S. G. STAPP.

ROTARY HYDROCARBON ENGINE.

APPLICATION FILED JAN. 19, 1911.

1,114,816.

Patented Oct. 27, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

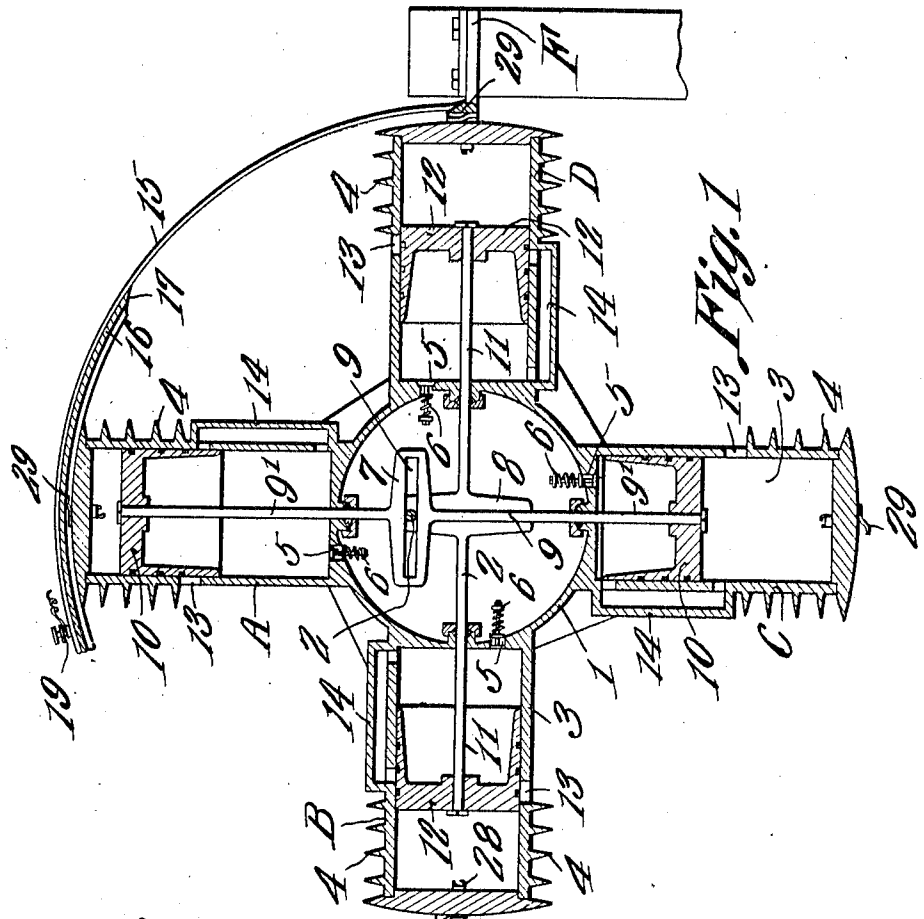
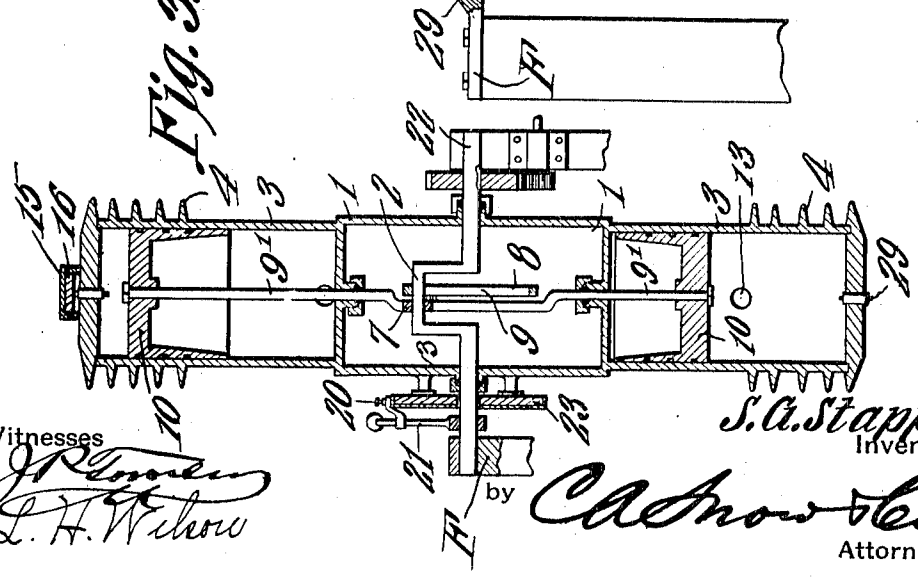


Fig. 3.



Witnesses

J. Rooney

L. H. Wilson

S. G. Stapp,
Inventor

by

Cashow & Co.
Attorneys

S. G. STAPP.

ROTARY HYDROCARBON ENGINE.

APPLICATION FILED JAN. 19, 1911.

1,114,816.

Patented Oct. 27, 1914.

2 SHEETS—SHEET 2.

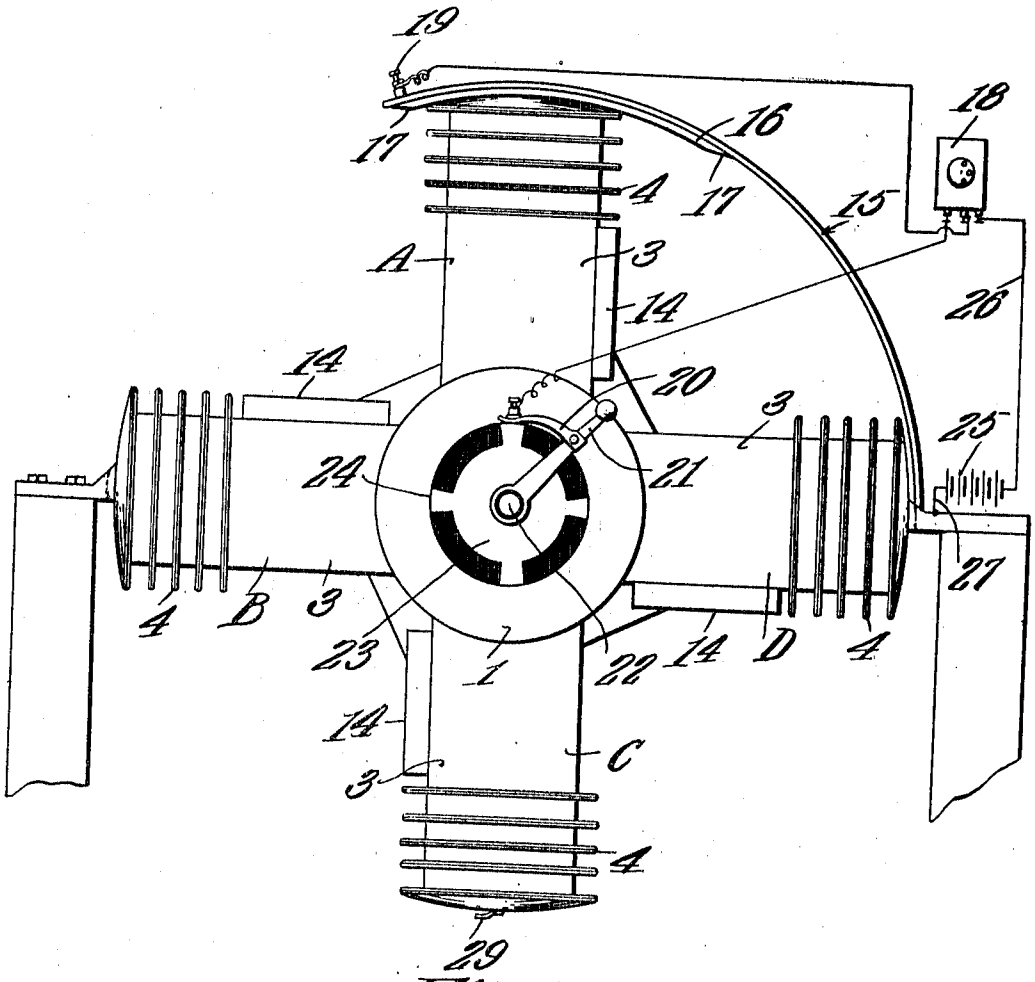


Fig. 2.

Witnesses

J. R. Tomlin

L. H. Wilson.

S. G. Stapp,
Inventor

by C. A. Snow & Co.
Attorneys

UNITED STATES PATENT OFFICE.

SIMEON G. STAPP, OF PHILLIPSBURG, KANSAS.

ROTARY HYDROCARBON-ENGINE.

1,114,816. Specification of Letters Patent. Patented Oct. 27, 1914.

Application filed January 19, 1911. Serial No. 603,557.

To all whom it may concern:

Be it known that I, SIMEON G. STAPP, a citizen of the United States, residing at Phillipsburg, in the county of Phillips and State of Kansas, have invented a new and useful Rotary Hydrocarbon-Engine, of which the following is a specification.

The present invention appertains to hydrocarbon or internal combustion engines of the rotary type, and aims to provide a novel and improved machine of that character.

One of the objects of the present invention is to provide a unique form of ignition apparatus for the engine, whereby the explosive charges may be ignited at the opportune moments, during the rotation of the engine.

Another object of the present invention is to provide a rotary engine embodying novel fuel supplying means for the cylinders.

It is also within the spirit of the present invention, to provide a rotary engine which will be improved generally in its construction, to enhance the utility of the engine.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention has been illustrated in its preferred embodiments in the accompanying drawing, wherein:—

Figure 1 is a section taken through the median plane of the engine. Fig. 2 is an elevation of the engine, portions being broken away, and portions of the ignition apparatus being illustrated diagrammatically. Fig. 3 is a central transverse section of the engine.

In carrying out the present invention, there is provided a suitable frame F within which is disposed a circular case, the same being mounted for rotation upon a transversely disposed crank shaft 2 having its terminals clamped or otherwise engaged to the sides of the frame F. The case 1 is closed, and is adapted to be supplied with the combustible fuel or mixture, in any suitable manner. The case is provided with a plurality of cylinders 3 projecting radially from its periphery, the outer end or head portions of the cylinders being provided with the peripheral or annular flanges 4 for facilitating the cooling of the cylinders, as the cylinders are rotated with the case 1. The inner ends of the cylinders are closed or provided with partitions to close the inner ends of the cylinders from the case 1. The inner ends or partitions of the cylinders are each provided with a passage or port 5, normally closed by a yieldably or spring seated valve 6 opening outwardly. Slotted yokes 7 and 8 are engaged to the crank of the shaft 2, the crank working within the slots 9 of the said yokes. The yokes 7 and 8 work in parallel planes and the yoke 7 is connected by oppositely extending piston rods 9′ to pistons 10 mounted for reciprocation in a pair of diametrically opposite and alining cylinders 3, designated A and B, while the yoke 8 is connected by piston rods 11, to pistons 12 mounted for reciprocation within the cylinders B and D. As illustrated, four cylinders are employed, and are arranged in a cruciform relation, the axes of the opposite cylinders being in alinement, and the axes of all of the cylinders lying in the median plane of the engine. The piston rods are slidable through the inner ends or partitions of the cylinders, the pistons defining the explosive chambers at the outer ends of the cylinders, and the compression chambers at the inner ends of the cylinders Each of the cylinders is provided with an exhaust port 13 in that side which is foremost when the engine is in operation, or in other words, each cylinder is provided in its front side with the exhaust port which opens toward the direction which the cylinder rotates, the exhaust ports being normally closed by the respective pistons and being opened when the successive pistons approach the inner ends of their strokes. Each of the cylinders is also provided upon its back side, or diametrically opposite the exhaust port, with a longitudinally extending by-pass or duct 14, the inner end of which communicates with the inner end of the cylinder, or the compression chamber, and the outer end of which is disposed slightly inward from or diagonally opposite the exhaust port 13. The outer ends of the by-passes or conduits are normally closed by the pistons, it being observed that as the pistons approach the ends of their inward strokes, the exhaust ports will first be opened, and the inlet ports

provided by the by-passes will be opened immediately following the exhaust ports.

The ignition apparatus includes an arcuate strip 15, which may be of insulating material, if desired, and which has one end attached to one end of the frame F. The strip 15 is disposed concentric with the axis of the crank shaft, and is disposed directly outside of the path of the heads or outer ends of the cylinders, the other end of the strip 15 being free to flex slightly, if necessary. Secured to the inner side of the free portion of the strip 16, is an arcuate contact strip 16, having its inner end 17 beveled, and being insulated from the strip 15 or from the frame F. An electrical conductor is attached to the strip 16 and is connected to a spark coil 18, the free end or extremity of the strip 15 supporting an insulated binding post 19 connected to the outer end of the contact strip 16, for the attachment of the said conductor.

An arm 21 is mounted for oscillatory adjustments upon the crank shaft between one side of the case 1 and one side of the frame F, and a yieldable commutator brush 20 is carried by the arm 21, and has a conductor attached thereto and connected to the spark coil. The terminals or ends 22 of the crank shaft, as above intimated, are clamped to or otherwise held by the sides of the frame, in order to properly hold the crank of the said shaft, it being apparent that by slightly oscillating the crank shaft, the crank may be disposed at various angles, as may be most desirable. A commutator 23 is disposed at one side of the case 1, and is arranged to revolve therewith, the commutator having an annular or peripheral series of segments or contacts 24 arranged to successively engage the brush 20. The segments 24 are electrically connected to the case 1.

The ignition apparatus also includes a battery or source of current 25 connected to the spark coil by a conductor 26 and to one end of the frame F and crank shaft by a conductor 27.

Each cylinder 3 is provided with a spark plug 28 in its head or outer end, one electrode of each plug or ignition means being provided with a brush or yieldable contact 29, the said brushes or contacts 29 being adapted to successively brush or wipe along the contact strip 16 as the engine rotates, it being observed that the brushes or contacts 29 are adapted to move along the strip 15 from its butt or basal end, to and along the contact strip 16, whereby the strip 15 will be somewhat supported by its engagement with the successive brushes or contacts 29.

In operation, as the cylinders rotate, they will operate with a two cycle action. Thus, as the cylinders rotate in a counter clockwise direction, as seen in Fig. 1, the cylinders in moving from the uppermost or upright positions to the lowermost or depending position, will cause the pistons to move inwardly, to thereby compress the explosive charge within the inner ends or compression chambers of the cylinders. As the cylinders approach their lowermost or depending positions, the exhaust ports will first be opened to permit the gases to exhaust, and then, the by-passes 14 will be opened to permit the compressed charges to pass into the explosion chambers. As the cylinders move from their lowermost or depending positions to their uppermost or upright positions, the pistons will be forced outwardly, to compress the new charges admitted into the explosion chambers, the exhaust and intake ports being closed, and the explosive mixture being drawn from the case 1 through the ports 5 into the compression chambers. The arm 21 is so adjusted that the brush 20 will successively engage the respective segments 24 to close the circuit through the case 1 and upper cylinder 3 to the spark plug, then across the electrodes of the spark plug to the respective brush contact, and to the contact strip 16 and then to the spark coil which is connected to the brush 20. In this manner, the compressed explosive charges are ignited when the cylinders are uppermost or in their upright position, and the charges then being ignited and expanded, serving to rotate the cylinders in a counter clockwise direction. The brushes or contacts 29 riding into contact with and working along the contact strip 16 will serve to effectively connect the successive spark plugs with the spark coil, whereby the circuit may be properly closed by means of the brushes 20 carried by the adjustable arm or lever 21.

It will be evident that the intake and exhaust ports of the cylinders are devoid of valves, the burnt gases being first permitted to pass out through the exhausts of the cylinders, as the pistons move inwardly beyond the exhaust port, and then following the openings of the exhaust ports and emission of the burnt gases, the intake ports will be opened to admit the entry of the new charges from the compression chambers through the by-passes 14. It is desirable to permit the exhaust ports to be first opened, to relieve the cylinders of the compression of the burnt gases, prior to the admission of the new charges into the explosion chambers, as will be obvious. This is accomplished by disposing the exhaust ports and outer ends of the by-pass 14 diagonally opposite each other.

What is claimed is:—

In a rotary hydrocarbon engine, a supporting frame, a stationary crank shaft carried thereby, a case mounted for rotation on the shaft within the frame and having a

plurality of radial cylinders, pistons in the cylinders and operatively connected to the crank shaft, ignition means carried by the outer end of each cylinder and including a yieldable terminal, an arcuate strip attached at one end to the said frame and disposed directly outside the path of the heads of the cylinders, an insulated arcuate contact strip secured to the inner side of the aforesaid strip at its free end and arranged to be successively engaged by the contacts, the contacts wiping along the said strips, a commutator disposed at one side of the case and rotatable therewith, the commutator including a series of segments electrically connected to the case, an insulated radial arm carried by the crank shaft and mounted for oscillatory adjustments, a yieldable brush carried by the said arm and coöperating with the commutator to be engaged successively by the segments, and electrical conductors connected to the contact strip and brush for connection with a spark coil.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

SIMEON G. STAPP.

Witnesses:

ALBERT C. MCDANNEL,

D. W. STAPP.