Jan. 23, 1968 A. RODRIGUEZ HUERTA 3,364,906

ROTATING INTERNAL COMBUSTION ENGINE

Filed July 11, 1966

FIG. 1

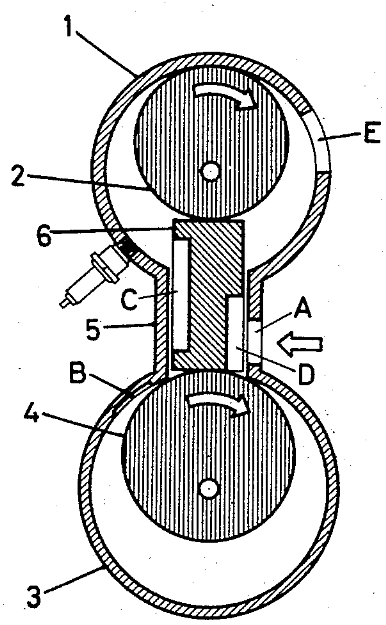


FIG. 2

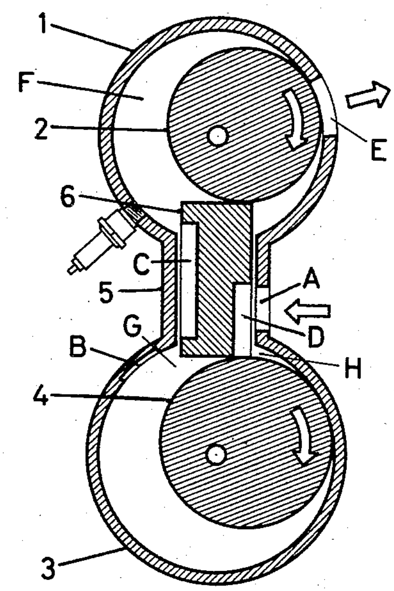


FIG. 3

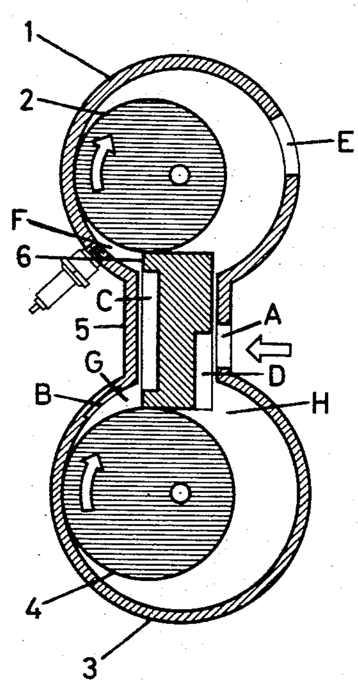
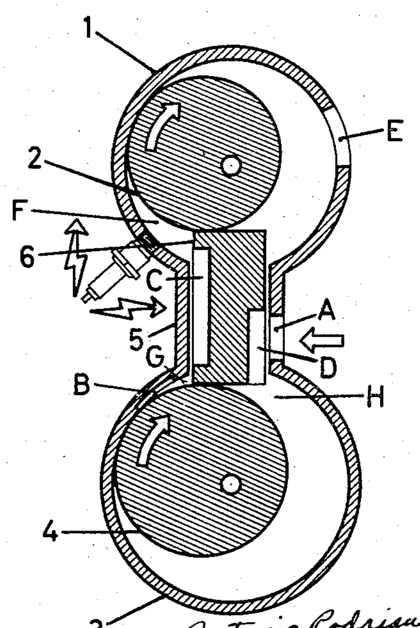


FIG. 4



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ROTATING INTERNAL COMBUSTION ENGINE

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This invention relates to a rotating internal combustion engine operating as a four-stroke cycle engine but with one explosion per rotation.

An object of the invention is to provide an internal combustion engine having three movable elements of which two have a rotative and circular motion while the other element has a reciprocating rectilinear motion.

A further object of the invention is to provide an internal combustion engine with a very high mechanical efficiency.

With the above and other objects in view which will become apparent from the detailed description below, one preferred construction of the invention is shown in the drawings in which:

FIGURE 1 is a diagrammatical cross-sectional view of the engine construction in one phase of its operation.

FIGURE 2 is a similar view showing the elements at the beginning of the suction phase.

FIGURE 3 is a similar view showing the elements at the compression stage and

FIGURE 4 is a similar view at the firing and exhaust phase.

Fundamentally the engine of the present invention comprises essentially three movable elements wherein the two eccentrics **2** and **4** rotate within the cylinders **1** and **3** respectively and a slide valve **6** reciprocates within a passage **5** connecting the cylinders **1** and **3**. The two eccentrics **2** and **4** are connected by pinions or any other usual construction which will cause them to rotate in synchronization. The slide valve **6** reciprocating in the channel **5** is in constant contact simultaneously with the surface of the two eccentrics.

The two cylinders **1** and **3** are maintained completely tight by the fit of the two spaced covers not shown, located at each side thereof. As the eccentrics rotate they maintain a close contact with the inside wall of the cylinders.

The chamber provided inside each cylinder is completely tight because of the adjustment of pieces not shown and the provision of any standard strips or segments not shown. Therefore, in their motion the eccentrics will cause a division of each chamber into two parts and the dimensions thereof will change with each revolution so as to carry out the four stroke cycle of the engine. In cylinder **1** there is provided in its cylindrical wall a slot E serving as an exhaust nozzle. This slot exhausts to the exterior. The valve **6** is provided with a groove C for conducting the compressed gas from cylinder **3** to cylinder **1** and it is also provided with a groove D whereby fuel may be supplied to the cylinder **3** from the linlet A.

In the position of the elements as shown in FIGURE 2, the eccentric **4** divides the cylinder **3** into two chambers G and H. When the eccentric is displaced in the direction of rotation shown by the arrow and moves to the position shown in FIGURE 3, the chamber G has been reduced in volume and the chamber H has increased in volume resulting in a vacuum which since it is connected to the inlet A through the channel D in the slide **6** serves to fill the chamber H with carbureted gas if a carburetor is used or with atmospheric air if fuel is injected directly into the combustion chamber F.

Upon continuing its rotating movement the eccentric **4** will push the gas and compress the same in the chamber G which is then passed through the channel C of the slide valve **6** into the combustion chamber F while part of such compressed air remains inside the channel C itself.

In the position of the elements shown in FIGURE 4 the slide valve **6** has closed the chamber G from the chamber F and the gases are compressed in the channel C and the chamber F of the cylinder **1**.

The channel C may extend parallel to the axis of the slide valve **6** or it may be arranged obliquely therein. A spark is then caused in the chamber F by spark plug **9** firing the compressed gas both in the channel C and in the chamber F of the cylinder **1**. Instead of a spark of course fuel may be injected into the chamber F if a Diesel type operation is desired. The firing of the gas drives the eccentric **2** in the direction of the arrow and when the eccentric **2** reaches the position shown in FIGURE 2 chamber F has been sufficiently enlarged so as to connect with the exhaust port E which exahusts the gases.

The eccentric **4** in each revolution produces in its chamber H the admission of the gases and through its chamber G the compression and passing them to the chamber F at the end of its revolution and simultaneously the eccentric **2** which receives the compressed gas carries out during the same revolution the period of work and exhaust during each revolution made by the two eccentrics so that the is an action cycle although the four stroke cycle has been carried out.

Eccentrics **2** and **4** may turn in one or the other direction or they may rotate in opposite directions.

The mechanical efficiency of the engine is very high. Bearing in mind that the movement is circular and that there is no other oscillating or reciprocating piece other than the slide valve **6** which is driven by the eccentrics, there are no losses because of any spring resistances nor because of any alternating movements having a strong movement of inertia.

On the other hand, when an explosion causing rotation takes place as in a two-stroke engine but without the feeding difficulties of the latter, since the feeding cycle is produced during a single rotation of the eccentrics, the filling and emptying of the chambers is complete and without any counter pressure absorbing energies so that the only pressure that might check the movement of the eccentric **4** would be that of the residual gases remaining in the chamber G when they reach their final compression point and the slide valve **6** closes. For this a slot B of a convenient form and size is provided so that when a predetermined point is reached the eccentric itself can allow the residual gases which are in the chamber **3** to pass in order to be compressed on the following rotation. The mechanical efficiency is therefore only subject to the frictions that the eccentrics, the slide and the adjustments as to tightness of the three elements may produce. These frictions may be rather small because of the special characteristics of the engine since both the eccentrics and the slide may be constructed in a form so that their surfaces may slide on bearings. As may be seen an eccentric with an appropriate construction could be a bearing with a rotating shaft off center.

It is also evident that the thermal efficiency is much higher than in a conventional engine since by the elimination of any reciprocating movement the index of compression may be very high and on the other hand this may be made easy by manufacturing the cylinder **3** for the admission and compression chambers with a diameter greater than the cylinder **1** forming the explosion and exhaust chambers.

In this way the compression ratio may be increased as much as may be necessary. On the other hand the variation of the eccentric radius will permit establishing the value of the engine torque within certain limitations.

Bearing in mind that the run of the working cycle may be changed from 120 to 200° according to the characteristics desired in the engine it is understood that the gas pressure produced may be maintained during an angular rotation much higher than in a conventional engine.

It is also obvious that any refrigeration system may be used with either water, air or any other method that may be desired.

The shape, material, dimensions and proportions may be varied as desired and any accessory and secondary features may be provided that does not alter, change or modify the essential features of the engine above described.

I claim:

1. An internal combustion engine comprising two cylinders, a passage connecting said cylinders, an eccentric in each cylinder making an internal tangential contact with the cylinder wall thereby dividing each cylinder into two chambers which vary in volume during each rotation of the eccentric, a reciprocating slide located in said passage contacting both eccentrics, a fuel intake located in said passage, a groove in said slide connecting said fuel intake with one of said cylinders, an exhaust opening in the other cylinder and a second groove in said slide interconnecting both of said cylinders at the compression stroke of one of said eccentrics.

2. An internal combustion engine as set forth in claim 1 wherein said eccentrics are rotated synchronously.

3. An internal combustion engine as set forth in claim 1 wherein one of said eccentrics which controls the explosion and exhaust phase is of smaller size than the other eccentric to increase the index of compression.

4. An internal combustion engine as set forth in claim 1 wherein an exhaust nozzle is provided.

5. An internal combustion engine as set forth in claim 1 wherein said eccentrics are constructed as roller bearings.

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RALPH D. BLAKESLEE, *Primary Examiner.*