate the heat from the spark plug, thereby to keep it relatively cool even though it is completely housed and concealed within the engine block.

A further object of the invention is to provide a rotary valve which may readily and easily be fitted into the complemental formations on the interior of the block so that when the two sections are assembled, the valve is automatically held in operating position with reference to the cylinder.

With the above and other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts, hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings in which:

Figure 1 is a detail perspective view of a pair of valves and their respective spark plugs, according to the present invention.

Figure 2 is a vertical transverse sectional view taken at the location of one of the cylinders and showing the rotary valve of the invention in operating position.

Figure 3 is a partial longitudinal sectional view of a motor embodying the present improvements.

Figure 4 is a partial horizontal section, illustrating the longitudinally divided motor block, having one of the valves positioned therein and shown in horizontal section.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

As previously indicated, the present improvements center about a novel rotary valve and the manner in which it is held in position by the opposite sections of a longitudinally divided motor block.

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Referring first to Figure 1, the rotary valve designated generally as "V," essentially includes a dome-shaped body 1 provided at its lower edge with an offset flange 2 having spaced teeth 3 cut in the upper corner thereof and which serve to centrifugally pump lubricant collecting from the dome through the pipes 4 and 5. The said dome-shaped body is also provided with a port 7 which alternately serves intake and exhaust functions, and the outer face of the dome 1 is provided with a channel 8 through which the oil is evenly distributed on the surface of the dome and whereby the overflow of the said oil through the port 7 into the combustion chamber is avoided. The crown of the dome is formed with a spark plug supporting and bearing neck 9 which is interiorly threaded to receive the usual threaded shank of a conventional spark plug S.

It is obvious that although the body of the valve has been shown and is described and claimed as dome-shaped, the said body may be conical, cylindrical, partially spherical or of any other suitable shape within the scope of the invention and the meaning of the claims.

At its upper end, the said neck 9 is joined by a horizontal web portion with a tubular head 10. This head is of a larger diameter than the neck and performs the dual function of receiving and housing the body of the spark plug and carrying an operating gear 11 which constitutes a part of a timing gear train operated from the crank shaft of the motor.

Referring to Figure 4, it will be observed that the motor block consists of the complemental casings or sections A and B which meet on the longitudinal center line C and are held in assembled relation by suitable bolts or equivalent fastenings D. The sections A and B of the motor block are mounted upon a suitable crank case E which houses the crank shaft F journaled therein in a plane which is co-axial to the cylinders.

The interior of the mating sections A and B of the motor block are hollow and are formed with suitable skeleton frame parts for supporting the cylinders G and also providing a cooling circulating jacket W thereabout. That is to say, the cylinders G are provided near their top and bottom ends with offset flanges G' and G^2, which are respectively fitted in complemental grooves formed in the inwardly projecting frame parts 12—12 and 13—13, suitable packing 14 being provided to render the mounting of the ends of the cylinder both gas-tight and water-tight.

The grooves in the parts 12—12 have their bottom walls stepped to not only fit against the

flange G' of the cylinder and its packing 14, but also abut the outer edge of the flange 2 of the body of the valve with sufficient clearance to permit valve operation.

The cylinder G is intended to receive a piston P of conventional design which is connected with the crank shaft F by connecting rod R.

The inwardly projecting parts 12—12 located substantially at the upper end of the cylinder G are formed with complemental wall portions 15—15 conforming to the profile of the body 1 of the valve and which terminate at their upper end in complemental reduced bearing portions 16—16 whose inner mating faces together form a journal for the neck 9 of the valve V.

The wall portions 15—15 are also provided with suitable intake and exhaust ports 7a and 7b which communicate with conduits A' and B' in their respective block sections.

The reduced bearing portions 16—16 are provided externally with one or more fins 17 which extend into the refrigerating means circulating space of the motor block for the purpose of conducting heat away from the bearing portions 16—16 and neck 9 and transferring it to the circulating cooling medium.

Adjacent the complemental valve bearing portions 16—16, the interior of the motor block is provided with the vertically elongated complemental segments 18—18 which together form a socket for receiving the lower end of the hollow head 10 of the valve unit. At the upper end of the segments 18—18, the motor block sections A and B are provided with a horizontal top wall portion 19 whose inner faces define the top of the cooling space while the outer or upper face defines the bottom of the gear chamber 6. The side walls of the block extend upwardly from the top wall 19 as at 20 thereby to complete the compartment 6 and said side walls are topped by a cover 21 suitably held in place by the bolts 22 or their equivalent.

The cover 21 is provided with a plurality of centrally alined openings, receiving the upper ends of the tubular valve heads 10. As will be seen from Figures 2 and 3, insulated caps 24, having an inner central terminal 24a for conductively engaging the metal center post 24b of the spark plug, are fitted on tubular extensions 23 formed around the above said alined openings, the said terminal being connected with the usual distributor of the ignition system by the lead or conductor wire 25.

As will be apparent from Figures 1, 2 and 3, of the drawings, the valves V are intended for use in connection with internal combustion engines having a single or a plurality of cylinders. For the purpose of simplifying illustration, only two cylinder units of a four-cylinder engine have been shown. On the other hand, it will, of course, be understood that the present improvements may be applied to other multiple cylinder engines whether the cylinders are in alignment or whether the motor blocks are of the H, V, W or "radial" types.

In the arrangement shown, it will be seen that the gears 11 of adjacent cylinders are in meshing relation and are disposed or housed within the chamber 6 at the top of the engine block. Figure 3 of the drawings illustrates the gear 11 for the second valve of the series as being in mesh with a pinion 26 carried by a vertical shaft 27 which is provided at its lower end with a bevel gear 28 meshing with another bevel gear 29 on the crank shaft F. It will, therefore, be apparent that the valve operating gears 11 may be driven directly by the crank shaft of the motor, and it will be further understood that the gear 26 may be utilized for operating other valve gears not shown, but constituting a part of the motor.

The oil, which enters through pipe 4, flows down between the outer surface of the valve dome 1 and the inner sides of wall portions 15—15 and tends to collect in the zone of the flange 2, the teeth 3, formed at the upper corner thereof, forcing said oil through the pipe 5 into the crank case, wherefrom, and through the usual pump system, it is made to re-establish circulation to the above said pipe 4.

From the foregoing description, it will be seen that the novel pre-formed valve unit V and the complemental inner formations of the block sections A and B cooperate when the said block sections are bolted together to secure the valve V in operating position so that its port 7 may be synchronized with the ports 7a and 7b and the passages A' and B' respectively formed in the sections A and B. When the valve V is thus assembled between the sections of the motor block and is fitted with a gear 11 which in turn meshes with an adjacent similar gear, rotary motion will be imparted to the valve through the medium of the pinion 26, shaft 27 and gears 28 and 29.

The valve V is not only provided with a combined bearing neck 9 which is internally threaded to receive a standard spark plug but is also provided with a tubular head 10 which completely houses and conceals the spark plug S and supports or is integral with the operating gear 11 for the valve. The arrangement described completely journales the valve in rotatable position at the top of the cylinder G and thus completes the top of the cylinder and at the same time provides a port which serves alternatively to receive and exhaust fuel and the products of combustion.

From the foregoing, it will be apparent that the present construction provides numerous advantages. For example, the valve is adequately supported in the motor block and the novel manner of mounting the spark plug in the valve makes it possible to obtain better cooling of the standard spark plug since the interior of the motor block may be provided with heat radiating flanges projecting into the cooling system. Also the flange 2 of the valve having the notches 3 acts as an oil pump to prevent flooding of the cylinder with oil. In addition, the particular shape of the valve makes it possible to mount the same in the block so that the valve can readily support and carry the timing gear.

We claim:

A rotary valve for internal combustion engines, comprising a dome-shaped body having a lateral port and an offset flange whose bottom face lies contiguous to the upper edge of an engine cylinder, said flange having teeth in its upper surface adapted to assist in the circulation of a lubricant pumped to the valve body when the same is rotated, a tubular neck at the crown of the dome-shaped body and having internal threads, a tubular head of larger diameter than the neck and connected therewith by a horizontal web and providing a spark plug housing, and operating means adapted to rotate said valve body with a spark plug threadedly mounted in the tubular neck of the valve body.

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(References on following page)

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
605,405	Davis	June 7, 1898
962,254	Rockwell	June 21, 1910
1,057,741	Keen	Apr. 1, 1913
1,061,653	Alyea	May 13, 1913
1,111,948	Clough	Sept. 29, 1914
1,402,695	Wall	Jan. 3, 1922
1,479,466	Guy et al.	Jan. 1, 1924
1,597,706	Aldous	Aug. 31, 1926
1,866,119	Manrodt	July 5, 1932
2,154,782	Snyder	Apr. 18, 1939
2,283,594	Aspin	May 19, 1942
2,331,801	Rodgers	Oct. 12, 1943
2,397,434	Ricart	Mar. 26, 1946