Jan. 27, 1931. C. R. WRIGHT 1,790,256

INTERNAL COMBUSTION ENGINE

Filed Nov. 28, 1927 2 Sheets-Sheet 1

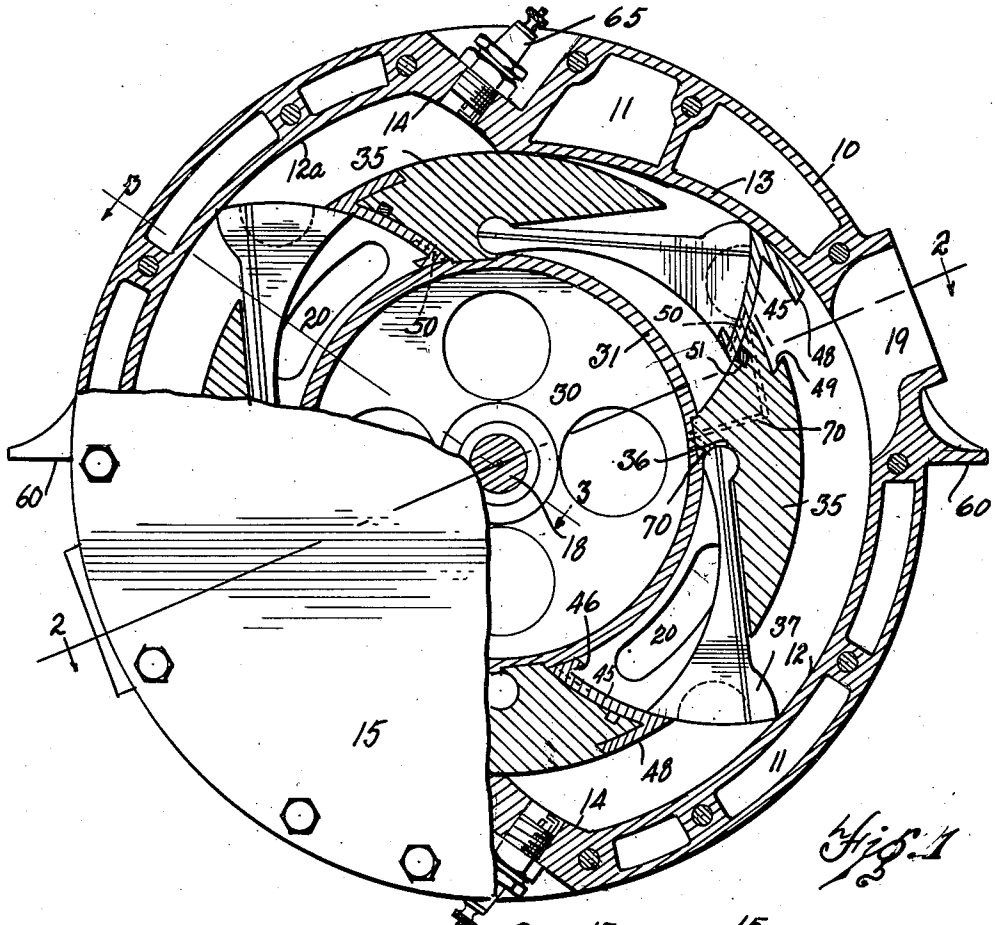

Fig. 1

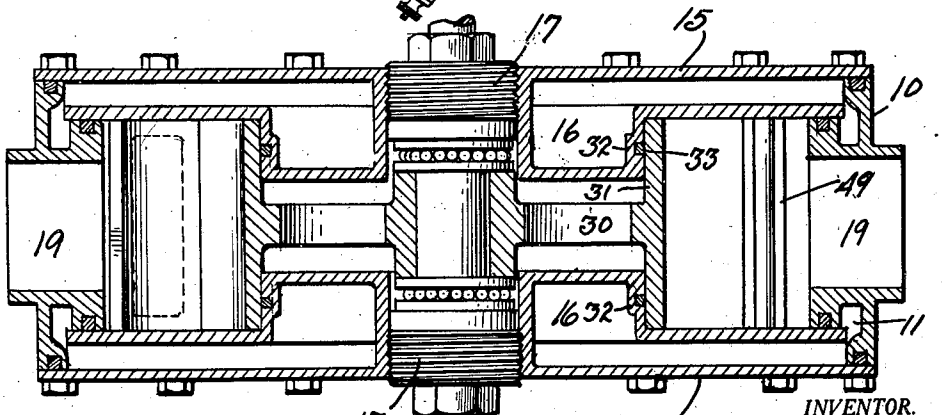

Fig. 2

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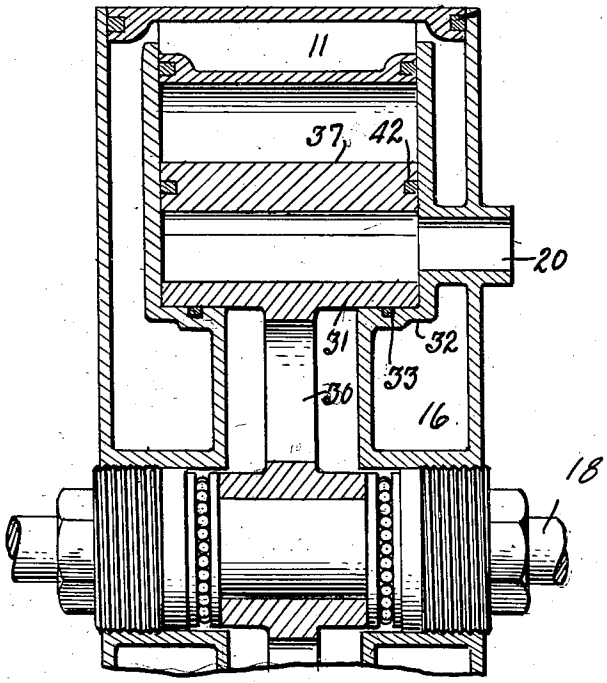

Fig. 3

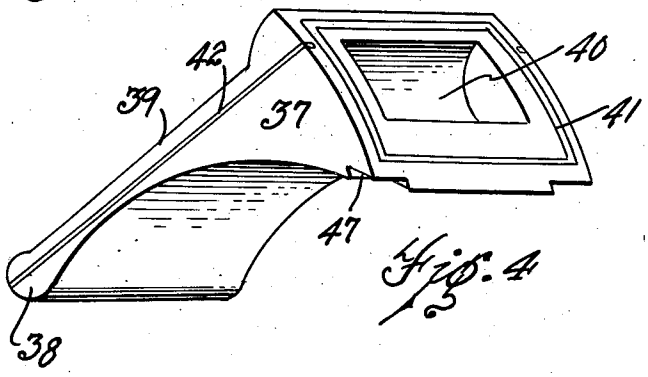

Fig. 4

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UNITED STATES PATENT OFFICE

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INTERNAL-COMBUSTION ENGINE

Application filed November 28, 1927. Serial No. 236,162.

Among the objects of this invention is an internal combustion engine of the rotary type.

Another object of the invention is an internal combustion engine of the type mentioned in which the propelling force is applied directly to produce rotary motion.

A further object of the invention is an internal combustion engine having an annular casing with a rotor therein carrying compressing means which also serves as the movable wall of the combustion chamber upon which the energy is impressed.

Still other objects will readily occur to those skilled in the art upon reference to the following description and accompanying drawings in which:—

Fig. 1 is a side elevation of the engine with parts in section;

Fig. 2 is a section on line 2—2 of Figure 1;

Fig. 3 is a section on line 3—3 of Figure 1;

Fig. 4 is an enlarged view of one of the swinging vanes.

As shown in the drawings, a preferred embodiment of the invention comprises an annular casing 10 whose outer wall is substantially circular and whose inner wall is spaced therefrom to provide a cooling water passage 11. The inner wall is of somewhat less width than the outer wall and its peripheral contour is divided into four portions 12, 12*a*, and 13, three of these being shown in Figure 1. Portions 12 and 12*a* are concentric with the outer casing and portions 13 are formed as elliptical arcs located between the portions 12 and 12*a*. At one end the portions 13 merge into the adjacent concentric surface while at the other end is produced a step 14 whose face is curved on a large radius for reasons made clear later.

The open sides of the annulus 10 are closed by a pair of double walled cover plates 15 of which the outer walls are substantially smooth while the inner walls, spaced to form a water passage 16, are stepped as shown in Figure 2 and provided with central openings in which are secured the bearings 17 for the rotor shaft 18. The stepped inner walls of plates 15 provide for an annular rotor chamber, of rectangular cross section communicating with a thinner central portion.

In addition to the features mentioned the annulus or casing 10 is provided with two exhaust ports 19 located diametrically opposite each other at the ends of the elliptical arcs 13 which merge into concentric portions 12 and 12*a*. And the plates 15 are provided with two intake openings 20 entering the rectangular rotor chamber near its inner side. These openings 20 are also diametrically opposite each other and about 135 degrees ahead of the exhaust openings 19.

Suitable manifolding will of course be provided for the intake and exhaust.

The rotor of the engine consists of a central spider member 30 keyed to shaft 18 and shaped in the form of a pulley whose rim 31 surrounds rather closely the stepped central portion 32 of the plates 15 packing rings 33 being provided to produce an oil and gas-tight joint.

Secured to the periphery of rim 31 are a plurality of blocks 35, in the present case four of the blocks are used. These blocks are of such shape that their outer contour when in place is circular and concentric with the shaft 18. The forward faces of the blocks are curved under and their rearward faces tangential to the rim 31 with a bearing 36 formed therein at the base. Mounted in these bearings are wings 37, one of which is shown in Figure 4.

As shown in Figure 4, the wing 37 is roughly triangular as viewed from the side with a cylindrical bearing member 38 formed at one of its apices. One of its sides 39 is substantially flat and the other side adjacent bearing 38 is curved inwardly so that it may lie close to the rim 31. The side opposite bearing 38 is also curved and is cut out to form a pocket or chamber 40, around which is a groove 41 for the reception of a suitable packing. There will also be provided a groove 42 along each edge of the block or swinging vane for packing. These swinging vanes are adapted to swing on bearing 38 between the tangential face of block 35 and the rim 31 and to fit snugly at the opposite end from the bearing against a Z-shaped valve piece (to be described) which in turn fits closely against the for-

ward inwardly curved surface of the following block 35.

The Z-valve is shown at 45 and comprises a plate curved to correspond to the curves of the end of wing 37 and the forward face of block 35 between which it lies. At its inner edge the plate is provided with a short forwardly projecting flange 46 curved to correspond with the curvature of rim 31 and swinging vane 37 may be cut away as at 47 to provide for such flange. At its outer edge the valve plate is provided with a rearwardly extending flange 48, curved to correspond to the outer surface of block 35 whose forward end may be cut away as at 49 to provide a recess in which said flange lies when down. Further the valve plate is provided with a short passage 50 in its forward face leading from its lower edge to such a point as will be opposite chamber 40 when the valve and swinging vane are in registry. Also, in order to provide a tight joint between valve 45 and block 35 a packing strip 51 is preferably set in the forward face of the block.

In the operation of the engine, it is of course understood that the casing 10 will be supported in suitable manner as upon lugs 60 in a suitable frame, and that a suitable fuel-air mixture will be supplied to the intake ports 20.

Rotation of the rotor 30 causes the swinging vanes 37 to move out against the walls 12 when they pass one of the steps 14. Such outward movement draws into the space between the wing 37 and rim 31 a charge of fuel-air mixture. Further movement of the rotor over the wall 13 causes its inward movement and the corresponding compression of the mixture. In the meantime, due to centrifugal action, the valve 45 will have moved outward likewise, so that, as the mixture is compressed, it passes into chamber 40. Compression is completed when the swinging vane 37 is ready to pass off step 14. As the movement is continued the swinging vane 37 moves off step 14 to its outer position without substantial loss of compression, opening chamber 40 to the face of the step in which is set a spark plug 65 by means of which the mixture is fired. The combustion pressure acting against swinging vane 37 produces rotation of the rotor and the high pressure acting on the flange 48 of the valve 45, delays the outward movement of the valve until about the position shown in Figure 1, at the lower right or upper left of the figure. At about the time the rotor opens the intake, the valve 45 moves out and is in position for passing a new charge into chamber 40.

The expansion of the gases is allowed to continue for a little over 90 degrees or throughout the quadrants 12 and 12*a* and exhaust occurs as compression begins at the beginning of a quadrant 13. Each swinging vane 37 in its power movement serves to push out the expanded gases ahead of it.

Lubrication of the several parts is accomplished by providing a quantity of oil in chamber within the central portion of the casing within rim 31 and through small oil passages 70, centrifugal force will cause it to pass to bearings 36 and to the rear faces of valves 45. From these points sufficient distribution to the other contacting faces will take place.

Now having described the invention and the preferred form of embodiment thereof, it is to be understood that the said invention is to be limited, not to the specific details herein set forth but only by the scope of the claim which follows.

I claim:

In an internal combustion motor having a stator enclosing a rotor having movable swinging vanes thereon with combustion chambers in their free ends, valve members adapted to contact with the free ends of said swinging vanes and walls fixed to said rotor to thereby cover said chambers and means on said valves to delay movement of said valves after the movement of the swinging vanes in one direction and means to cause movement of the valves with the swinging vanes in the other direction.

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