W. E. PEARSON.

REVERSIBLE EXPLOSIVE ROTARY ENGINE UNIT.

APPLICATION FILED DEC. 4, 1907.

901,554. Patented Oct. 20, 1908.

5 SHEETS—SHEET 1.

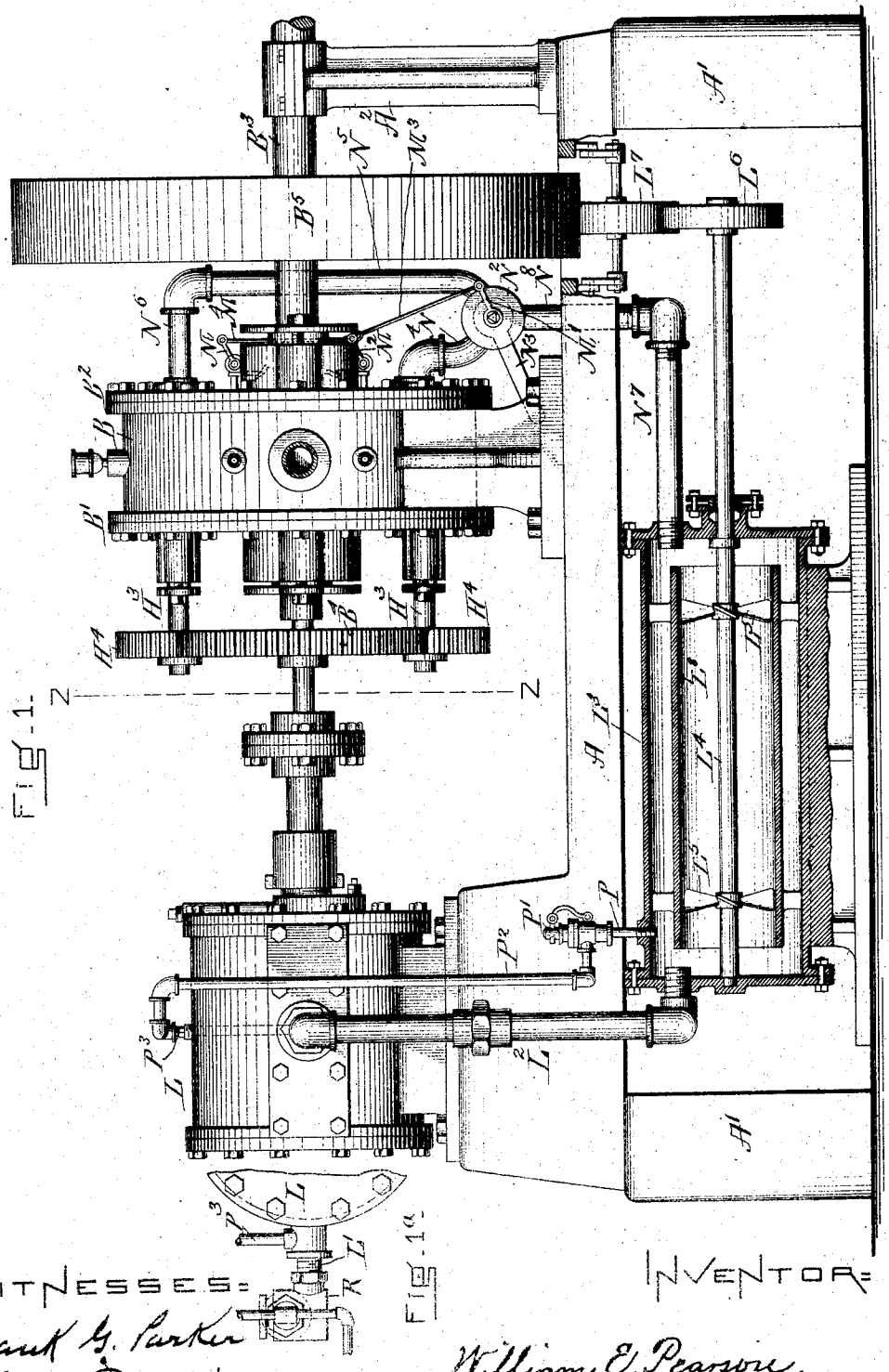


Fig. 1.

Fig. 1a.

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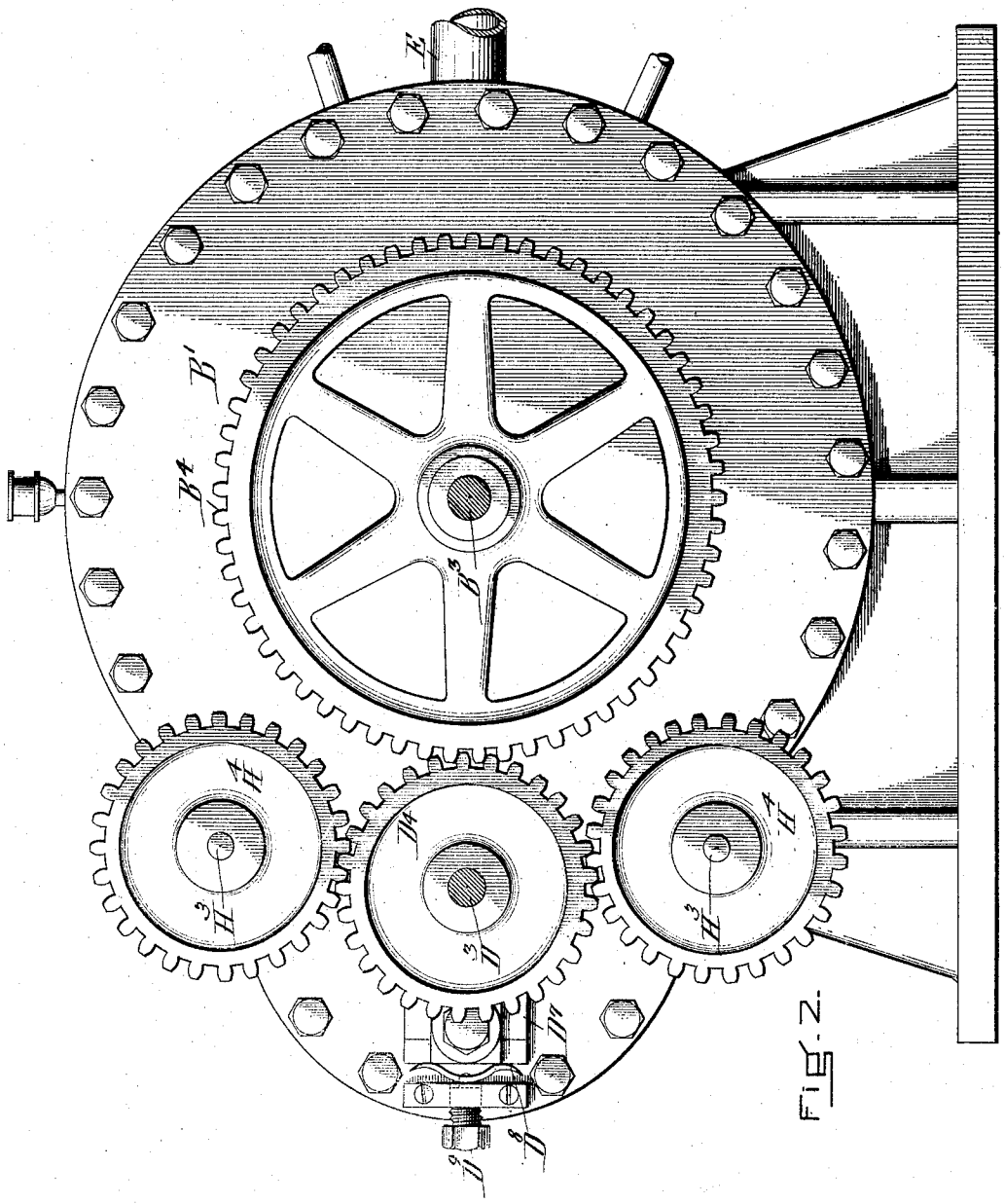


Fig. 2.

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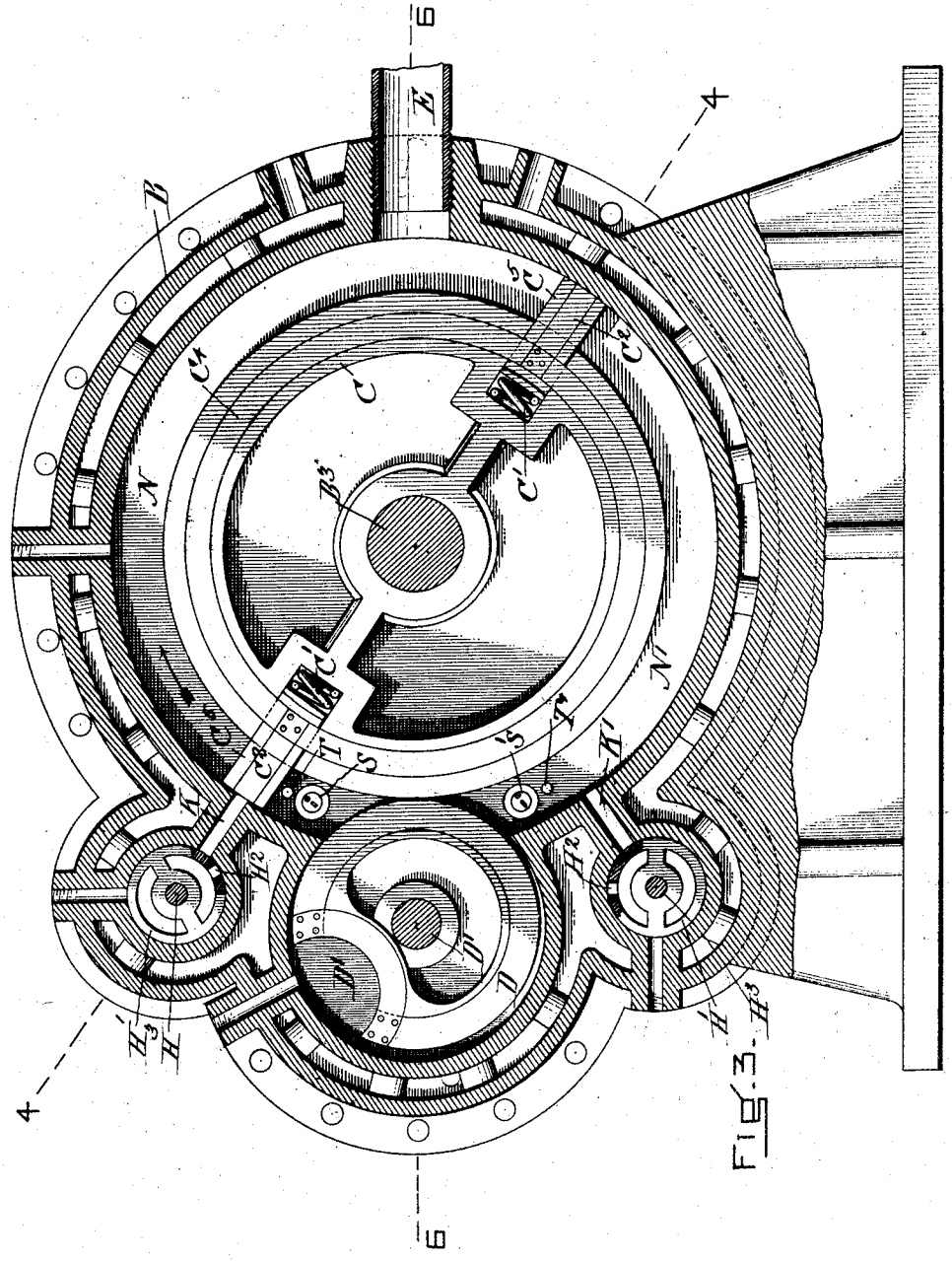


FIG. 3.

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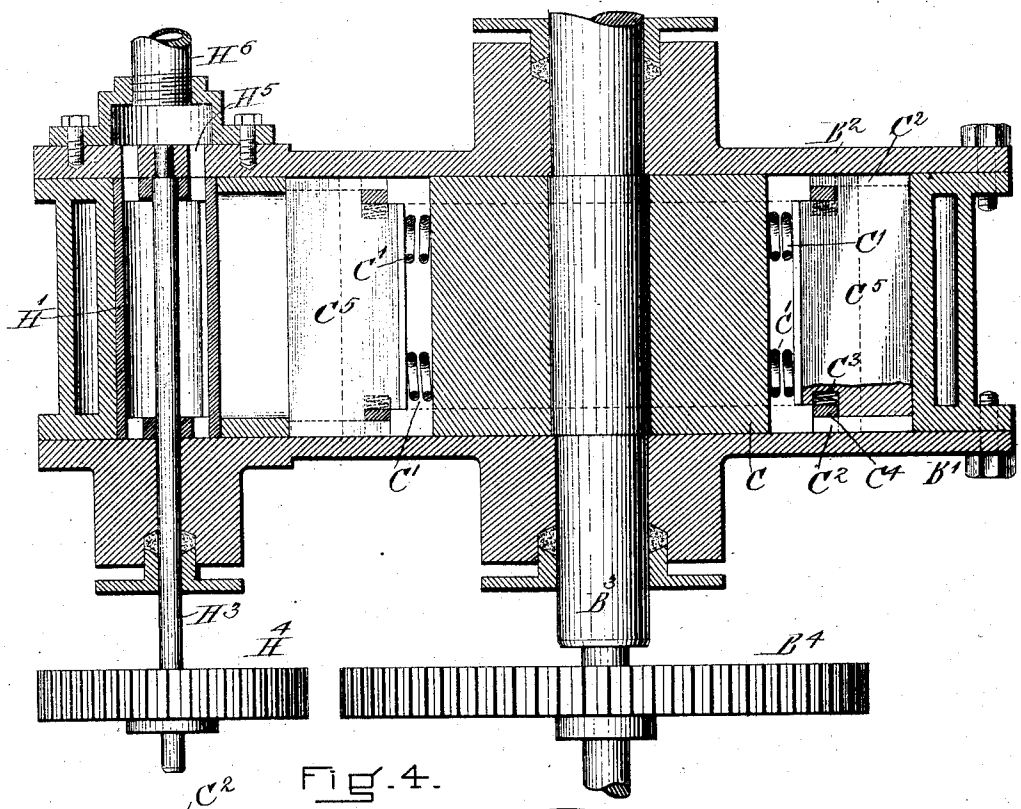


Fig. 4.

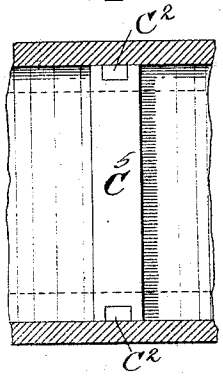


Fig. 4a

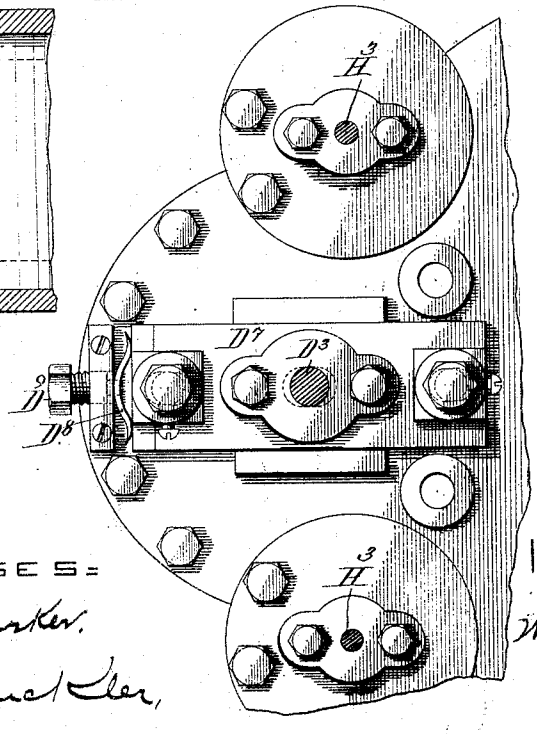


Fig. 5.

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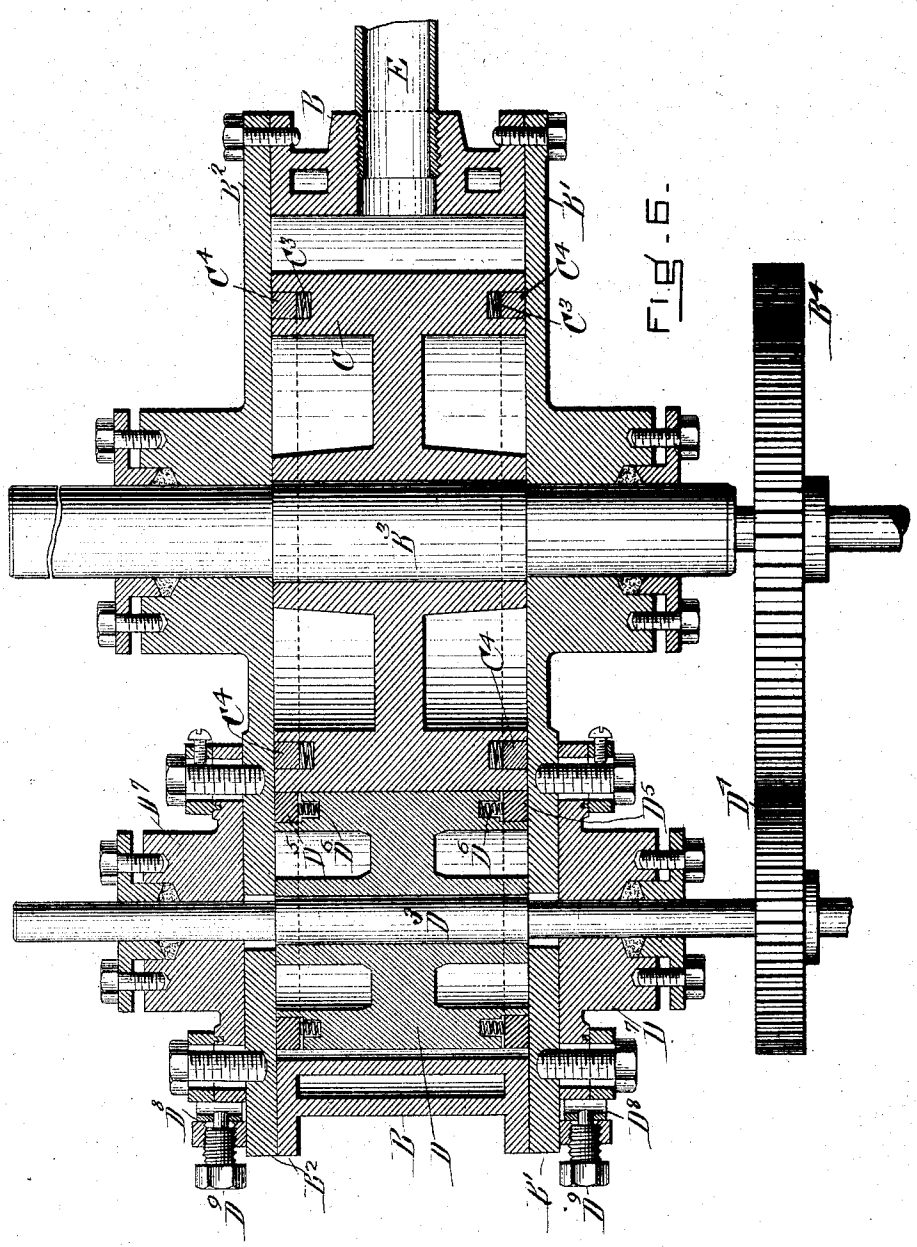


Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM E. PEARSON, OF SWAMPSCOTT, MASSACHUSETTS.

REVERSIBLE-EXPLOSIVE-ROTARY-ENGINE UNIT.

No. 901,554. Specification of Letters Patent. Patented Oct. 20, 1908.

Application filed December 4, 1907. Serial No. 405,108.

To all whom it may concern:

Be it known that I, WILLIAM E. PEARSON, a citizen of the United States, of Swampscott, in the county of Essex and State of Massachusetts, have invented a new and useful Improvement in Reversible-Explosive-Rotary-Engine Units, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of explosive rotary engines in which compressed mixtures of air and gases or vapors are used for generating power; and consists in the construction and arrangement of parts, and may be best understood by reference to the full description.

The object of the invention is to so construct and arrange the parts that the whole shall constitute a unit for developing power, all the elements of the engine having continuous rotary movements, and are so constructed that by the movement of a hand lever the engine will reverse its rotation. This object I attain by the mechanism illustrated in the accompanying drawings, in which

Figure 1 is a front elevation of my machine; Fig. 2 is an end elevation of the engine proper, viewed from line 2—2 of Fig. 1, made on a larger scale than Fig. 1. Fig. 1^A shows an end elevation of a part of the compressor with the carburetter attached. Fig. 3 is a vertical cross section taken through the casing of the engine but showing the piston carrier, pistons, the buttress and the valves in end elevation. Fig. 4 is a section of the engine and one of the rotating valves taken on line 4—4 of Fig. 3. Fig. 4^A shows the outer edge of one of the pistons, that is the part that bears on the interior surface of the cylinder. Fig. 5 is an end view of a part of the engine casing showing an adjustable bearing for the journal of the buttress. Fig. 6 is a horizontal section taken on line 6—6 of Fig. 3.

In the drawings the base of the entire machine is represented by A, Fig. 1, and is supported upon legs, A^1, A^1. The standard A^2 supports one end of the main shaft B^3 of the engine proper B. The engine is secured to the base A, as shown.

Referring particularly to Figs. 3 and 6, the construction of the engine proper will be explained. The cylindrical casing is indicated by B, and the ends by B^1, B^2. C is the piston carrier and is mounted upon the main shaft B^3. The said piston carrier C has at its ends packing rings C^4 C^4 which are forced outward against the interior of the casing B^1 and B^2, by springs C^3, C^3. The packing rings have radial arms, C^2, C^2, one of which is shown in full lines in Fig. 4 and two of them are shown in end view in Fig. 4^A. These radial arms C^2, C^2, pass through grooves made in the end of the pistons C^1, as shown in Figs. 4 and 4^A, and act as packings for the ends of the said pistons. The said pistons C^5, C^5, of which there are two, are shown in end view in Fig. 3, and are forced outward with springs C^1, thus insuring a close fit and providing for wearing.

The buttress, D, is mounted upon the shaft D^1, and has a piston-receiving recess d^1. This buttress makes two rotations for one rotation of the piston carrier C, and is connected by gearing, see Figs. 2 and 6, to the piston carrier. The said gearing consists of a large spur gear B^4 which engages with a gear wheel D^4 of one-half the diameter, on the shaft D^3. The said shaft is mounted in adjustable housings D^7 which have springs D^8, and adjusting screws D^9. The rotating buttress D has packing rings D^5, D^5, at its ends which are kept in contact with the inside of the casing by spiral springs D^6—D^6.

My engine is reversible and has one exhaust port, E, but requires two inlet ports, K and K^1, which are controlled by rotating valves; the construction of the said valves is shown in Figs. 3 and 4. Each inlet port is controlled by a rotating valve H^1, which is mounted upon a shaft H^3, and is rotated by a spur gear H^4, on the shaft of the said rotating valve. One of these rotating valves is shown in section in Fig. 4. The charge is supplied to the rotating valve by the pipe H^6, which is interiorly connected with the openings H^5 through which the charge flows into the center chamber of the valve and from it is discharged through the openings H^2 (when the valve is in position) into the piston chamber N or N^1, that is, into the chamber N to cause the pistons to move in one direction, that of the arrow, into the chamber N^1 to cause them to move in the other direction, that is, the reverse.

I will now describe the compressor and its connection, see Fig. 1. The compressor consists of a pump, L, of the rotary class and is so constructed that it will work equally well when running in either direction, that is, it is a reversible rotary pump, adapted to furnish

an explosive mixture as a charge for the rotary engine proper. The exploding charge is drawn from the carbureter R, through the pipe L^1 into the compressor pump L; from the pump the charge is forced through the pipe L^2 to the mixer L^3. This agitator or mixer consists of a casing L^3 of any suitable dimensions and has within it a shaft L^4 having propeller-like wings L^5—L^5 which rapidly rotate and thus keep the charge mixed. To increase the efficiency of this device, I place within the outer casing L^3 an inner casing L^8, arranged as shown, leaving a passage between the inner and outer casings and free passage at each end so that irrespective of the way that the fans L^5—L^5 rotate there will be strong currents and eddy currents in the mixer casing or tank. This is essential as the charge is often but a mixture of air and vapor and sometimes air and a sprayed fluid or air and a fixed gas of a different gravity or density. It will be seen that this construction will maintain a homogeneous condition of the charge or mixture whether the engine turns in one direction or the other. The mixing fans are driven by the main wheel B^6 acting through the adjustable friction pulley L^7 and the pulley L^6. From the mixer L^3 L^8 the charge passes through the pipe N^7, N^8, to the three-way cock N^2, thence through the pipe N^4 to the lower rotating valve H^1, see Fig. 3, or through the pipe N^5, N^6, to the upper rotating valve, also indicated by the letter H^1. In the latter case the charge passes through the port K and causes the engine to operate as indicated by the arrow, Fig. 3. And in the other case the charge passes through the port K^1, and the engine is reversed. The three-way cock N^2 is operated by the hand lever N^3, see Fig. 1. To prevent a too great pressure in the mixer L^3 L^8, a pipe P leads to a relief valve P^1, from which a pipe P^2 P^3 returns to the inlet pipe L^1 of the pump L.

Another and very important feature of my engine is the clearance port, of which there are two, T and T^1, Fig. 3, located near the spark plugs S and S^1. The object of these clearance ports is to allow of the escape of air and gases that may remain in the piston chamber after the piston has passed the exhaust port E; for instance, referring to Fig. 3 we see that the piston C^5 has passed the exhaust port E, and that the chamber N^1 must of necessity be filled with air taken in at the port E, or with the products of combustion remaining in the said chamber, after the explosion, and that had not been driven out before the piston C^5 passed the exhaust port, it is evident that unless the said dead contents of the chamber N is allowed to escape it will check, by becoming condensed, the rotation of the piston carrier or it will pass by the buttress D^1 and expanding fill the chamber between the buttress D^1 and the piston C^5, and thus prevent a full explosive charge from entering through the valve K, the clearance port T being closed. Another advantage of having the piston chamber freed from air or other dead charge is that when the new charge is admitted it is not diluted, and hence lowered in its efficiency, by the said air or other dead charge. It being understood that when the engine is running direct, that is, in the direction of the arrow, the clearance port T is always closed, and when the engine is reversed the clearance port T^1 is always closed.

The means for opening and closing the clearance ports may be described as follows: Attached to the hand reversing lever N^3, Fig. 1, that operates the three-way cock N^2, is a short arm M^1, which is connected by the link M^3 to a short arm M^2 which operates the valve of the clearance port T^1. The same link M^3 is also connected by a second link M^4 to a short lever M which operates the valve of the clearance port T.

From the above it may be seen that the lever which controls the explosive charge and sends it to the direct charge port K or to the reverse charge port K^1, also controls the clearance ports T and T^1, always closing one when opening the other.

Claims.

1. An explosive rotary engine unit, comprising a casing, having exhaust and inlet ports; a cylindrical continuously rotating piston carrier and pistons; a continuously rotating buttress; continuously rotating valves controlling and directing the charges; a continuously rotating charge compressor, a charge reservoir having rotating mixers, and means for operatively connecting the several parts; substantially as and for the purpose set forth.

2. A reversible explosive rotary engine unit, comprising a casing, having exhaust and inlet ports; a cylindrical continuously rotating piston carrier and pistons; a continuously rotating buttress; continuously rotating valves controlling and directing the explosive charges; a continuously rotating charge compressor; a charge reservoir; an exhaust port and clearance ports and means for operatively connecting the several parts; substantially as and for the purpose set forth.

3. A reversible explosive rotary engine unit comprising a casing having exhaust and inlet ports; a cylindrical continuously rotating piston carrier and pistons; continuously rotating valves controlling and directing the charges; a continuously rotating charge compressor; a charge reservoir having continuously rotating mixers; clearance ports and means for operatively connecting the several parts; substantially as and for the purpose set forth.

4. In a rotary engine apparatus, a reversing valve, a lever for operating the said valve,

clearance ports having closing valves and mechanism connecting said reversing valves with the closing valves of the said clearance valves whereby the said reversing valves and the said clearance valves will be operated substantially as and for the purpose set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, on this 3d day of December A. D. 1907.

WILLIAM E. PEARSON.

Witnesses:

FRANK G. PARKER,
WILLIAM EDSON.