

March 16, 1926.

1,577,141

H. D. MORRISON ET AL

ROTARY INTERNAL COMBUSTION ENGINE

Filed Dec. 6, 1920

3 Sheets-Sheet 1

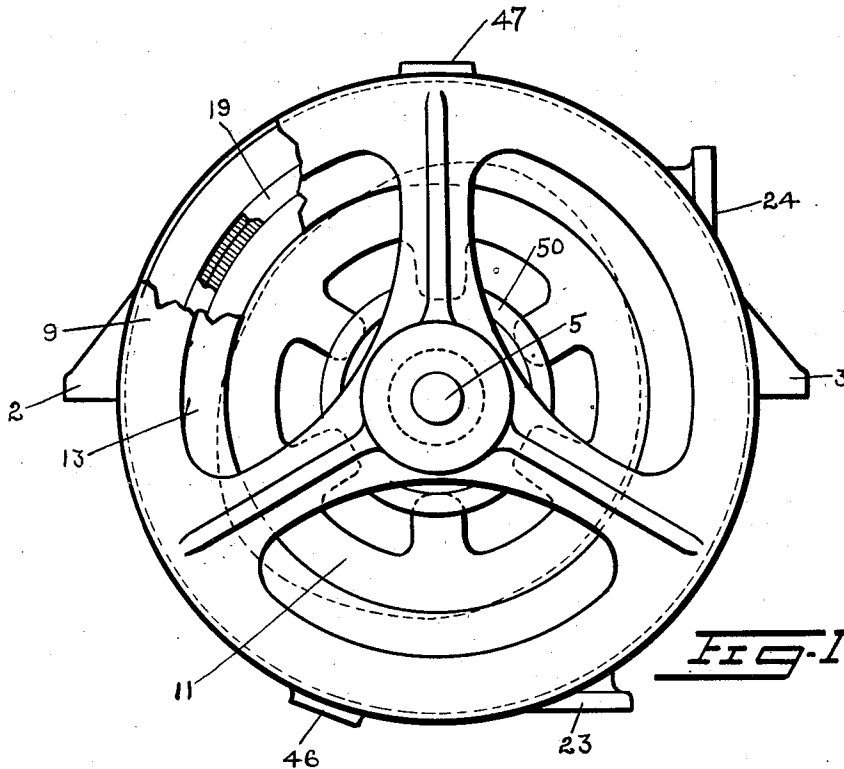


FIG. 1

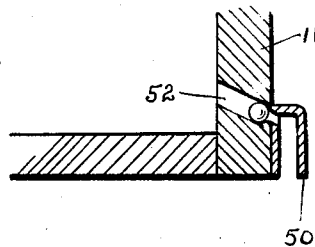


FIG. 7

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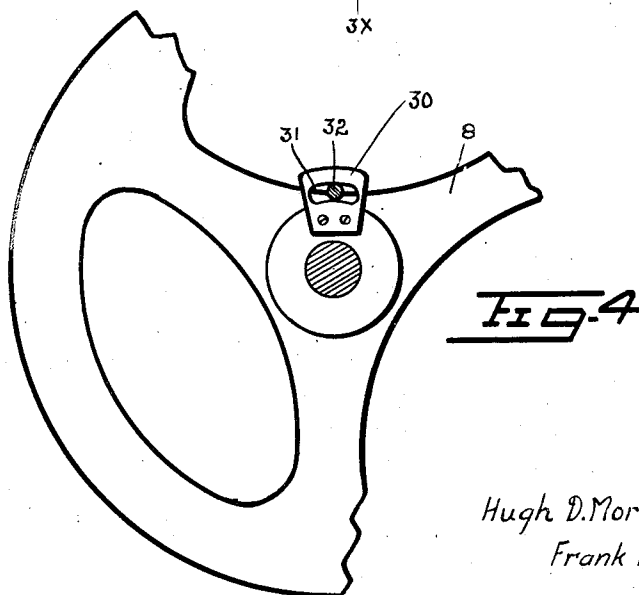
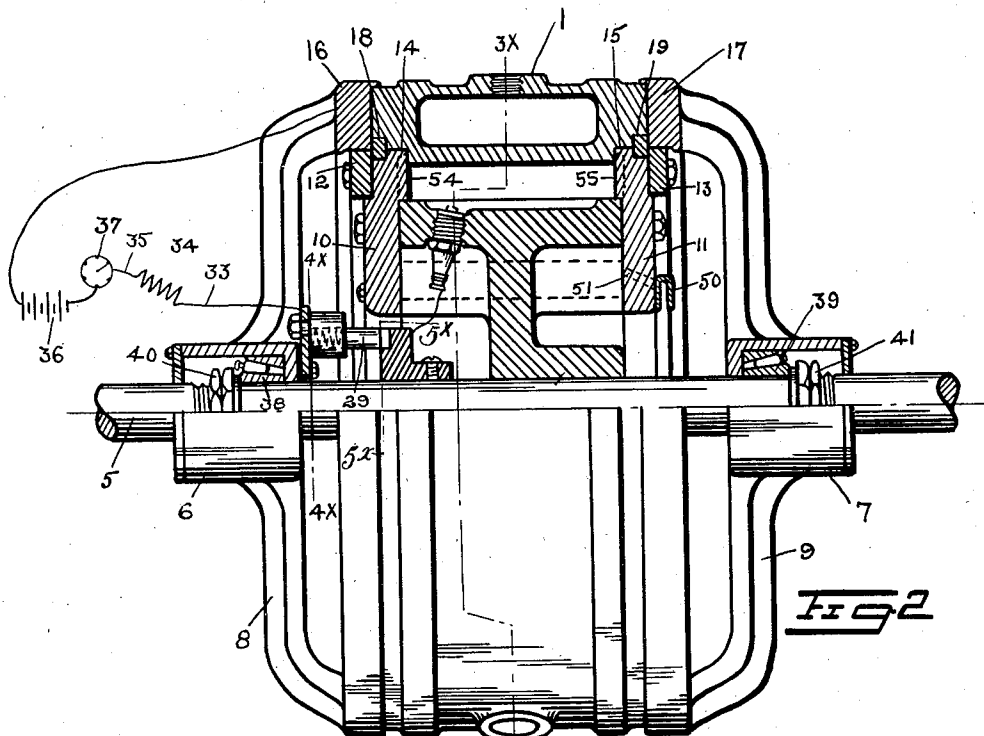
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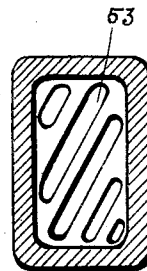
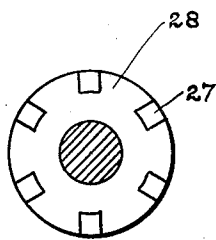
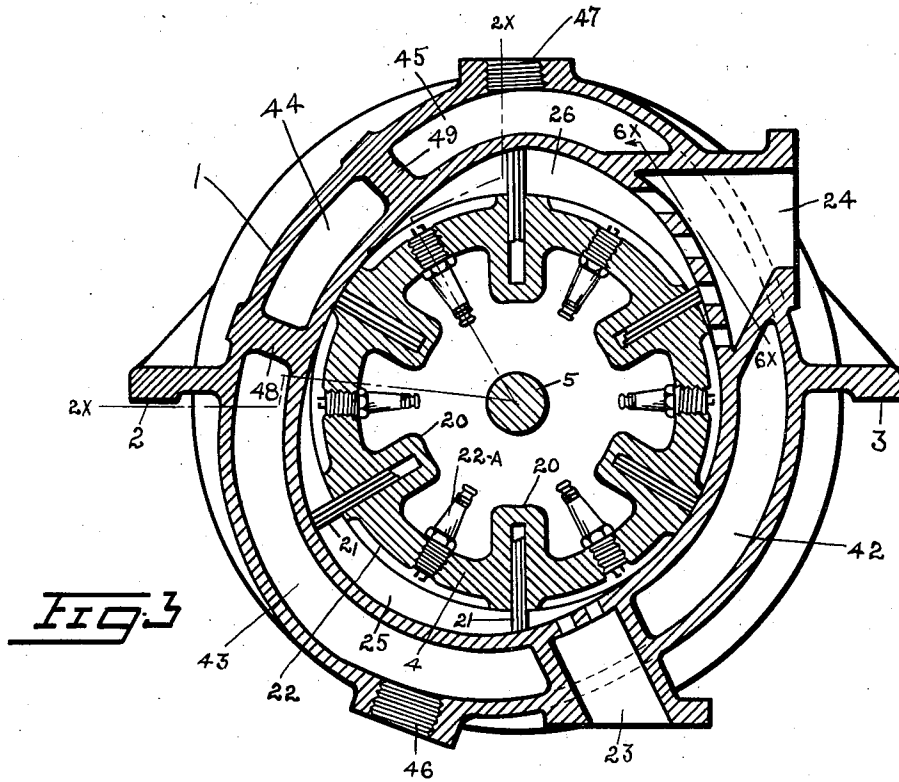
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

HUGH D. MORRISON AND FRANK B. WEBB, OF ROCHESTER, NEW YORK.

ROTARY INTERNAL-COMBUSTION ENGINE.

Application filed December 6, 1920. Serial No. 428,779.

To all whom it may concern:

Be it known that we, HUGH D. MORRISON and FRANK B. WEBB, citizens of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Rotary Internal-Combustion Engines, of which the following is a specification.

The object of this invention is to provide a new and improved form of rotary internal combustion engine.

This and other objects of this invention will be fully illustrated in the drawings, described in the specification and pointed out in the claim at the end thereof.

In the drawings,

Fig. 1 is a side elevation of the improved form of engine.

Fig. 2 is an end elevation of the invention, partly in section, the section being taken on the line 2^x—2^x of Fig. 3.

Fig. 3 is a vertical longitudinal section, the section being taken on the line 3^x—3^x of Fig. 2.

Fig. 4 is a fragmentary detail view of the spider on the left hand side of Fig. 2.

Fig. 5 is an end elevation of the distributor, the view being taken on the line 5^x—5^x of Fig. 2, the shaft being shown in section.

Fig. 6 is a section thru the exhaust port, the section being taken on the line 6^x—6^x of Fig. 3.

Fig. 7 is a detail view of the lubricating channel and a back pressure valve.

In the drawings, like reference numerals indicate like parts.

In the drawings, reference numeral 1 indicates the cylinder casing having the lugs 2 and 3 thereon, which rest on the bed or foundation that supports the engine. In this casing turns a rotor 4, which is carried on a shaft 5, which revolves in bearings 6 and 7, carried on the spiders 8 and 9, which are fastened by bolts or any other suitable manner to the ends of the cylinder. Fastened to the rotor are the end plates 10 and 11, which are circular in outline and make close contact with the concentric races 14 and 15 in the cylinder. Bolted to the margin of the end plates 10 and 11 are the rings 12 and 13, which rotate therewith and make close contact with the insides of the rings 16 and 17 of the spiders. Between the end plates 10 and 11 and the cylinder 1 are also provided floating packing rings 18 and 19,

which assist to keep the joint tight between the rotor and the parts that move therewith and the cylinder and spiders, which are stationary.

The rotor 4 is provided with a series of pockets 20, 20, which carry the pistons 21, 21. Each piston is made up of a series of three thin blades, the series of thin blades making better contact with the cylinder than would a single thick blade. Between the piston blades are located pockets, or by-passes, 22, which are concentric with the shaft 5, in which pockets are located the spark plugs 22^A. At the bottom of Fig. 3 is shown the intake port 23 and at the top of the figure is shown the exhaust port 24. The rotor 4 is cylindrical and is concentric with the races 14 and 15 of the cylinder, while the inside of the cylinder is eccentric, forming the pockets 25 and 26, the pocket 25 communicating with the intake port and the pocket 26 communicating with the exhaust port. As the rotor revolves, the piston blades 21 are held in contact with the inside of the cylinder by centrifugal force. As the piston blades 21 pass the intake port 23, a charge is drawn in which fills the space enclosed between the rotor 4, the piston blades 21 and the cylinder. As the piston blades move along the pocket 25, and past it, the charge is first compressed into the pocket 22 from which it is then allowed to expand into the pocket 26. After the rear blade has passed beyond the pocket 25, the charge can be fired and the increase in pressure will drive the forward piston blade forward, the charge expanding in the pocket 26 until the blade reaches the exhaust port 24, where the exhaust will take place.

To secure the explosion of the charge at the proper point, we provide the spark plugs 22^A, which are electrically connected to the contacts 27 on the distributor 28. This distributor 28 revolves with the rotor. With the ends of the contacts 27, a stationary brush 29 makes contacts, which brush is held on the segmental plate 30, supported on and insulated from the spider 8. In the segmental plate 30, a segmental slot 31 is provided, along which the brush 29 is adjusted by means of a bolt 32 so that the brush 29 can be advanced or retarded by the length of the segmental slot 31. The brush 29 is electrically connected by the conductor 33 to the secondary terminal of the spark coil 34. The primary side 35 of

the spark coil is connected to the battery 36 and timer 37, which timer may be located on the shaft 5 so as to rotate therewith. Thru this mechanism, the primary circuit of the induction coil is made and broken at the correct time to secure a spark in the spark plug for the purpose of igniting the charge.

In the bearings 6 and 7 are provided roller bearings having the cones 38 and 39. The male cones are clamped in place on the shaft by means of the nuts 40 and 41 so as to hold the male cones in correct position with reference to the female cones in the bearings, thereby in turn holding the rotor properly positioned with reference to the cylinder.

The cylinder 1 is cored as indicated at 42, 43, 44 and 45, all of which cores are connected together, the water entering the core at the inlet 46 and passing out at the outlet 47. At intervals in the cores are provided the bosses 48 and 49, which may be drilled and tapped to permit the introduction of priming or permit fuel injection.

The rotor and piston are lubricated as follows:

On the end plate 11 is bolted an U-shaped ring 50, which at intervals communicates by ducts 51 with the pockets which carry the piston blades. The oil is poured from time to time into this ring and centrifugal force carries it thru the ducts into the pockets and from there, it works its way out along the piston blades to the walls of the cylinder. To prevent the oil from being forced back thru the ducts by explosion, each duct may be closed by a back pressure valve, such as is shown at 52 in Fig. 7.

The intake and exhaust ports are provided by milling the cylinder with a series of diagonal slots in the ports, forming a grid. These slots are shown at 53 in Fig. 6. These slots are pitched diagonally to the path of travel of the piston and the grid will

support the pistons and hold them firmly in place while traveling over the openings, both during the intake and the exhaust.

The piston blades 21 are as wide as the rotor and the pockets that carry them, extend the full width of the rotor. The rims of the end plates 14 and 15 are provided with annular flanges 54 and 55, which extend inwardly therefrom. These flanges are slotted as indicated in Fig. 2 to receive the piston blades and form a guide and a seal therefor as they move in and out, keeping contact with the inside of the cylinder.

We claim:

In a rotary engine, the combination of a hollow casing, a flange provided at each end of said casing on the outside thereof, a channel formed between said flanges and said casing, a ring mounted in each of said channels and forming a second channel at each end of said casing, a rotor mounted to rotate within said hollow casing, a pair of parallel flanges provided at each end of said rotor, one of each of said flanges being adapted to engage into said second channels formed in said casing and the other of each of said pair of flanges on said rotor being adapted to make frictional contact with the outside of said ring carried at each end of said hollow casing, piston blades mounted to slide in said rotor, and shallow pockets formed in the periphery of said rotor between said piston blades, spark plugs projecting through said rotor into each of the pockets formed in the periphery thereof, the outline of the inside of said hollow casing being such as to compress and confine an explosive charge in said shallow pockets in the rotation of said rotor.

In testimony whereof we affix our signatures.

HUGH D. MORRISON.
FRANK B. WEBB.