O. H. WILBER, JR.

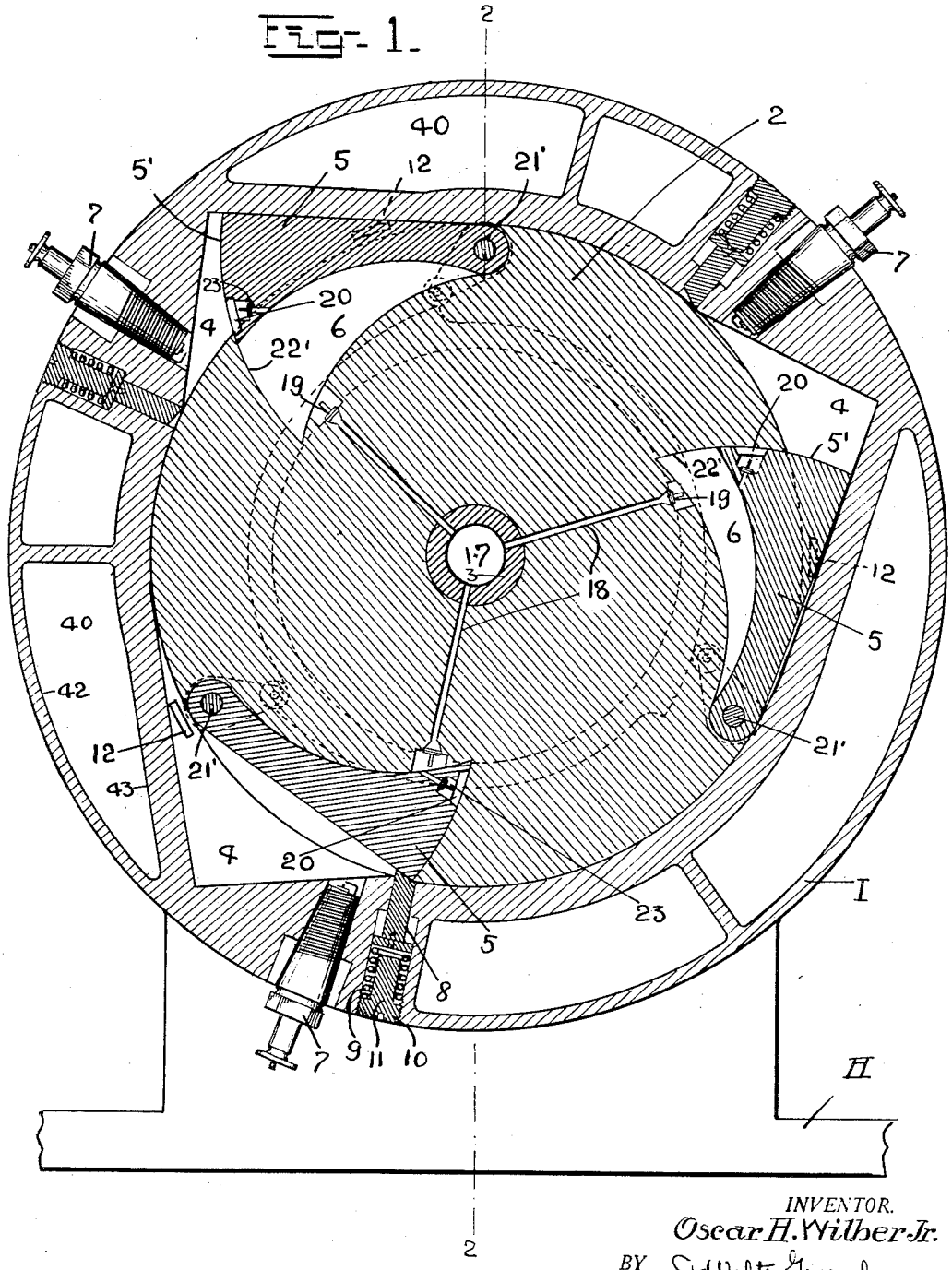
ROTARY ENGINE.

APPLICATION FILED JULY 17, 1918.

**1,349,353.** **Patented Aug. 10, 1920.**

4 SHEETS—SHEET 1.

Fig. 1.




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4 SHEETS—SHEET 2.

FIG. 2.

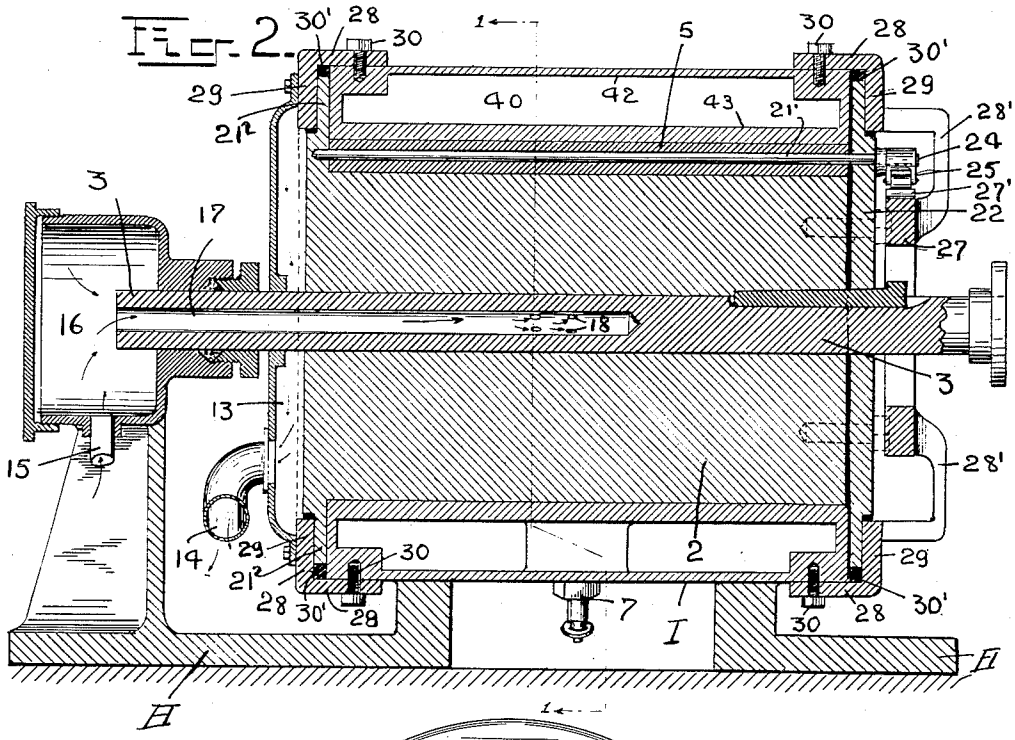
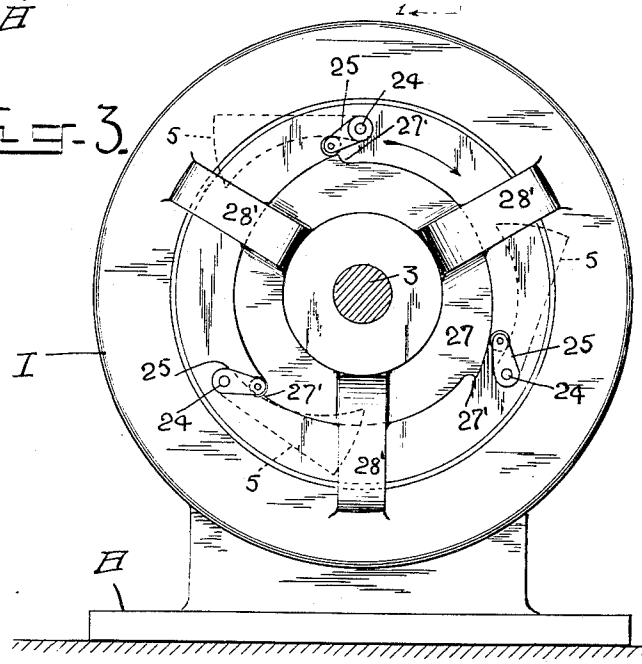



FIG. 3.




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4 SHEETS—SHEET 3.

FIG. 5.

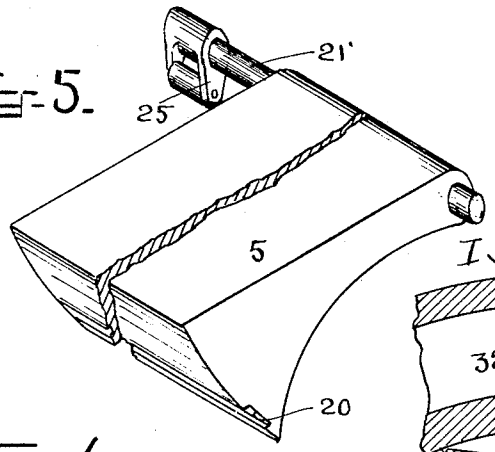



FIG. 6.

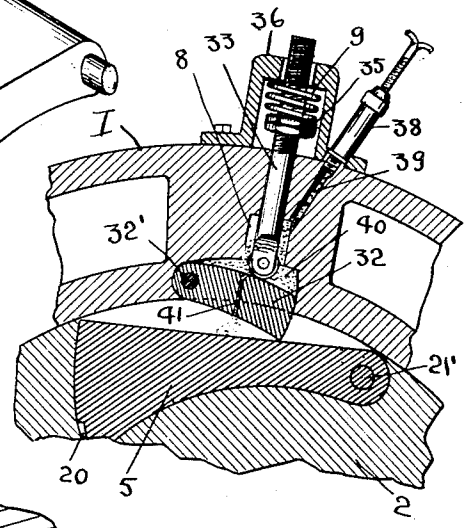
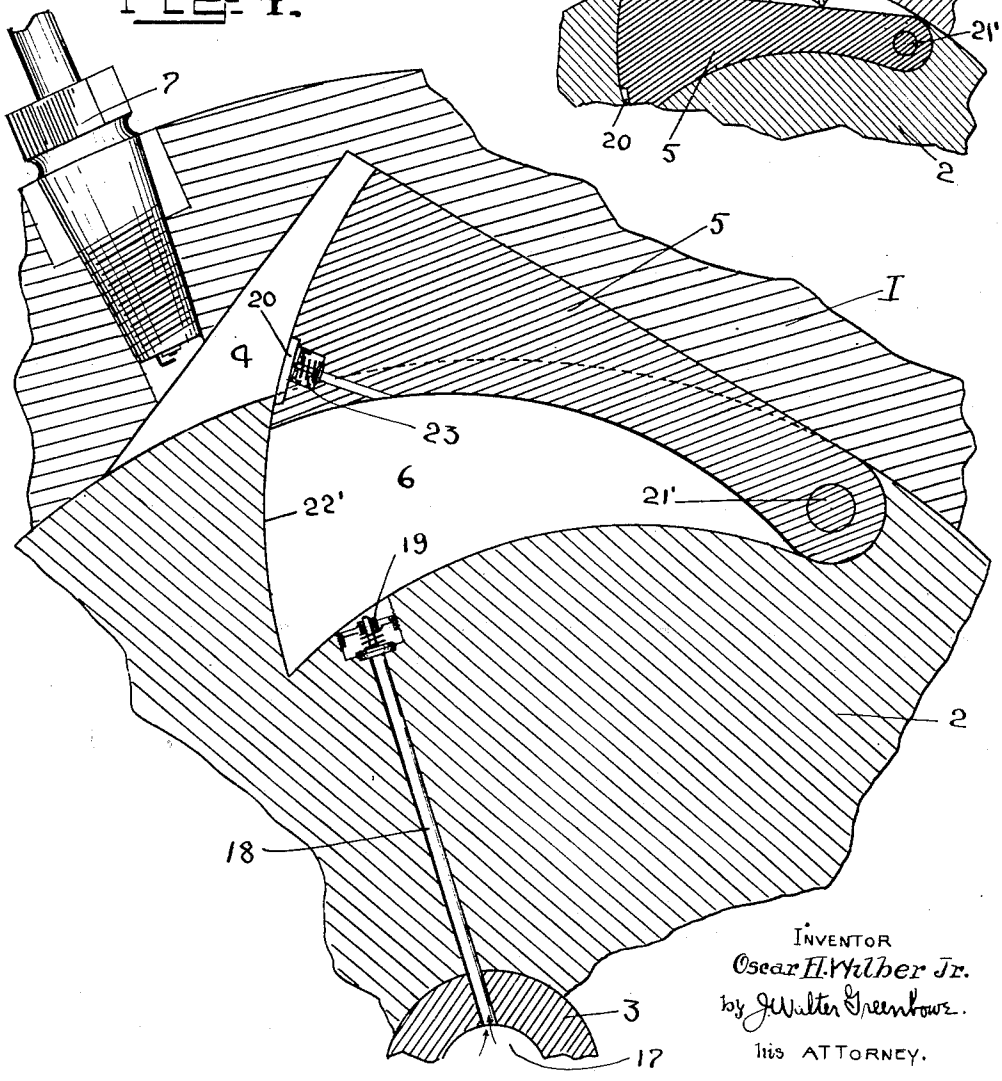



FIG. 4.




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**1,349,353.**

**Patented Aug. 10, 1920.**

4 SHEETS—SHEET 4.

FIG. 7.

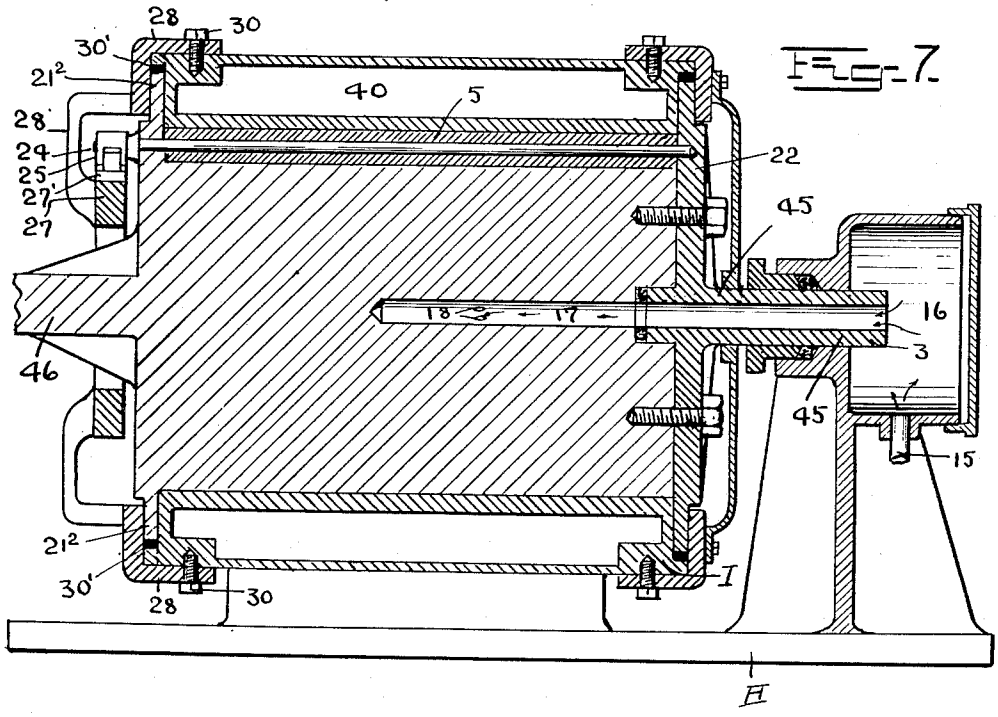
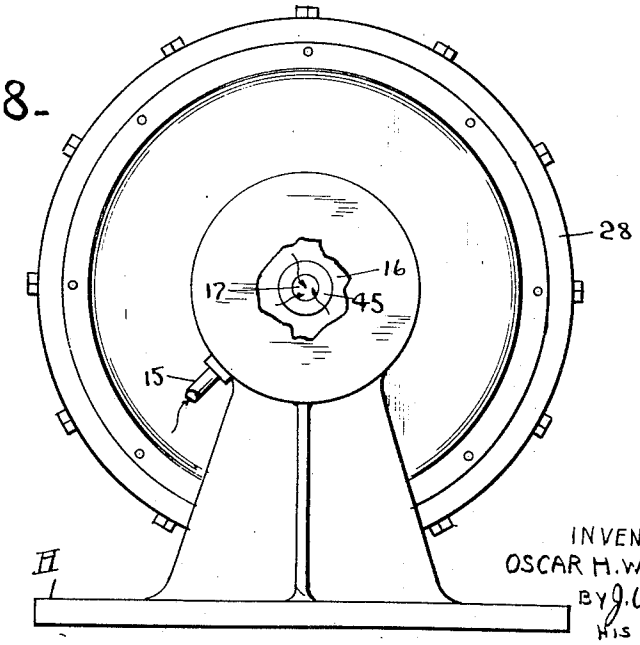



FIG. 8.




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# UNITED STATES PATENT OFFICE.

OSCAR HOWARD WILBER, JR., OF MOBILE, ALABAMA.

## ROTARY ENGINE.

1,349,353. Specification of Letters Patent. **Patented Aug. 10, 1920.**

Application filed July 17, 1918. Serial No. 245,387.

*To all whom it may concern:*

Be it known that I, OSCAR H. WILBER, Jr., a citizen of the United States, whose residence and post-office address is 914 South Broad street, Mobile, county of Mobile, and State of Alabama, have invented certain new and useful Improvements in Rotary Engines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improved rotary explosive engine wherein an explosive mixture is ignited to propel a rotary member arranged to revolve within a casing.

The primary object of the invention is to produce an engine of the class described in which a comparatively small number of working parts are employed to construct a motor of high efficiency and without complicated mechanism.

Another object is to produce an engine wherein the impulses are even or balanced, thus reducing the wear and tear throughout the machine.

A further object is to simplify the arrangement and reduce the number of valves.

The engine may be applicable to stationary or marine work and for the reason that it is of comparatively light construction and is also applicable to air-craft.

Some of the objects and advantages of my device having been enumerated above, a further and more complete understanding of the invention will be obtained by reference to the annexed specification and drawing.

In the drawing, Figure 1 is a transverse cross-section of my engine taken on a median line; Fig. 2 is a longitudinal cross-section where hatched taken on line 2—2 in Fig. 1; Fig. 3 is an elevation of one end of the engine showing cams and lever-arms; Fig. 4 is an enlarged portion showing a part of the motor in section where hatched; Fig. 5 is a perspective view of one of the working parts; Fig. 6 shows a portion of the device partly in section with a modified arrangement. Fig. 7 is a modified form of my motor showing a longitudinal section similar to Fig. 2. Fig. 8 is an end view opposite to that shown in Fig. 3 with a portion broken away to show gas passage.

I will first describe the various parts of the engine and their arrangement, using letters and numerals to designate the separate parts.

My motor is composed of a bed or base plate H which rigidly supports and may be integral with a casing I. The said casing is cylindrical or tubular in form, having a rotary member 2, fitted movably within the inside or bore of the tubular casing and rigidly secured to a shaft 3, arranged to be revolved upon the axial line of the casing. The rotary member is constructed with flange $21^2$ integral to one end and when in place within the casing a removable flange 22 is bolted to the opposite end. Annular collars 28 with inwardly turned flanges 29 are then secured to the casing by tap-bolts 30, and in this manner the rotary member is held movably in position; packing 30′ being provided to prevent leakage.

Upon the inner wall of the casing, combustion chambers 4 are provided. Any number of such chambers may be used, three being shown in the drawing.

Hinged pistons 5 corresponding in number to the said chambers are movably secured to the rotary member and arranged to move into and out of pockets or recesses 6, which may be cast or machined therein to act as pockets to receive the pistons.

The combustion chambers are open to jump-sparks which are provided by spark-plugs 7. Stops or what may be termed packings 8 are located in the casing and held normally against the rotary member by means of the expansion of a helical spring 9 which is interposed between a flange 10 on a screw-plug 11 and the enlarged head of the packing. The packings are made as wide as the pistons, namely, they are as wide as the distance between the flanges $21^2$ and 22 at opposite ends of the rotary member.

From the combustion chambers, ports 12 lead into and through a passage 13, (see Fig. 2) whereby the burnt gases may pass and escape to the atmosphere through an outlet 14. The movement of the piston closes and opens the said port, thereby eliminating the necessity of a valve.

The gas used to operate the motor is mixed in and led from any suitable vaporizer (not shown) through pipe 15 into an auxiliary or receiving chamber 16 from which it may pass through a passage 17 bored partially through shaft 3. Such passage leads part way through the rotary member and connects with any desired number of supplemental passages or inlets 18, through which the said mixed gas may pass

the check valves 19, and enter the recesses 6 with each outward movement of the respective piston from the recess. The opening of the valves being caused, as is common in combustion engines, by the difference in pressure between the chambers. Along the face or head 5′ of the hinged pistons are provided channels 20, which, when one of the pistons is moved into its recess, forms a compression chamber, the end flanges of the rotary member and the side 22′ of the recesses forming the necessary walls to complete such chamber. Between the compression chamber and the recesses 6 is provided a set of check valves 23.

To give positive and uniform action to the hinged pistons, the end 24 of each of their shafts 21′ passes a short distance out of the rotary member, and a lever arm 25 is fixed thereon having a roller upon its end. At the same end of the motor and around the shaft 3 is hung a cam 27 having raised portions 27′ upon its surface, upon which the roller of the lever arm is made to bear. As the roller is moved over the cam, the hinged pistons will be moved completely into the combustion chambers at the time the rollers reach the summit of the raised portions of the cams, and permitted to move out again as the roller drops or moves off the said raised portion of the cam.

The cam is supported by bridging arms 28′ which are made integral with the annular collar secured to the casing.

As a cooling means, water may be admitted to the provided space 40 between the walls 42 and 43 of the casing.

When mixture has been fed into the auxiliary chamber it travels through the hollow portion of the shaft and thence into the supplemental passages leading to the valves located in orifices which connect the said passages with the recesses.

Assuming that the engine is about to be operated, and that one of the pistons is occupying its recess, it will be readily seen that as the rotary member is moved by the starting of the engine in the usual manner (of priming or by turning the shaft) the roller upon the lever arm fixed to the shaft to which the piston is rigidly secured, moves up the inclined surface of the cam face thereby rocking the corresponding piston out of its recess. As the piston leaves the recess the partial vacuum created, opens the valve between the gas passage and the recess, and causes an instantaneous filling of the recess. A further movement of the rotary member allows the piston to move out of the recess and partially occupy the combustion chamber consequently forcing the burnt gas, (from the previous explosion) to pass through the provided port and into the atmosphere. The piston having thus been moved out of the recess and the recess filled with the mixed gas, the continued movement of the rotary member and the contact of the piston with the inner wall of the casing moves the said piston again into the recess and it immediately begins to compress the mixture causing the valve leading to the recess to close. The further movement of the piston causes the compressed mixture to pass the valve between the recess and the compression chamber upon the piston and be wholly and further compressed in said chamber.

In this manner, considering the relative difference in capacity between the recess and the said chamber it will be readily seen that the gas in the compression chamber will be made to receive as much reduction in volume or compression as desired, depending on the difference between the two compartments.

The gas having thus been suitably compressed the piston moves into the combustion chamber permitting the highly compressed mixture in the compression chamber to escape therein. As shown in the drawing, the said compressed mixture is let into but a small portion of the combustion chamber, which may be of any desired lesser capacity than the recess from which the gas was taken and the gas or motive fluid therefore still remains in a highly compressed state. The degree to which the gas may be compressed or the state in which it is exploded may be governed by the proportionate difference in capacity between the various compartments and it is obvious that the invention is not limited to the relative size of compartments as shown in the drawing, but that their ratio may be varied as desired. At the point where the gas is released into the combustion chamber the spark is timed to ignite it in the usual manner. It will be seen that by exploding the mixture between the piston head and the abutting face of the said chamber a complete and efficient utilization of the mixture is obtained and great force is transmitted to the rotary member through the respective pistons. As a precaution against leakage between the casing and the rotary member a curtain or what has been termed a packing is held firmly against the rotary member and against the pistons when the same pass thereunder. In Fig. 6 is shown a modification of the said packing which has been given the reference character 8. In this view the packing is in the form of a rocking arm 32, and is movable upon a shaft 32′ fixed to the casing. The packing is held firmly in its working position by a contacting rod 33 which receives its motion from the expansion of a helical spring 9, acting between lock-nut 35 and the bolted yoke 36. A roller upon the end of the rod gives free movement of the packing. By adjusting

the lock-nut upon the threaded portion of the rod the tension upon the rod may be changed as found necessary. At one side of the yoke is shown a grease cup 38, wherefrom a lubricant may be forced through passage 39 to an annular recess at the end of the rod above the packing. As the rotary member revolves, the packing is moved into and out from the pocket 40, as it alternately contacts with the pistons and the rotary member. Such movement forces the lubricant through a passage 41 in the packing and upon the rotary member, and such portions of the working surface of the internal members are lubricated as required.

Figs. 7 and 8 show a modification of my motor differing in the form of construction but being substantially the same in operation as that shown in the preceding figures. Instead of a shaft passing through and carrying the rotary member, I provide end flanges with extended portions 45 and 46. The gas inlet 17 passes through the extended portion 45 and the extended portion 46 may be coupled to any work. In this construction, the cost of building is less as the end flanges and their extensions may be forged or cast and centering and a long drilling operation is dispensed with.

It is premised, however, that my invention is not limited to the specific construction as shown, but may be varied without departing from the scope of the invention as set forth in the claims.

Now having described my improvements, I claim as my invention:

1. In a motor the combination with a stationary casing, a rotary member located rotatably within the said casing and having its axial line in coincidence with that of the casing, a shaft fixed to the said rotary member, a main gas passage leading through a portion of the said shaft, a hinged piston upon the rotary member and pockets in the said member to receive the said pistons, combustion chambers corresponding in number to the pistons located upon the inner wall of the casing, supplemental passages leading from the main gas supply passage to the respective pockets whereby a quantity of gas is drawn into the said pocket by the outward movement of the piston and means whereby the said quantity of gas is compressed and then admitted between one of the abutting walls of a combustion chamber and the head of a piston to revolve the rotary member.

2. In a motor the combination with a stationary casing, a movable shaft upon the axial line of the casing, a rotary member within the casing and secured to the shaft, a plurality of pistons pivoted to the periphery of the rotary member, combustion chambers upon the inner wall of the casing to receive the pistons during a partial movement of the rotary member, recesses upon the rotary member to receive the pistons, an auxiliary mixture-chamber without the casing and at one end thereof arranged to receive a portion of the shaft and a duct within the shaft whereby an explosive mixture may be fed to the said pockets and thence to the combustion chambers.

3. In a motor the combination with a stationary casing, a rotary member secured to a movable shaft, a plurality of movable pistons and pockets therefor upon the periphery of the rotary member, combustion chambers upon the inner wall of the casing, a main gas passage located within the rotary member, supplemental passages leading from the main passage to the respective pockets, the said pockets serving as primary gas receiving chambers, a compression chamber upon the head of each piston into which the gas from the pocket is forced and compressed when a piston moves into a pocket and means whereby the said compressed gas is admitted into one of the said chambers on the casing and ignited to drive the said rotary member.

4. In a rotary engine the combination with a tubular casing, a rotary member within the said casing, a shaft secured to the said rotary member, swinging pistons upon the said rotary member, pockets to receive the said pistons, combustion chambers upon the inner walls of the said casing, channels upon the face of the said pistons to form compression chambers when the said piston is within its pocket, a main gas passage located upon the axial line and partially through the rotary member, supplemental passages leading to the said recesses, check valves between the supplemental passages and the recesses and between the compression chambers and the said recesses, means for supplying an explosive gas to the said recesses and compressing the same within the compression chamber as the piston moves into its recess and means for admitting and igniting the said compressed mixture between an abutting wall of a combustion chamber and a piston head to propel the rotary member about its axis.

5. In a rotary engine the combination with a tubular casing, a rotary member within the said casing, flanges on opposite ends of the said rotary member to close the ends of the casing, pistons movably secured to the rotary member, pockets upon the rotary member to receive the pistons, a main gas passage within the said rotary member and connecting with the said pockets, channels upon the faces of the said pistons so arranged as to form compression chambers, combustion chambers upon the inner wall of the said casing, an exhaust gas port leading from the ends of the said chambers, the said port being opened and closed by

the movement of the said pistons, shafts passing through the said pistons and out of the rotary member at one end thereof, lever arms upon the said ends of the shafts adapted to engage with a cam face to govern the movement of the said pistons, means for supplying an explosive mixture to the said pockets and compressing the same in the compression chambers by the downward movement of the pistons and means for admitting the said compressed gas and igniting the same between abutting walls of the combustion chambers and the piston heads to impart a rotary motion to the said rotary member.

6. In a motor the combination with a stationary casing, a rotary member carried upon a shaft and located within the casing, gas receiving pockets upon the rotary member, pistons arranged to move into and out from the said pockets, explosion chambers upon the said casing, compression compartments upon heads of the said pistons, one wall of the said compartment being formed by one side of the said pocket when the piston is therein, means for admitting gas to the receiving pocket when the piston is moved out of same, a valve controlled passage to admit the gas for compression in the said compartment when the piston is moved into the pocket, and means for igniting the said gas when released from the said compartment into the said explosion chamber.

In testimony whereof I have hereunto set my hand.

OSCAR HOWARD WILBER. JR.