P. R. PETERSON.

GAS ENGINE.

APPLICATION FILED MAR. 7, 1919.

1,347,055.

Patented July 20, 1920.

2 SHEETS—SHEET 1.

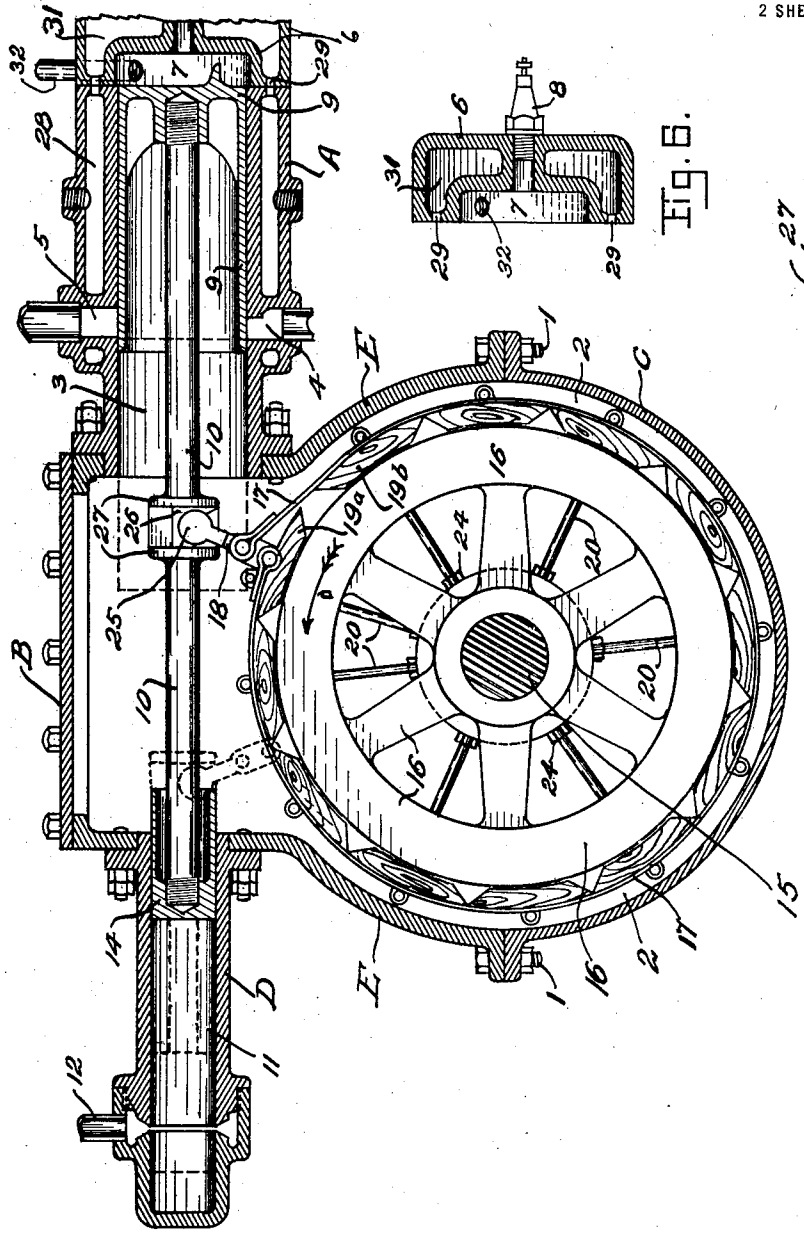


Fig. 1.

Fig. 6.

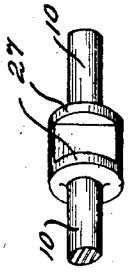


Fig. 7.

Peter R. Peterson

INVENTOR.

BY J. M. Thomas

ATTORNEY

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2 SHEETS—SHEET 2.

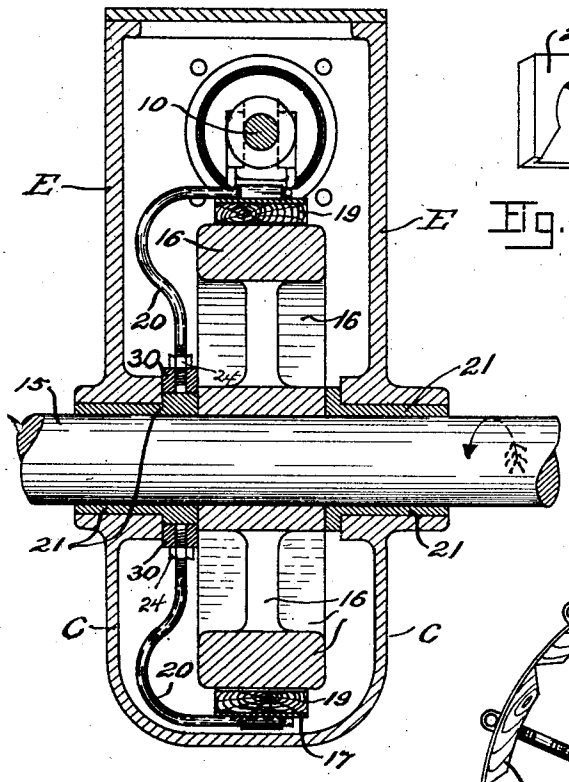


Fig. 2.

Fig. 4.

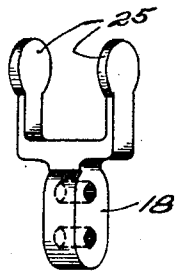


Fig. 5.

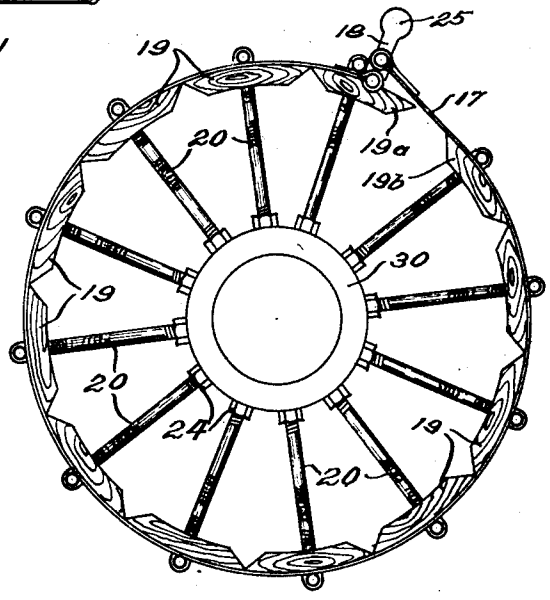


Fig. 3.

Peter R. Peterson

INVENTOR.

BY S. M. Thomas

ATTORNEY

UNITED STATES PATENT OFFICE.

PETER R. PETERSON, OF SALT LAKE CITY, UTAH.

GAS-ENGINE.

1,347,055. Specification of Letters Patent. Patented July 20, 1920.

Application filed March 7, 1919. Serial No. 281,289.

To all whom it may concern:

Be it known that I, PETER R. PETERSON, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake, and State of Utah, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

My invention relates to gas engines, and has for its object to provide a piston driven gas engine whereby the explosive force of compressed gas may be used to reciprocate a piston and thereby rotate a driving shaft without using a crank shaft, eccentric or gears, and whereby a much greater amount of the explosive force of compressed gas may be utilized with fewer parts and a less number of valves.

These objects I accomplish with the machine illustrated in the accompanying drawings in which similar letters and numerals of reference indicate like parts throughout the several figures, and as described in the specification forming a part of this application and pointed out in the appended claims.

In the drawings in which I have shown a substantial embodiment of my invention, Figure 1 is a section longitudinally through the explosion chamber and transversely through the shaft and rotary portion of the machine. Fig. 2 is a transverse section of the rotor and casings with the shaft in elevation, parts cut away. Fig. 3 is a side elevation of the friction elements. Fig. 4 is a view in perspective of one of the lever blocks. Fig. 5 is a view in perspective of the connecting lever. Fig. 6 is a section of the casing cap with the spark plug in elevation. Fig. 7 is a view in perspective of a portion of the connecting rod, showing the lever engaging portion.

The present invention consists of casings A, C, D and E which inclose the internal combustion chamber, the connecting rod and pistons and the rotor. An opening is provided in one side of said casing E, through which the interior of said casing may be reached to remove the pistons and other internal parts, which opening is normally closed by the plate B. The said casing E, which inclosed a portion of the rotor, coacts with another casing C to form the rotor casing. The said casing C is fastened to the casing E by bolts 1 through flanges on said casings to form an oil chamber 2, wherein oil is retained to lubricate by the splash system the interior parts of the machine. The said casing A is internally bored to provide a piston chamber 3, in the walls of which chamber are provided the gas inlet or port 4, and the exhaust port 5. On one end of said piston chamber 3 is secured a closure cap 6 which forms one end and side walls of the explosion chamber 7. A spark pug 8 of any make is provided in said cap 6 through which the gas is exploded by the usual electric spark. A piston 9 is operated in said chamber 3, and to which piston is fastened the connecting rod 10. Within the casing D is provided an air chamber axially alined with said piston chamber 3 but in opposed position thereto and the said air chamber 11 has an air port 12 opening to its interior. A piston 14 which is fastened to said connecting rod 10 is operated in said air chamber 11. A driven shaft 15 is journaled between said casings C and E transverse in position to said connecting rod 10, and a rotor 16 is secured on said shaft. The friction elements are mounted normally concentric with said rotor 16 and consist of a spring band 17 formed into a circle and with its ends fastened and pivoted to the lever connection 18. The wearing shoes 19 are fastened to the inner periphery of said spring band, and each consists of a block of some good wearing material, such as wood, with curved faces to conform with the said band 17 and the peripheric face of said rotor 16. Each of said shoes 19 has its inner corners cut off and to each is provided a goose neck shaped spring 20 which is secured at one end to a collar 30 by being threaded and screwed therein and held in place by a jam nut 24 to be screwed down when said spring has been adjusted, which collar is operable on a bearing sleeve 21. The free end of each of said springs is fastened on the spring band 17. One end portion of said lever connection 18 is bifurcated and formed into two spaced apart circular disks 25. Each of said disks 25 engages in its respective slidable block 26, that in turn is operated between the ribs

27 integrally and medially formed on the said connecting rod 10. A water jacket 28 is provided around the explosion chamber 3 with openings 29 bored into the end walls which connect said water jacket 28 with another water jacket 31 which I provide in the said cap 6.

The operation of my engine is as follows:—

With an explosive gas under some compression in a tank connected with the ports 4 and 32, some of said gas is allowed to flow into the compression chamber 7 through the port 32 in said cap 6 for the initial start. The said gas is fired in the usual way by an electric current jumping the gap in the spark plug 8. The explosion of this gas will force the piston 9 away from the said cap 6 to the position shown in dotted lines and the exploded gas will exhaust through the port 5 and another charge of gas will flow through the port 4 and fill said chambers 3 and 7. This new charge of gas will in its turn be compressed in the compression chamber 7 by the return movement of said piston 9 and it will be fired in a similar way by the electric spark. When the said piston 9 is driven away from the cap 6 by an explosion the connecting rod 10 will drive the piston 14 into the air chamber 11 and some air will be forced out into the air supply reservoir, which is not shown, through the port 12. All of the air within that portion of said chamber 11 which is below the said port 12 will be compressed and act as a cushion to stop the momentum of the two pistons and rods 10 and start them on the return stroke or movement. The said compressed air in the lower portion of chamber 11 will start the said pistons 14 and 9 on the return stroke and when said port 12 is opened by the passing of piston 14, the compressed air which is held in the air supply reservoir will then return the pistons to the explosion position, whereby another charge of gas will be compressed and fired, thereby causing reciprocation of the said connecting rod 10 and the said pistons 9 and 14 within their respective chambers. To apply and explain the said reciprocatory movements of said rod 10 with the other connected parts of the engine, the explosion movement of said rod 10 will first throw the connecting lever 18, in the direction of the arrow *a* shown on the rotor 16, and tighten the spring band 17 and lessen its circumference and diameter, and thereby the shoes 19 will be brought into gripping contact with the rotor 16. The continuation of said explosion movement on the rod 10 will be imparted to the rotor 16 and it will be rotated in the direction of the arrow *a*. The first portion of the return or compressed air movement as applied to the connecting rod 10 and its connections will be to throw said connecting lever 18 opposite the movement of the rotor 16 and release the said shoes 19 from any contact with said rotor. The momentum of the rotor, and a fly wheel if desired, will continue the rotation until the next explosion which will repeat the movements. In order to regulate the distance between the inner faces of said shoes 19 and the peripheric face of said rotor the goose neck shaped springs 20 are provided, one for each shoe, and they are radially fastened in a collar 30, which is journaled on the bearing sleeve 21, and extend outwardly and are given a curve to bring the free end in parallel relation with the outer face of said shoes 19 and said spring band 17, and said free end is then secured to said band and the shoe adjacent by passing said end through the fastening means used to hold said shoes in fixed relation with said band. The curved portion of said springs will allow slight movements of said band and shoes but normally hold the shoes free of the rotor. Each explosion of the gas will drive the pistons 9 and 14 and the rod 10 and cause the band 17 and shoes 19 to grip the rotor and rotate it always in the direction of the arrow, and each air compression of chamber 11 will drive the pistons and rod in the opposite direction and release the spring band and shoes from said gripping contact with the rotor and return the pistons, rod 10 and gripping numbers to another explosion position, thus making the movements automatic except the firing of the gas.

As will be obvious if I desire to rotate said shaft 15 in the opposite direction I will provide another rotor thereon and similar gripping elements adapted to engage said rotor when the connecting rod is driven in the opposite direction by the gas explosion, and to release said grip when said rod is driven by the compressed air. Also more than one rotor and moving elements may be employed to drive said shaft 15 in either direction if desired.

Having thus described my invention I desire to secure by Letters Patent and claim:—

1. In a gas engine the combination of an explosion cylinder having an exhaust and an inlet port; an air cylinder in alinement with said explosion cylinder; a piston operable in each of said cylinders; a connecting rod between said pistons; a driven shaft transversely mounted adjacent said connecting rod; a rotor secured on and rotatable with said shaft; a friction band concentrically spaced from said rotor; friction shoes fastened on the inner face of said friction band; springs to normally hold said shoe spaced from said rotor; and a connecting lever pivoted to the ends of said friction band and operated by said connecting rod.

2. A gas engine comprising a driven shaft; a rotor secured on and rotatable with

said shaft; an explosion cylinder; a piston operable therein; means to grip said rotor when said piston is moved in one direction and to release said gripping means when said piston is moved in the opposite direction, said means consisting of a spring band adjacent the periphery of said rotor; friction shoes secured between said band and said rotor; and a lever pivoted to the ends of said band and operated by said piston.

In testimony whereof I have affixed my signature.

PETER R. PETERSON.