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ROTARY VALVE MECHANISM FOR INTERNAL COMBUSTION ENGINES

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2 Sheets-Sheet 1

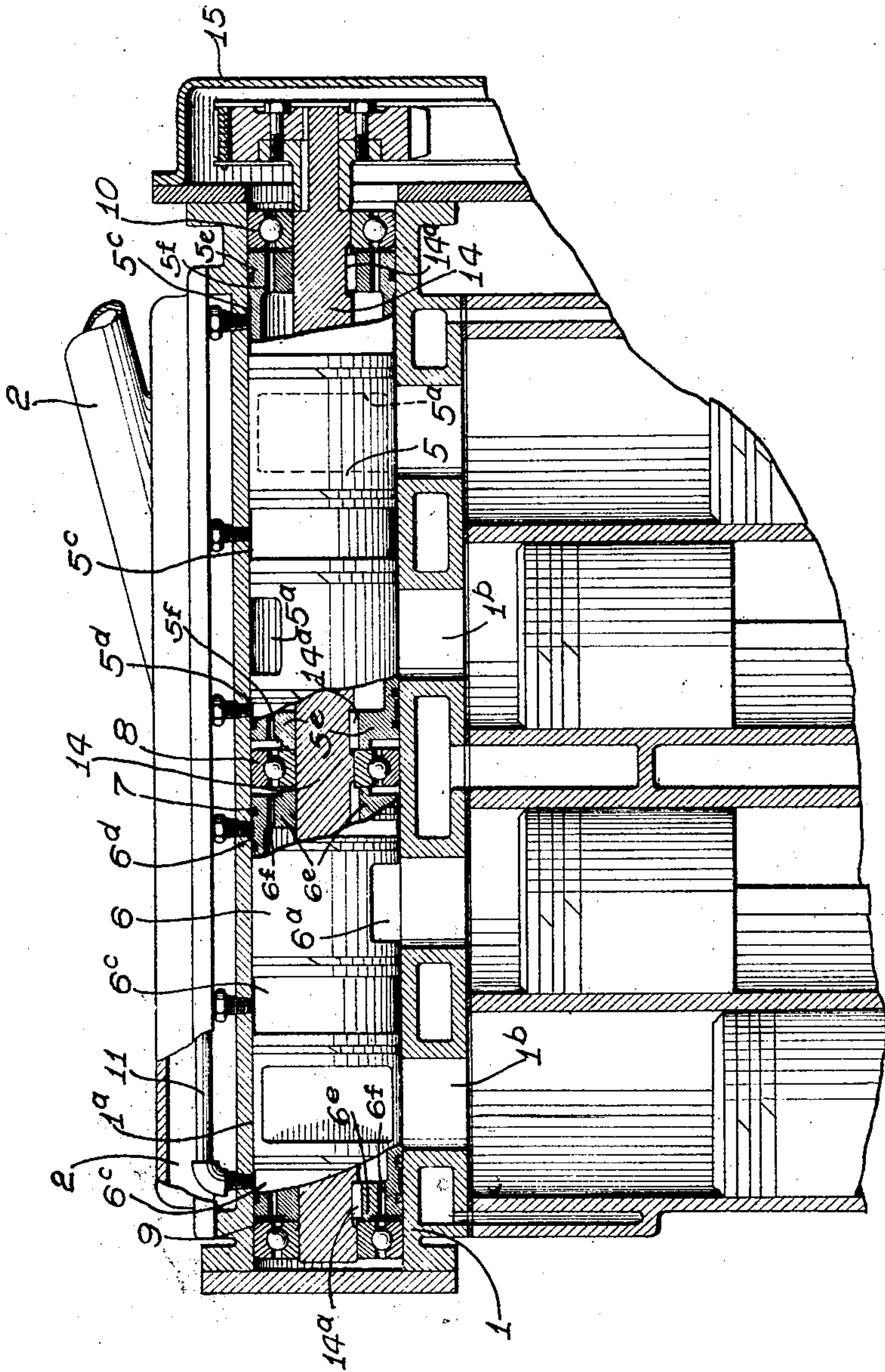


FIG. 1

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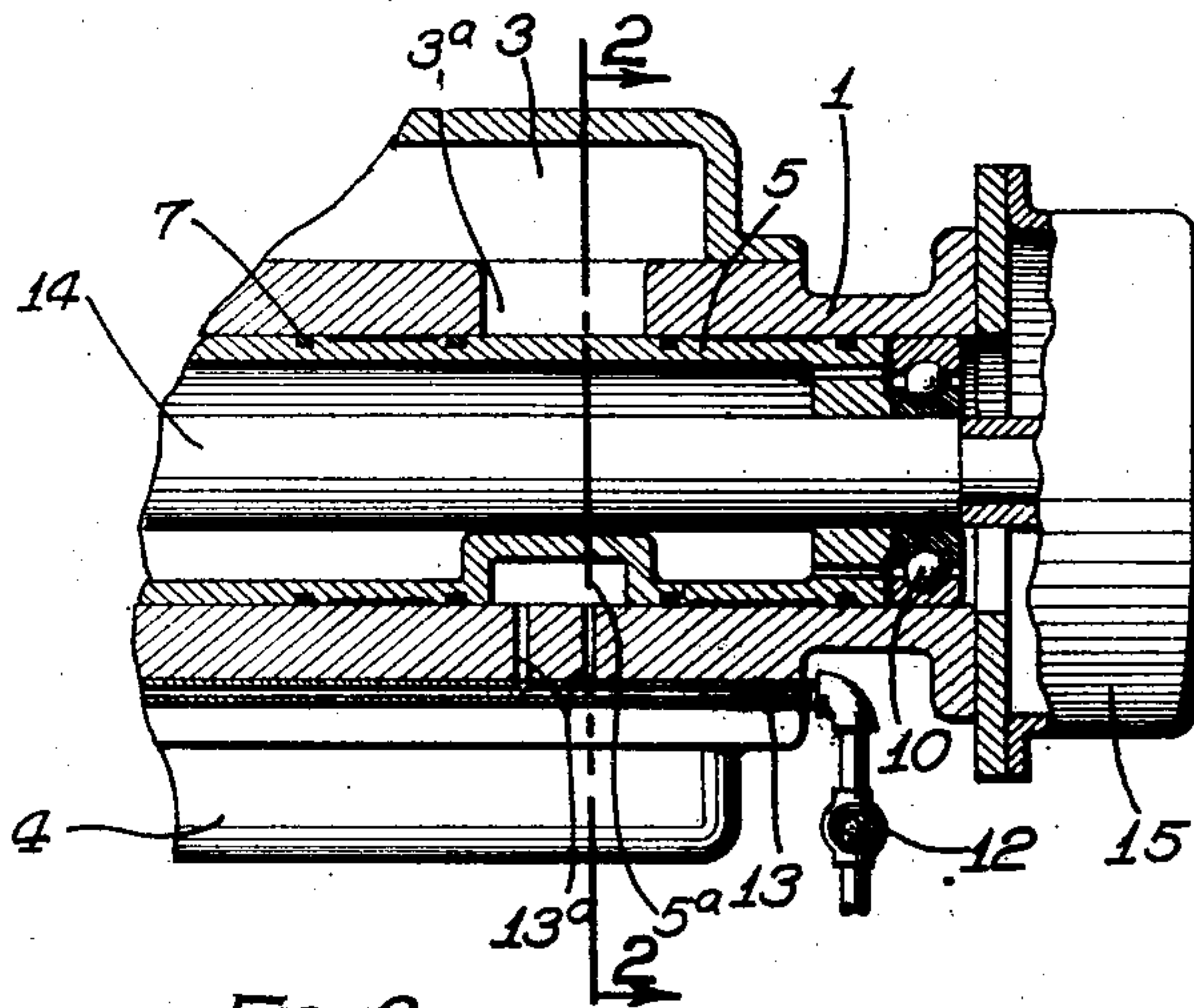
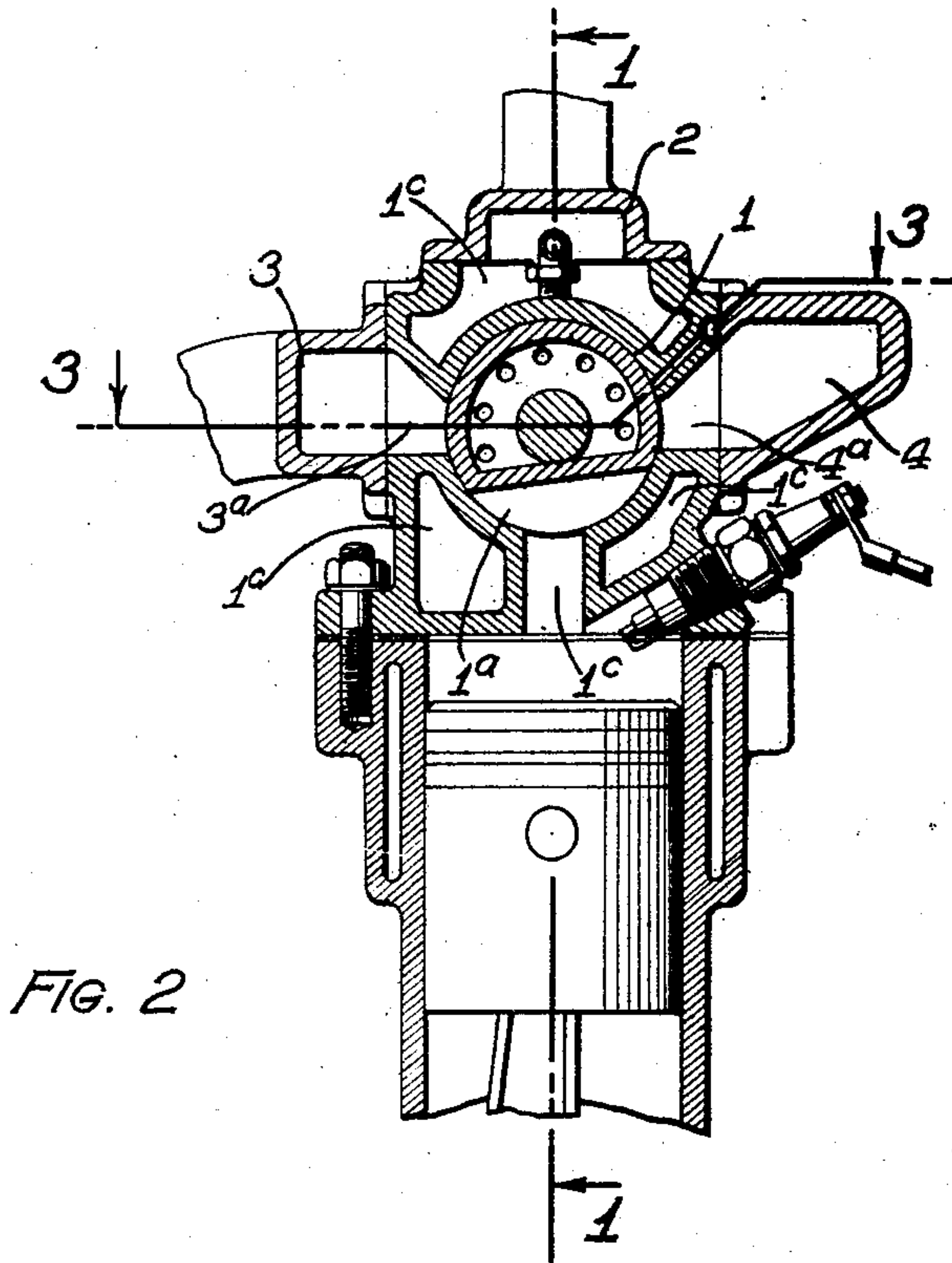
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2 Sheets-Sheet 2



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ROTARY VALVE MECHANISM FOR INTERNAL-COMBUSTION ENGINES

Application filed October 26, 1926. Serial No. 144,232.

My invention relates to rotary valve mechanism for internal combustion engines, and the objects of my invention are: first, to provide an improved rotary valve mechanism over my valve mechanism disclosed in my Patent No. 1,650,362, Nov. 22, 1927, for rotary valve type, internal combustion engine; second, to provide a rotary valve mechanism in which the rotor member is supported intermediate its ends to prevent its being warped or distorted by reason of the pressure exerted by the exploding gases; third, to provide a rotary valve mechanism of this class with novel means of supporting the rotor relative to the casing so that the rotor cannot touch the casing; fourth, to provide novel and efficient means of providing an oil seal between the rotary valve and the casing; fifth, to provide a novelly constructed rotary valve for gas engines; sixth, to provide novel bearing and supporting means for rotary valves for gas engines, and seventh, to provide a rotary valve mechanism of this class which is very simple and economical of construction and installation, durable, efficient in its action, and which will not readily deteriorate or get out of order.

With these and other objects in view, as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangements of parts and portions, as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon, which form a part of this application, in which:

Figure 1 is a longitudinal sectional view of the fragmentary upper portion of a four-cylinder gas engine, showing my valve mechanism in connection therewith and showing some of the parts and portions in elevation to facilitate the illustration; Fig. 2 is a transverse sectional view through 2—2 of Fig. 3, showing some of the parts and portions in elevation to facilitate the illustration, and Fig. 3 is a fragmentary sectional view through 3—3 of Fig. 2, showing some of the parts and portions in elevation to facilitate the illustration.

Like characters of reference refer to similar parts and portions throughout the several views of the drawings.

The casing 1, water jacket manifold 2, intake manifold 3, exhaust manifold 4, rotor members 5 and 6, packing rings 7, bearings 8, 9 and 10, oil conductor 11, oil conductor 12, oil conductor 13, and shaft 14, constitute the principal parts and portions of my rotary valve mechanism for gas engines.

The casing 1 is a hollow casing member provided with a bore 1^a adapted for the rotary valve members 5 and 6 to fit therein, the rotary valve members 5 and 6 being approximately 3/1000 of an inch less in diameter than the interior bore of the casing 1, and the space between the two is filled with a film of oil, as will be hereinafter described. This casing 1 is provided with oppositely disposed ports 3^a and 4^a, the ports 3^a being the intake ports and the ports 4^a the exhaust ports. It is also provided with ports 1^b which communicate with the combustion chamber of the engine cylinder. It is provided with water jacket channels 1^c for permitting the passage of water through the valve casing. Communicating with this water jacket channel 1^c is the water intake manifold 2, which connects with the radiator. Secured to the sides of the casings over the ports 3^a is an intake manifold 3, which communicates with the carbureter in the conventional manner, not shown, and on the opposite side of the casing, secured over the ports 4^a, is the exhaust manifold 4, which also extends in the conventional manner, not shown.

Secured at the one end of the casing 1 is another casing member 15 in which the gear and operating mechanism are encased. This casing and the gear operating mechanism are the same as in my former application, as hereinbefore set forth. Revolvably mounted in this casing 1 is a pair of revoluble valve members 5 and 6, which are secured on a shaft 14 which extends the full length of the casing, and the one end extends outwardly and connects with the gearing for operating the valve. This shaft 14, it will be noted, is provided with two end ballbearings 9 and 10 and with a central ballbearing

8, thus supporting the shaft 14 at its middle portion, as well as at the ends, to prevent warping under pressure. Secured to this shaft 14 are the valve members 5 and 6 by means of keys 14^a. The keys extend into the hub portions 5^e and 6^e of the valves 5 and 6, said hub portions being bored to receive the shaft 14. The ball bearings 8, 9, and 10 support the shaft in concentric relation with the bore 1^a. Openings 5^f and 6^f extend axially through the hub portions 5^e and 6^e for permitting passage of lubricant through the ball bearings into the interior of the valves 5 and 6. These valve members 5 and 6 are each provided with valve ports 5^a and 6^a at right angles to each other in the sides which communicate with the ports 4^a, 4^b and 1^b in properly timed relation. Interposed between the ports 4^a and 6^a and on opposite sides of said ports in the members 5 and 6 are packing rings 7, which serve to provide tight joints between the ports in said revoluble members. Between these rings in this revoluble member in the space between the ports are provided annular channels 5^c and 5^d and 6^c and 6^d, which serve as oil channels for supplying an oil seal between the various ports in the revoluble members 5 and 6 and also furnishing an oil film for the revoluble members 5 and 6 in the casings so that there is a minimum of gas leakage between the revoluble members and the interior wall of the casing. These channels 5^c and 5^d and 6^c and 6^d are supplied by means of the oil conductor 11 with extended nozzle portions which extend to these channels through the casing wall.

In the casing 1 on the exhaust manifold side is a conductor 13, which is mounted in a recess conforming thereto in the wall of the casing, and extending from this conductor 13 is a plurality of branches 13^a, which extend to the interior of the casing in a position in line with the ports 1^a for providing a small quantity of oil to these revoluble members 5 and 6 at the recessed or ported portions to prevent gas leakage. It will be noted that the conductor 13 is mounted in the wall of the casing 1 in such a manner that the exhaust manifold rests against one side of the same, forming a tight packing and providing means for readily uncovering said conductor as desired. The other conductor 11 is mounted in the water intake manifold and is therefore easily accessible by removing the water intake manifold.

It will be noted that the operating gears, gear casing and ends of the casing are the same as in my former application, as hereinbefore set forth.

Though I have shown and described a particular construction, combination and arrangement of parts and portions, I do not wish to be limited to this particular con-

struction, combination and arrangement, but desire to include in the scope of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a revoluble valve for gas engines, a casing provided with a plurality of spaced inlet and exhaust ports and with ports connecting with the separate engine cylinders, a shaft revolubly mounted in said casing extending from end to end thereof, ball bearing supports in said casing engaging said shaft at each of its ends, another ball bearing support in said casing at the middle portion thereof engaging the middle portion of said shaft, a pair of ported valve members secured on said shaft and positioned between the middle bearing and end bearing on each end of said shaft, spaced apart packing rings positioned in each of said ported valve members between the separate ports therein, spaced sufficiently to provide a supporting film of oil between said ported valve member and the casing for supporting said ported valve member in spaced relation with the casing and means for conducting oil to said spaces.

2. In a revoluble valve for gas engines, a casing provided with a plurality of spaced inlet and exhaust ports and with ports connecting with the separate engine cylinders, a shaft revolubly mounted in said casing extending from end to end thereof, ball bearing supports in said casing engaging said shaft in each end and intermediate its ends and a plurality of ported valve members secured to said shaft between the end and intermediate bearings each provided with a plurality of ports for engagement with separate engine cylinders and separate intake and exhaust ports, said ported valve members being slightly smaller than the interior of said casing, packing rings in spaced relation between the separate engine cylinder ports forming channels for oil film for supporting said ported valve members relative to said casing and means for conducting oil under pressure to said spaces.

3. In a revoluble valve for gas engines, a casing, ball bearings positioned at each end of said casing and intermediate its ends, a shaft extending longitudinally through said casing and supported at its ends and intermediate its ends by engagement with said ball bearings, a plurality of ported valve members slightly smaller than the interior of said casing secured on said shaft and revoluble in said casing and a plurality of packing members in spaced relation on said ported valve members and in close proximity to the ports therein thereby providing a large space between the separate cylinder ports in said

ported valve members and means for conducting oil under pressure to the spaces between said packing members.

5 4. In a revoluble valve for gas engines, a casing, ball bearings positioned at each end of said casing and intermediate its ends, a shaft extending longitudinally through said casing and supported at its ends and intermediate its ends by engagement with said
10 ball bearings, a plurality of ported valve members slightly smaller than the interior of said casing secured on said shaft and revoluble in said casing, a plurality of packing members in spaced relation on said port-
15 ed valve members and in close proximity to the ports therein, relatively wide, shallow annular channels in said ported valve member between said packing members between the separate cylinder ports in said ported
20 valve members, means for conducting oil under pressure to said annular channels and inlet and exhaust manifolds mounted on the sides of said casing communicating with the ports therein.

25 In testimony whereof, I have hereunto set my hand at San Diego, California, this 16th day of October, 1926.

EDWARD W. JEWELL.

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