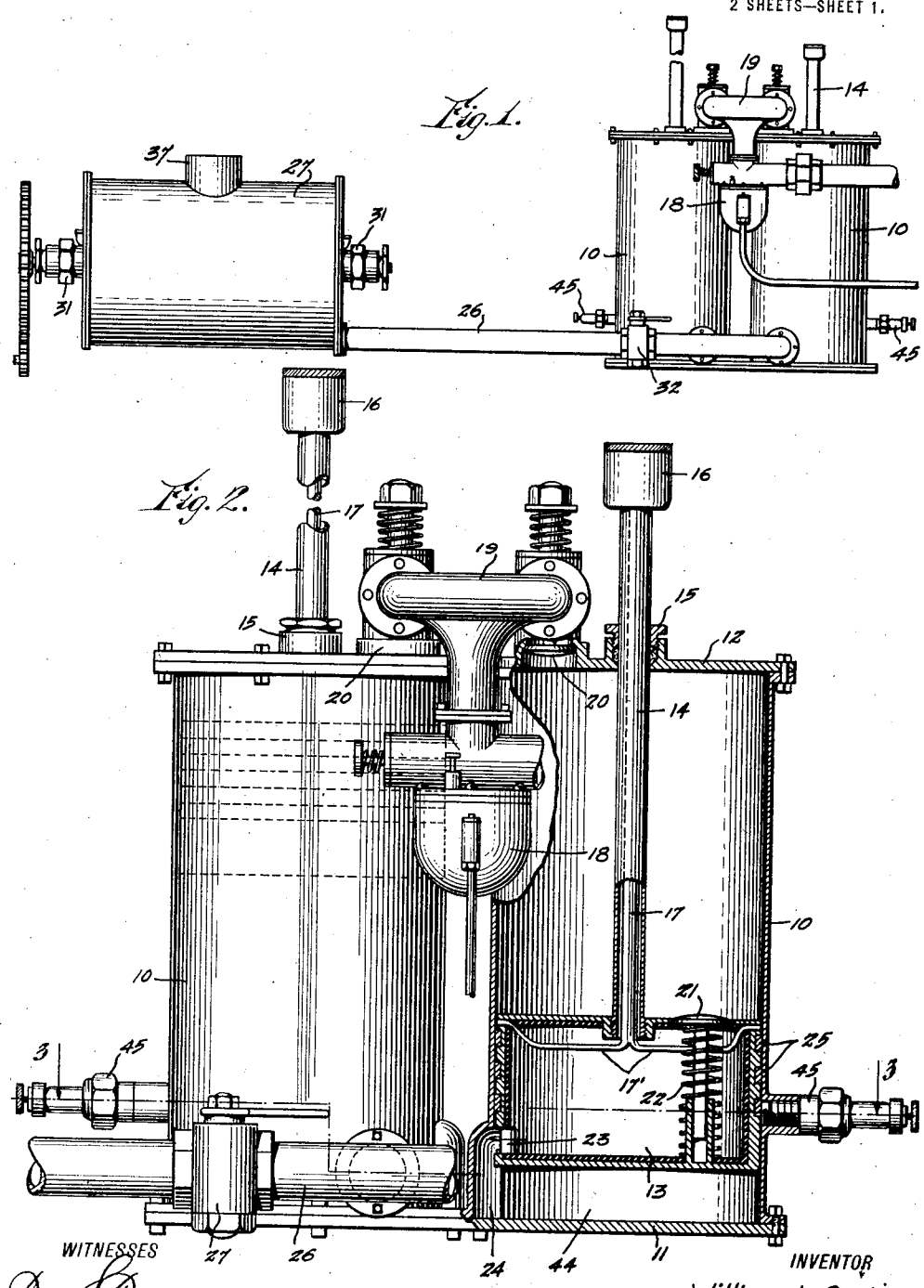


1,332,807.

W. L. CORLISS.
COMBUSTION ENGINE.
APPLICATION FILED OCT. 3, 1918.

Patented Mar. 2, 1920.
2 SHEETS—SHEET 1.



WITNESSES
Frank J. Paggiari
Geo. H. Seeler

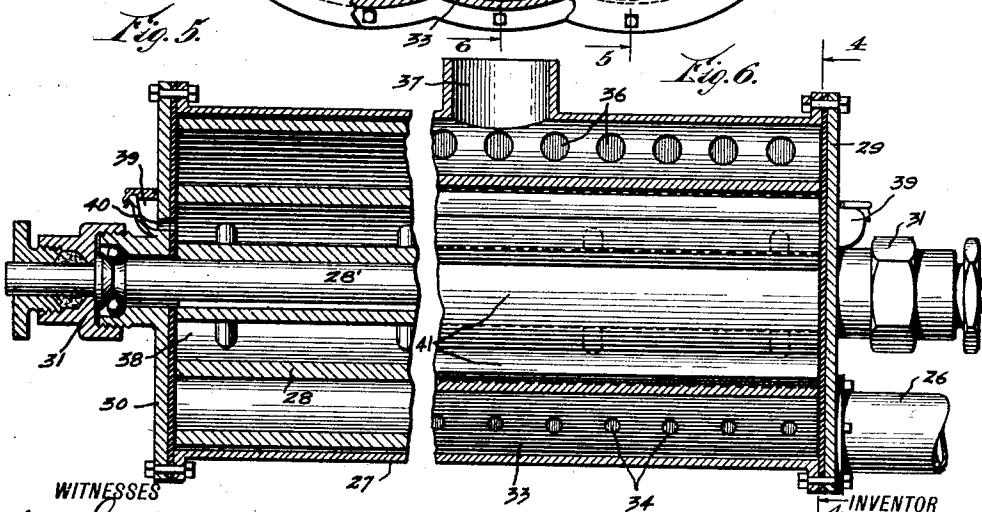
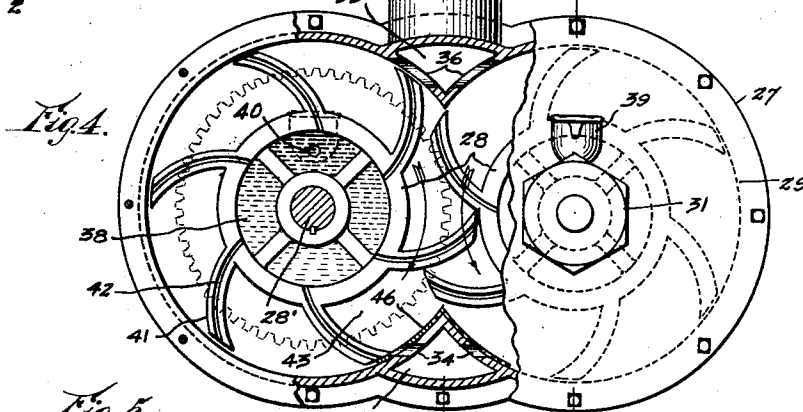
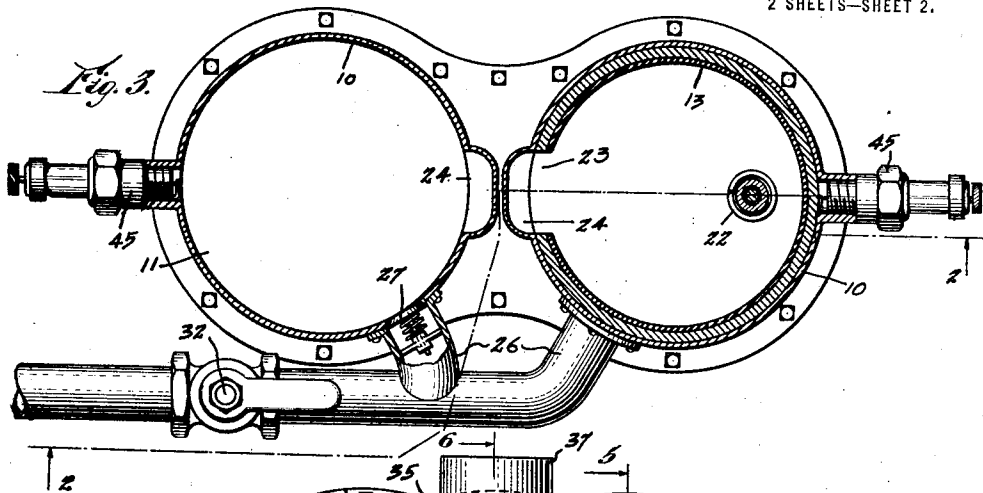
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ATTORNEYS

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UNITED STATES PATENT OFFICE.

WILLIAM LARKIN CORLISS, OF NEW YORK, N. Y.

COMBUSTION-ENGINE.

1,332,807.

Specification of Letters Patent.

Patented Mar. 2, 1920.

Application filed October 3, 1918. Serial No. 256,724.

To all whom it may concern:

Be it known that I, WILLIAM L. CORLISS, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Combustion-Engine, of which the following is a full, clear, and exact description.

This invention relates to engines in which there is involved the combustion of gaseous vapors.

Among the objects of the invention is to provide an engine comprising a pair of co-operating rotors in a compound casing, each rotor constituting an abutment for the other or between which there is a direct propulsive effect of the driving medium.

A further object of the invention is to provide a casing constituting a combustion chamber, and in or with relation to which there operates an automatic reciprocating compressor for mixed gases that are received from the source of supply and delivered to the combustion end of the casing.

With the foregoing and other objects in view the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed or suggested herein, still for the purpose of illustrating a practical embodiment thereof reference is had to the accompanying drawings, in which like reference characters designate the same parts in the several views, and in which—

Figure 1 is a diagrammatic side elevation of my improvement.

Fig. 2 is an enlarged side elevation of one of the combustion chambers and indicating a companion combustion chamber in vertical section on the line 2—2 of Fig. 3.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2.

Fig. 4 is a vertical transverse section on the line 4—4 of Fig. 6.

Fig. 5 is a partial longitudinal section on the line 5—5 of Fig. 4.

Fig. 6 is a similar view on the line 6—6.

Referring now more particularly to the drawings, I show in the first two figures what may be termed power creating or originating means in the provision of a casing 10 of hollow cylindrical form having a closed end or base 11, and a cap plate 12 at the opposite end. Within the casing 10 is a hollow reciprocating piston 13 having a stem or

handle 14 extending upward through a stuffing box 15 in the center of said cap plate. The stem 14 is in the nature of a tube having a cup 16 at its upper end and through which a suitable lubricant may be conveyed through an inner tube 17 and branch ducts 17' to lubricate the wearing surface of the piston that is reciprocated along the inner surface of the casing. It will be noted that I show two of these combustion casings, and in this connection it will be understood that a greater or less number than two may be employed and the specific description of one of them will be understood as applicable to any number.

18 indicates any suitable form of carbureter or gaseous fuel mixer and from which a manifold 19 leads through a puppet valve 20 into the upper end of the casing.

The piston 13 being hollow is fitted in its upper face with an inwardly opening puppet valve 21 held normally closed by means of an expansion spring 22. At the lower portion of the cylinder is provided a port 23 adapted when the piston is down to communicate with a by-pass 24 at or adjacent to the base 11 of the combustion casing. The piston is provided with suitable packing rings 25 for their usual purpose.

From the bottom of the casing 10 there is a pipe 26 guarded by means of a puppet valve 27, opening outward from the casing, and this pipe 26 leads into a compound cylinder 27 within which are two coöperating rotors 28 adapted to rotate in opposite directions around parallel axes located in the centers of the two merging or twin cylinder structures having substantially closed ends 29 and 30. These cylinders are stationary and the rotor shafts 28' are journaled in suitable bearings therein shown at 31. The pipe 26 leading from the combustion casing to the rotor cylinders is provided with a hand operated cock 32 whereby the passage of the gases may be controlled.

The pipe 26 delivers the gases into a longitudinal distributing chamber 33 shown as arranged below and adjacent to both of the rotors, the wall separating the chamber 33 from the rotors being provided with oppositely arranged ports 34. At the upper portion of the double cylinder structure is another chamber 35 into which larger ports 36 open and from which exhaust is had through the exhaust port 37.

The rotors are peculiar in the construc-

tion of central cylindrical oil chambers 38 concentric with the shafts 28' and adapted to be kept supplied with oil through cups 39 at the ends and through ports 40 formed in the end closures 29 and 30. The rotors in addition to the oil cylinders at their hubs are provided with a series of wings or blades 41 extending preferably the full length of the rotors and arranged, generally speaking, approximately tangential to the oil cylinders. These wings 41, however, are curved rearward at their outer ends with respect to the direction of rotation indicated by the arrows on Fig. 4. These wings furthermore are provided with oil ducts 42 through which the oil may be conveyed from the cylindrical hubs out to the bearing surface of the cylinders against which the outer edges of the wings have fairly close fit. The wings of one rotor interengage with the wings of the other rotor, and these two rotary structures are so arranged that the edges of the wings of one will just meet or touch the exterior surface of the oil hub of the other just ahead of the roots of the wings of the latter. Thus the cavity within the adjacent cylinders at 43 just within the ports 34 will always be bounded by the two oil cylinders which while rotating constantly around fixed centers are in effect stationary, the stationary wall of the cylinders in which are formed the ports 34, and three wings, two of the wings being movable substantially away from each other while passing the ports 34 while the third wing is the one bridging the gap between the two cylinders 28. Irrespective, therefore, of the form of the wings and the fact that the propelling gases are jetted through the ports 34 in opposite directions, the pressure of the gases is effective against twice as much moving surface in one direction as in the other, thus insuring the rotation of the rotors as indicated, and as a result of relatively light force or pressure.

The operation of the engine herein described is substantially as follows: Under ordinary circumstances it is calculated that the combustion space 44 in the lower end of the casing 10 below the piston 13 will be retained at all times at least partly charged with products of combustion tending to lift the piston 13. If, however, the device is not so charged or is cold it may be started or primed by manually grasping the outer end of the stem 14 and reciprocating the piston thereby up and down for the purpose of delivering a sufficient charge of gaseous fuel received through the carbureter and manifold down into the combustion chamber 44 where it will be ignited by any suitable form of sparking device or torch indicated conventionally at 45. The combustion of the gases in the combustion chamber will cause naturally the expansion thereof under a high

degree of force, a portion of such gases passing outward through the pipe 26 to the combined rotor cylinders. Another portion of such gases will act to force the piston upward and at the same time compress the charge of fresh gases in the space between the piston and the cap plate 12. By reason of the closing of the valve 20 during this action the gases so compressed or a large portion thereof will be delivered inward past the valve 21 to the interior of the piston. At the moment the pressures balance between the interior of the piston and the space above it, the valve 21 will close and upon the relief of the pressure below the piston incident to the expansion and exhaust of the gases through the rotor structures the portions of compressed gas above the piston will act to force the piston downward until the port 23 is uncovered at the by-pass 24, thus bringing about equilibrium of pressures within the piston and below it, whereby together with the rebounding action of the piston the piston will be lifted sufficiently to uncover the igniting device 45 and thus the alternate admissions of the fresh gases and the combustion thereof will continue automatically so long as the admission and delivery of the gases to and from the combustion cylinders are not checked by valves or other means. The gases admitted through the ports 34 into the pressure chamber 43 will act to drive the two adjacent forward moving wings in opposite directions and will be delivered eventually through the ports 36 and exhaust port 37 with slight resistance. At the part of the cylinder casings where active wings cooperate I may provide a packing facing 46 which may be renewed from time to time as it may become worn.

I claim:

1. In an engine of the character set forth the combination of a movable power device, means to convey expansive gases thereto and means to create expansive gases, the last-mentioned means comprising a fixed cylinder, a hollow reciprocating piston slidably fitted in said cylinder, a cylinder head fixed to each end of said cylinder, an intake means for an explosive mixture provided in one cylinder head, means provided in the opposite cylinder head for the exhaust of the products of combustion, means for admitting the explosive mixture to the hollow piston at one end of its stroke, means for exhausting said compressed explosive mixture into the cylinder at the opposite end of its stroke, and means for igniting the compressed explosive mixture.

2. In an engine of the character set forth, the combination of a combustion cylinder having at one end a combustion chamber and being adapted to receive at the other end a fresh mixture, a hollow piston recip-

rotating within the cylinder serving to convey a charge of fresh compressed mixture from one end of the cylinder to the other, means to cause combustion of the charge so delivered, and movable power means actuated by the products of combustion.

3. In an engine of the class set forth, the combination of a combustion cylinder, means to deliver fresh mixtures into one end of the cylinder, a hollow piston within the cylinder, and adapted to reciprocate from one end to the other thereof, said piston serving when reciprocated toward the admission end of the cylinder to receive within the piston a charge of compressed mixture and when reciprocated toward the opposite end serves to deliver said compressed charge to the space beyond the piston, means to fire the charge of compressed mixture last referred to, a movable power device, and means to convey the products of combustion from the last mentioned space to the movable power device.

4. The herein described engine comprising a twin cylinder structure, cooperating rotors adapted for continuous rotation around parallel axes in said cylinder structure, said rotors comprising alternately arranged interengaging wings, a cylinder coaxial with the axis of rotation of each rotor and supporting said wings, means for admitting a lubricant to each of said cylinders, means for conveying the lubricant to the outer ends of the wings, and means to introduce a power pressure fluid into the space within the cylinder structure just beyond the interengaging wings whereby the force of the fluid will cause movement of the wings away from each other and the

rotation of the rotors in the opposite direction.

5. In an engine of the character set forth, the combination of two communicating cylinders, a pair of rotors journaled for rotation therein in opposite directions around parallel axes, a distributing chamber extending along one portion of the cylinder structure at the line of connection of the two cylinders, the inner walls of said distributing chamber having oppositely directed ports, an exhaust port at the opposite side of the cylinder structure from the distributing chamber, said rotors having cylindrical hub structures, means for admitting a lubricant to each of said cylindrical hub structures, and having also interengaging wings arranged approximately tangential to said hub cylinders, said wings serving to prevent the passage of power fluid between the rotor hubs, means for conveying a lubricant from said cylindrical hub structures to the tips of said wings, and means to deliver power fluid into said distributing chamber.

6. In an engine of the class set forth, the combination of a cylinder structure comprising two communicating cylinders, a pair of rotors journaled in the axes of said cylinders, means to admit a power fluid into one portion of the cylinder structure, an exhaust port at a remote part of the cylinder structure, said rotors comprising hollow hub structures and a series of interengaging wings extending from the surface of said hub structure, and means to convey a lubricating means through the hollow hubs and along the wings to lubricate all wearing surfaces.

WILLIAM LARKIN CORLISS.