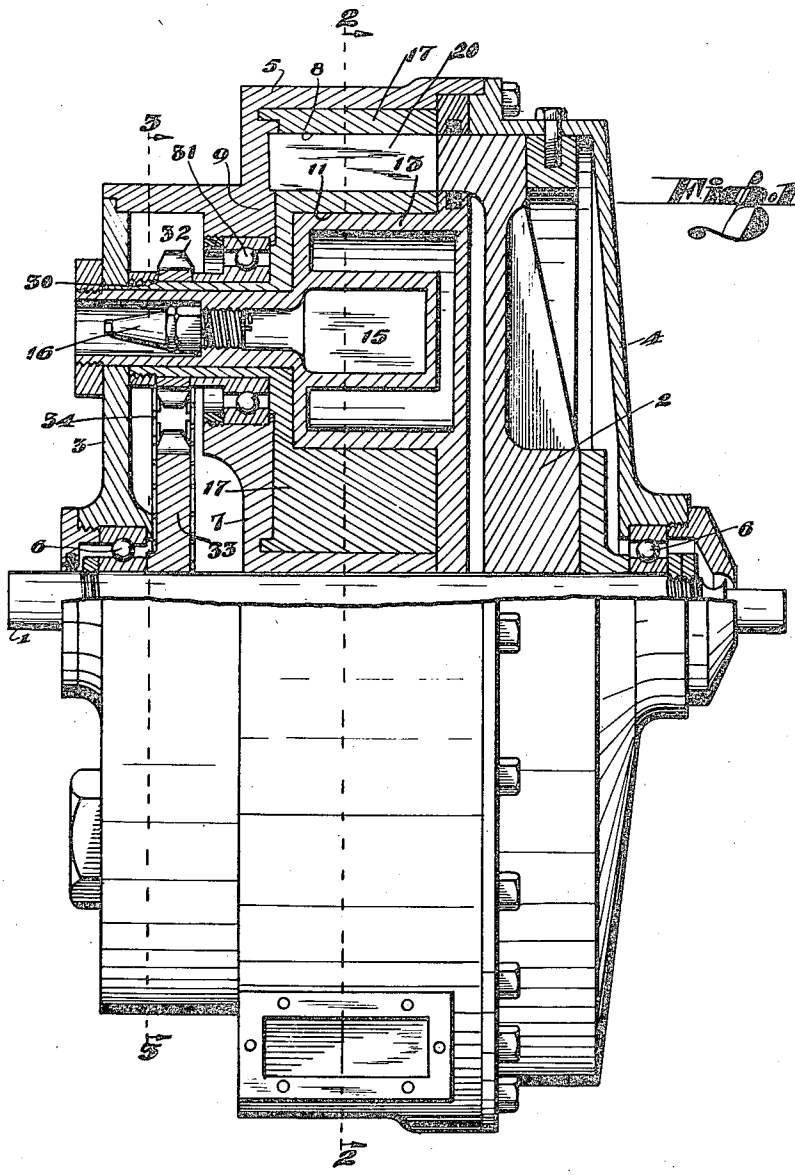
May 15, 1923. 1,455,324

T. CUSHMAN

ROTARY GAS ENGINE

Filed Sept. 3, 1920 3 Sheets-Sheet 1



INVENTOR.

T. Cushman

BY

Hazard & Miller

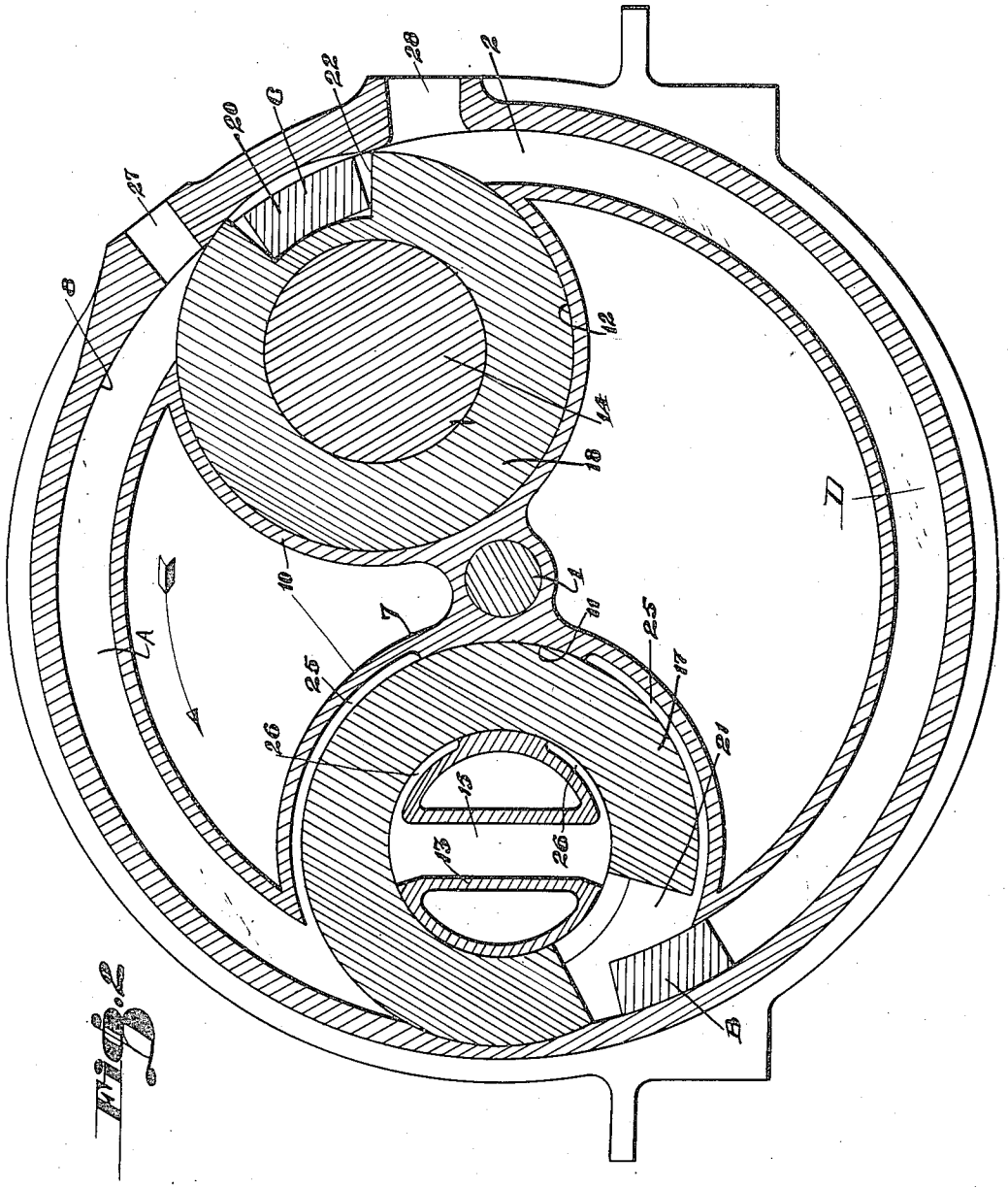
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ROTARY GAS ENGINE

Filed Sept. 3, 1920 3 Sheets-Sheet 2



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Fig. 3

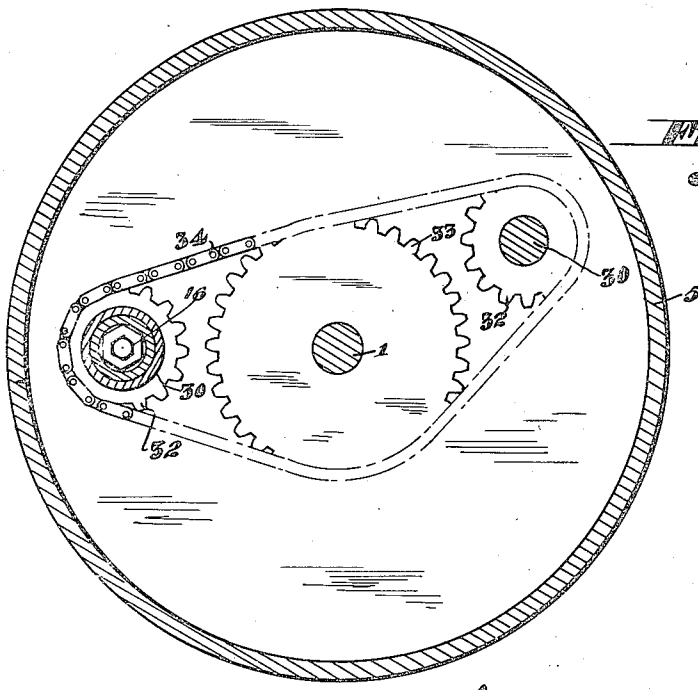
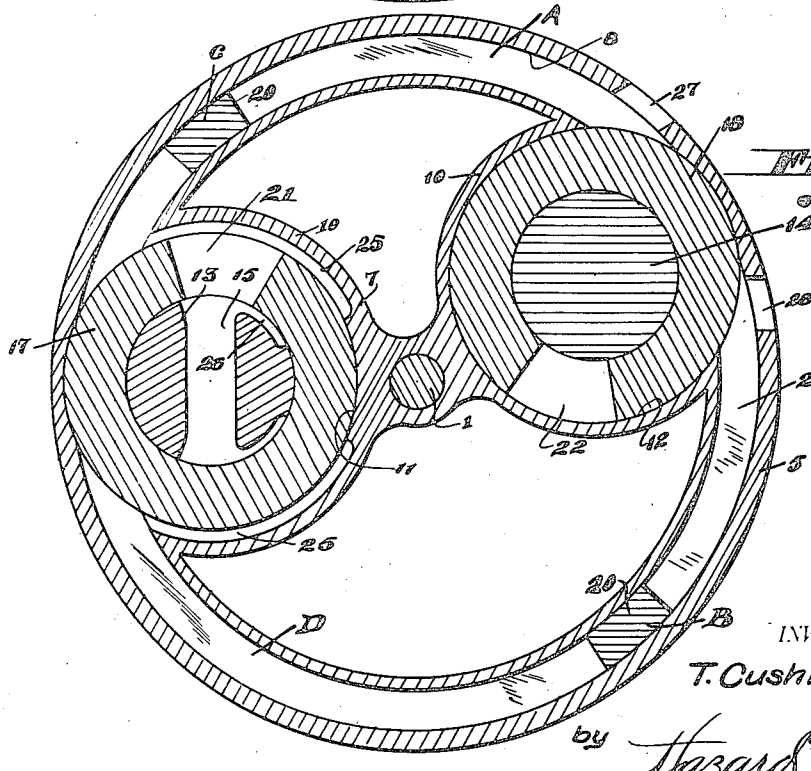


Fig. 4



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Patented May 15, 1923. 1,455,324

UNITED STATES PATENT OFFICE.

TRAV. CUSHMAN, OF ANAHEIM, CALIFORNIA.

ROTARY GAS ENGINE.

Application filed September 3, 1920. Serial No. 407,931.

To all whom it may concern:

Be it known that I, TRAV. CUSHMAN, a citizen of the United States, residing at Anaheim, in the county of Orange and State of California, have invented new and useful Improvements in Rotary Gas Engines, of which the following is a specification.

This invention relates to internal combustion engines of the rotary type and has for its object the provision of a construction consisting essentially of a rotor carrying a piston movable within an annular chamber and abutments extending across said chamber and movable so as to permit passage of the piston, one of said abutments having a valvular means whereby an explosive charge may pass from one side to the other of the abutment so as to be exploded and act upon the piston.

The invention will be readily understood from the following description of the accompanying drawings, in which—

Figure 1 is a longitudinal section through an engine constructed in accordance with the invention.

Figs. 2 and 3 are transverse sections on the lines 2—2 and 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 2 showing the engine at the different point in its cycle of operation.

The engine is shown as comprising a main shaft 1 having a fly wheel 2 fixed thereon. A stationary casing surrounds the main shaft and the fly wheel, said casing being shown as including end plates 3 and 4 connected by the cylinder 5. The main shaft is journaled in end plates 3 and 4 as by usual antifrictional bearings 6. A stationary casing 7 is received within the shell formed by walls 3, 4 and 5, said casing being received around main shaft 1 at one side of fly wheel 2. This casing is arranged in spaced relation from wall 5 to form an annular chamber 8. This annular chamber is closed at its respective ends by fly wheel 2 and by an interior annular projection 9 of cylinder 5.

At circumferentially spaced points around chamber 8 the casing 7 forming the same is recessed as shown at 10 in order to form the circular recesses 11 and 12 in the chamber 8. Central cores 13 and 14 are positioned in the recesses 11 and 12, said cores being supported by the exterior shell of the engine. One of said cores, say the core 14, is of solid construction, while core 13 is provided with a transversely extending chamber 15 forming the firing chamber of the engine. A spark plug 16 projects through the shell of the engine into the firing chamber.

Rotatable sleeves 17 and 18 are mounted upon cores 13 and 14, said sleeves fitting snugly within recesses 11 and 12 and abutting against the wall 5 forming chamber 8 so as to form abutments extending across said chamber and completely closing the same. Diametrically opposed pistons 20 are carried by fly wheel 2 and extend within annular chamber 8. The sleeves 17 and 18 are provided with recesses 21 and 22 respectively which are arranged to co-operate with the pistons 20, so that when the pistons are moved opposite the sleeves 17 and 18 the recesses will be in position to have the pistons received therein. By this arrangement continued rotation of the pistons and the sleeves will permit the pistons to pass the abutments formed by said sleeves.

The recess 21 in sleeve 17, preferably, extends through the same so as to form a passageway communicating with firing chamber 15 when the sleeve is turned to such position as to bring said recess into alinement with either end of firing chamber. The recess 11 is, preferably, offset at each of its ends adjacent chamber 8 in order to provide passageways 25 communicating with annular chamber 8 and the passageway 21. In similar manner the core 13 is offset at one side of the firing chamber and at opposite ends thereof in order to provide passageways 26 forming communication between passageway 21 and the firing chamber.

Inlet and exhaust ports 27 and 28 extend through wall 5 so as to communicate with chamber 8 at opposite sides of the abutment formed by the sleeve 18. The inlet port may be connected to any usual source of fuel supply, and the exhaust port may lead to any suitable muffler or directly to the atmosphere.

The driving connection for rotating sleeves 17 and 18, preferably, includes axle projections 30 upon said sleeves and journaled in the main shell and in casing 7 of the engine by means of antifrictional bearings 31. Sprockets 32 are fixed upon the axle projections 30, and a sprocket 33 is fixed upon the main shaft 1. A sprocket chain 34 extends around sprocket 33 and around the respective sprockets 32 for causing rotation of the latter and the sleeves 17 and 18 in the same direction as the main

shaft 1 and fly wheel 2. This sprocket connection is so arranged that sleeves 17 and 18 are rotated at twice engine speed.

The operation of the engine will be readily understood by reference to Figs. 2 and 4. The sleeves 17 and 18 and pistons 20 are so arranged relative to one another that when the pistons come opposite the abutments formed by said sleeves they will be received in recesses 21—22 in order to permit movement of the pistons past the abutments.

With the parts in the position shown in Fig. 2 assuming the engine to be rotating in the direction indicated by the arrow, a charge will have been drawn into the portion of chamber 8 denoted by the letter A through the suction created in said chamber by the passage of the piston denoted by the letter B along said chamber. As soon as the piston C moves beyond sleeve 18 it will compress said charge within chamber A, the far end of said chamber being closed by sleeve 17. When the charge is compressed recess 21 will have moved into alinement with the passage 25 communicating with the portion A of chamber 8 and the compressed charge will be forced through passage 21 into the firing chamber 15. Continued rotation of the sleeve 17 will bring the recess 21 thereof into alinement with the opposite end of firing chamber 15 and with the passage 25 communicating with the portion D of chamber 8. With the parts in this position the charge within firing chamber 15 is exploded so that the force of the expanding gases will be exerted against piston B for forcing the same along the portion D of chamber 8. This movement of piston B along chamber 8 will at the same time force the exhaust gases in rear of piston C out of chamber D through the exhaust port 28.

Various changes may be made without departing from the spirit of the invention as claimed.

What is claimed is:

An internal combustion engine including a casing forming an annular chamber, a rotor having a piston movable in said chamber, abutments traversing said chamber and shiftable to permit said piston to pass, inlet and exhaust ports at opposite sides of one of said abutments, the other of said abutments being rotatable, hollow, and provided with a transverse chamber having a port adapted to communicate with said annular chamber at opposite sides of the piston as said abutments shift, and a firing means within said transverse chamber, the latter being arranged to communicate with said annular chamber at its respective ends through successive alinement of said ends with said port in the hollow abutment, so as to permit the passage of a charge contained in said annular chamber from one side of said hollow abutment to the other.

In testimony whereof I have signed my name to this specification.

TRAV. CUSHMAN.