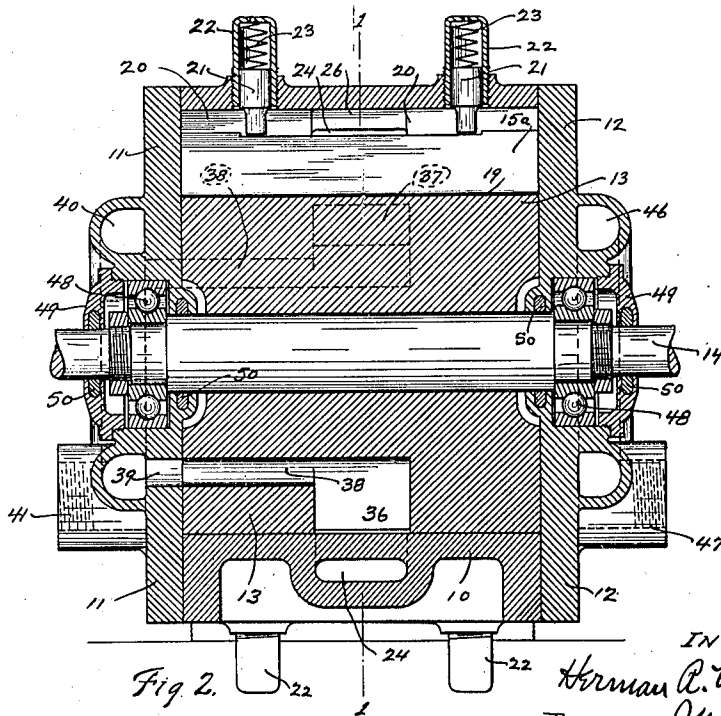
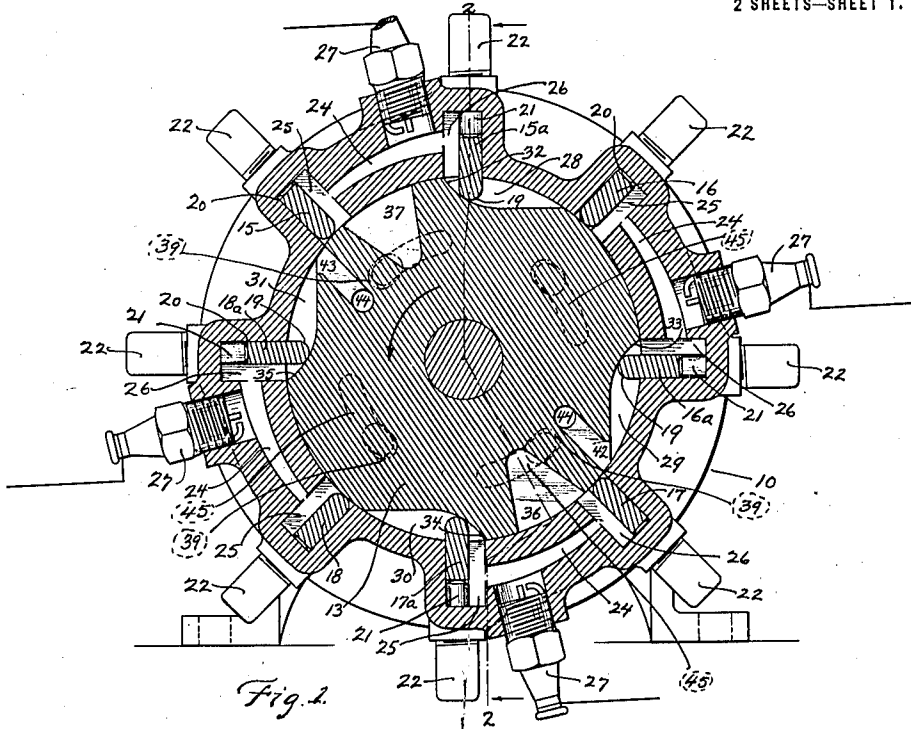


H. A. WEIDENBACH.
 ROTARY ENGINE.
 APPLICATION FILED JUNE 12, 1917.

1,280,915.

Patented Oct. 8, 1918.
 2 SHEETS—SHEET 1.



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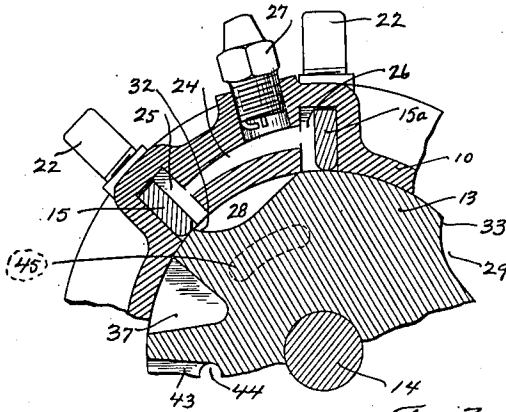


Fig. 3.

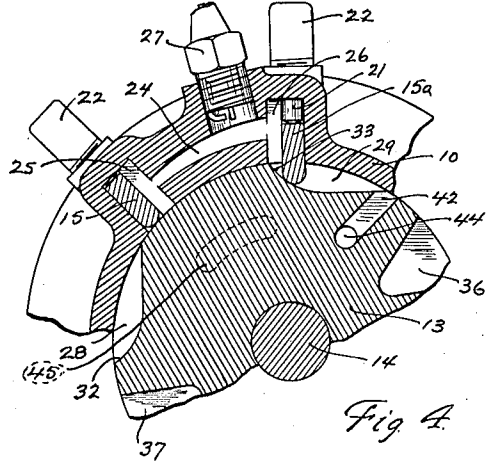


Fig. 4.

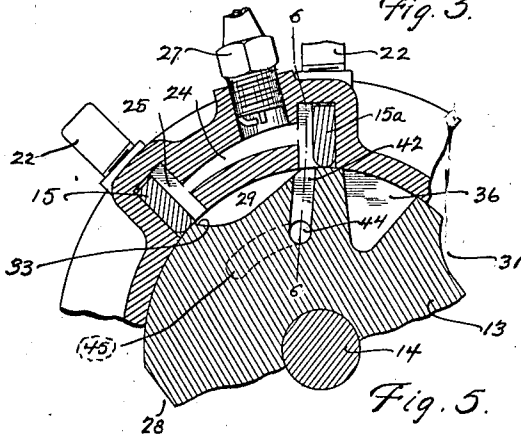


Fig. 5.

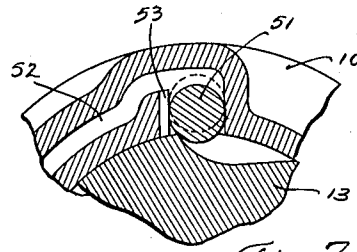


Fig. 7.

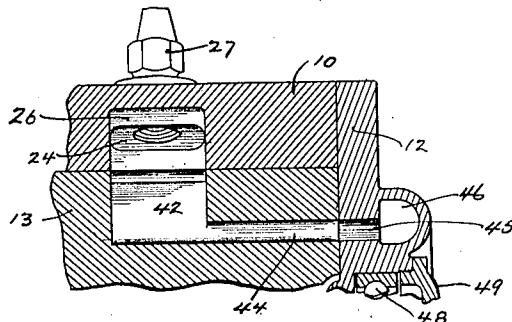


Fig. 6.

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UNITED STATES PATENT OFFICE.

HERMAN A. WEIDENBACH, OF BUFFALO, NEW YORK.

ROTARY ENGINE.

1,280,915.

Specification of Letters Patent.

Patented Oct. 8, 1918.

Application filed June 12, 1917. Serial No. 174,368.

To all whom it may concern:

Be it known that I, HERMAN A. WEIDENBACH, a citizen of the United States of America, and a resident of the city of Buffalo, county of Erie, and State of New York, have invented certain new and useful Improvements in Rotary Engines, of which the following is a full, clear, and exact description.

My invention relates generally to rotary engines and more particularly to that type of engine known as an internal combustion engine, using gas or gasoline for its fuel.

The general object of my invention is to provide an efficient engine which shall be simple and cheap to operate.

One of the characteristic features of my invention, which greatly increases its efficiency, is that its casing is formed with a plurality of compression chambers, and a sliding valve at each side of each of the chambers.

My invention consists in the construction, combination and arrangement of parts, shown in the accompanying drawings, in which:—

Figure 1 is a transverse, sectional elevation of the complete engine, taken on line 1—1 of Fig. 2.

Fig. 2 is a longitudinal, sectional elevation, taken on line 2—2 of Fig. 1.

Figs. 3, 4 and 5 are fragmentary, transverse, sectional elevations taken on line 1—1 of Fig. 2.

Fig. 6 is a fragmentary, longitudinal sectional elevation, taken on line 6—6 of Fig. 5.

Fig. 7 is a fragmentary, transverse, sectional elevation of a modified form of valve.

My device comprises, in general, a stationary outer casing 10, having a head 11 at one end and a head 12 at the outer end thereof; a rotor 13 arranged to rotate within the casing; and a shaft 14, having the rotor 13 rigidly mounted thereon, and suitably journaled within the casing heads 11 and 12.

The casing 10 is provided with a plurality of pairs of radially arranged sliding valves 15 and 16^a, 16 and 16^a, 17 and 17^a, and 18 and 18^a. These valves are each preferably rectangular in cross-section, and the working face 19 of each is circular in form. Each of these valves extends preferably the full width of the casing, and each is mounted within a radial slot 20. Secured to the cas-

ing and arranged immediately above each of the valves are, preferably, two spring plungers 21. Each of these plungers is arranged within a cylinder 22, preferably screw-threaded into the casing 10 and containing a helical spring 23, which bears against the upper face of the plunger 22, thus serving to keep its lower face in contact with the sliding valve. The cylinders 22 may be adjusted so as to alter the spring pressure upon the sliding valves.

Formed within the casing 10 and arranged between each pair of sliding valves is a compression chamber 24. Each of these chambers is arranged concentric with the casing and is preferably a little wider at one end than at the other. They are each made to communicate with the interior of the casing at one end by means of a compression port 25 and at the other end by means of a compression port 26. These ports 25 and 26 are arranged next to the inner oppositely arranged faces of each pair of sliding valves. A spark plug 27 is provided for each one of the compression chambers.

The rotor 13 of my device is provided in its periphery with a plurality of suction chambers 28 and 30 and a plurality of combustion chambers 29 and 31, thus forming abutments 32, 34, 33 and 35 respectively. These suction chambers are arranged diametrically opposite each other, and the combustion chambers in a like manner. This rotor is rotatably arranged within the casing 10 and is of such a diameter that its periphery is in close proximity to the inner wall of the casing, thus closing off the compression chambers, and inlet and exhaust chambers, to be hereinafter described.

36 and 37 are inlet chambers, formed in the periphery of the rotor, and arranged diametrically opposite each other. An inlet port 38 is provided in the rotor for each of these inlet chambers; and each of them extends from the inlet chamber to which it is connected to the left hand face of the rotor, (as viewed in Fig. 2) where it terminates. These inlet ports communicate periodically with a series of auxiliary inlet ports 39 arranged in the head 11. As these ports 39 are formed in the head 11, (which does not appear in Fig. 1) they are shown by dot and dash lines. There are as many auxiliary inlet ports as there are suction and combustion

chambers, and they are connected together by means of a manifold 40, arranged on the outside of the head 11. An intake connection 41 is provided on this head and it is in communication with the manifold 40, whereby fuel from a suitable carbureter or vaporizer is conducted to the engine. The inlet chambers 36 and 37 are each preferably V-shaped in form, so that they will be in communication with the compression ports 25 during a portion of the rotation of the rotor. When these inlet chambers are in communication with any two diametrically opposite compression ports 25 the inlet ports 38 connected therewith will be in communication with two of the ports 39 in the head 11.

42 and 43 are exhaust chambers, formed in the periphery of the rotor, and arranged with their outer ends diametrically opposite each other. These chambers 42 and 43 are so positioned that the outer end of each opens into the outer periphery of the rotor and also into each of the two diametrically opposite combustion chambers 29 and 31, respectively. The inner end of each of these exhaust chambers is in communication with an exhaust port 44, which extends through the rotor and terminates at the right hand face thereof (as viewed in Fig. 6). Each of these exhaust ports communicate periodically with a series of elongated auxiliary exhaust ports 45, arranged in the casing head 12. These auxiliary ports are shown in dotted lines in Figs. 1, and 3 to 5, and are connected with each other by means of a manifold 46, made preferably integral with the head 12. An exhaust connection 47 is provided on the head 12, and is in communication with the manifold 46, whereby the exhaust gases are conducted from the engine. The auxiliary exhaust ports 45 are arranged so that the exhaust ports 44, leading from the exhaust chambers 42 or 43, are in communication therewith, from the time that the exhaust chambers register with the compression ports 26 until they have passed the compression ports 25.

The shaft 14, which carries the rotor 13, is rotatably mounted preferably in anti-friction bearings 48, carried by the heads 11 and 12. A dust cap 49 is arranged about the shaft and at the end of the bearings. Suitable packing 50 is provided within each of the heads and dust caps.

In the modification shown in Fig. 7, a valve in the form of a roller 51 is shown instead of the rectangularly shaped valve of the other form of my device. Any suitable type of spring pressure means may be provided for these rollers, as for instance, the type shown and hereinbefore described. 52 is one of the compression chambers and 53 is a port which connects the compression chamber with the interior of the casing.

For clearness of illustration, I have shown

the shaft 14 broken off at each end, it being obvious that power may be taken off at one end, and that to the other end may be connected a timer of any suitable form for distributing the current to the spark plugs 27.

In the illustrated form of my invention there are two suction chambers and two combustion chambers, and, when my engine is in operation, there are eight impulses or explosions to every revolution of the rotor, one occurring in each of the two diametrically opposite combustion chambers 29 and 31 simultaneously, when they are in register with the compression chambers 24.

I will now describe the cycle of operation, reference being had particularly to Figs. 1, and 3 to 5, inclusive: Referring first to Fig. 1, it will be seen that the inlet chamber 37 is in register with the compression port 25. As the rotor is revolved in a counter-clockwise direction, the chamber 37 will continue to remain in register with the compression port 25, while the inlet port 38 (shown in Fig. 2) will be in register with the auxiliary inlet port 39 (shown in dot and dash line). During this part of the revolution of the rotor, the abutment 32 of the suction chamber 28 will be receding from the sliding valve 15^a and causing a suction through the compression port 26 and compression chamber 24. A charge of fuel will, therefore, be drawn in through ports 39, 38, inlet chamber 37, and into the compression port 25, compression chamber 24 and compression port 26. The supply of fuel to this compression chamber 24 will be cut off as soon as the farther side of the inlet chamber 37 has reached the valve 15. When the rotor is revolved a little beyond this point it will occupy the position shown in Fig. 3, to which reference is now made. In this figure it will be seen that the circular part of the periphery of the rotor has closed the compression port 26, and that the suction chamber 28 is in communication with the compression port 25 and compression chamber 24. As the rotor continues to revolve, the valve 15 will contact with the upper surface of the suction chamber 28; and, as this chamber is gradually tapered rearwardly, the volume of the combined chambers will be diminished and, therefore, cause the gases to be compressed within the compression chamber 24 and the compression ports 25 and 26. When the tail end of the suction chamber 28 has passed the valve 15, the valve 15^a will contact with the surface of the combustion chamber 29 and the parts will occupy the position shown in Fig. 4. When in this position, the abutment 33 of the combustion chamber 29 will be in register with the compression port 26, and at this point, the timer of the engine will cause the spark plug 27 to ignite the charge and force the abutment 33 away from the valve 15^a,

thereby propelling the rotor and allowing the gases to expand. When the rotor has revolved to the point where the valve 15^a will pass the boundary of the exhaust chamber 42, as shown in Fig. 5, the exhaust gases will start to escape therethrough; and, as the rotor continues to revolve, the burned gases will be forced from the combustion chamber 29 until the exhaust chamber 42 reaches the valve 15 and is cut off thereby. When the rotor has passed this point in its revolution, the inlet chamber 36 will permit another charge to be drawn into the compression port 25 and compression chamber 24, whereupon the cycle of operation is repeated in this compression chamber.

While I have described the operation of the compression chamber between the pair of valves 15 and 15^a, it will be understood that the same cycle of operation is occurring in the compression chamber 24, between the opposite pair of valves. The charges contained within the compression chambers between the pairs of valves 15 and 15^a and 17 and 17^a are exploded simultaneously. Likewise the charge contained within the compression chambers 24, arranged between the pairs of valves 16 and 16^a and 18 and 18^a are exploded simultaneously. The explosions in the two sets of diametrically opposite pairs of compression chambers occur in succession, so that eight impulses are given to the rotor during each complete revolution thereof.

As hereinbefore stated, I have shown in the drawings a rotor having but two suction and two combustion chambers, it being obvious that any desired number of chambers may be formed, the number of pairs of sliding valves being increased accordingly. I have also shown but one form of spring pressure means for the sliding valves and clearly, any well known form of such means may be employed. Furthermore, for clearness of illustration, I have not shown a water cooling jacket for the casing. Obviously, these and other modifications may be made, and the casing may be provided with a water cooled jacket without departing from the spirit of my invention or the scope of the appended claims; and I do not, therefore, wish to be limited to the exact embodiment herein shown and described.

Having thus described my invention, what I claim is:

1. A rotary engine comprising a cylindrical casing and a cylindrical rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being formed in its periphery with a plurality of suction chambers and with a plurality of combustion chambers, and a plurality of radially reciprocating valves

carried by the casing and engageable with the suction chambers and the combustion chambers.

2. A rotary engine comprising a cylindrical casing and a cylindrical rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being formed in its periphery with a plurality of suction chambers and with a plurality of combustion chambers, a plurality of radially reciprocating valves carried by the casing and engageable with the suction chambers and the combustion chambers and arranged adjacent to the compression ports, and means for keeping the valves in engagement with the periphery of the rotor.

3. A rotary engine comprising a cylindrical casing and a cylindrical rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being formed in its periphery with inlet chambers arranged to communicate with the compression ports and chambers of the casing, and a plurality of radially reciprocating valves carried by the casing and engageable with the periphery of the rotor.

4. A rotary engine comprising a cylindrical casing and a cylindrical rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being formed in its periphery with a plurality of suction chambers and with a plurality of combustion chambers, the rotor being also formed in its periphery with inlet chambers arranged to communicate with the compression ports and chambers of the casing, and a plurality of radially sliding valves carried by the casing and engageable with the suction chambers and the combustion chambers.

5. A rotary engine comprising a casing and a rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being provided in its periphery with exhaust chambers arranged to communicate with the compression ports and chambers, and a plurality of sliding valves carried by the casing and engageable with the periphery of the rotor.

6. A rotary engine comprising a casing and a rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being provided in its periphery with a plurality of suction chambers and with a plurality of combustion chambers, said rotor being also provided in

its periphery with exhaust chambers arranged to communicate with the compression ports and chambers, and a plurality of sliding valves carried by the casing and engageable with the suction chambers and the combustion chambers.

7. A rotary engine comprising a casing and a rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being provided in its periphery with inlet and exhaust chambers, arranged to communicate with the compression ports and chambers of the casing, and a plurality of sliding valves carried by the casing and engageable with the periphery of the rotor.

8. A rotary engine comprising a casing and a rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being provided in its periphery with inlet and exhaust chambers, arranged to communicate with the compression ports and chambers, an inlet port connected with each inlet chamber and extending to one face of the rotor, an exhaust port connected with each exhaust chamber and extending to the other face of the rotor, and a plurality of sliding valves carried by the casing and engageable with the periphery of the rotor.

9. A rotary engine comprising a casing, a rotor, and heads secured to the ends of the casing, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being provided in its periphery with a plurality of suction chambers and with a plurality of combustion chambers, a plurality of sliding valves carried by the casing and engageable with the suction chambers and the combustion chambers, one of the heads being provided with auxiliary inlet ports, and the other of said heads being provided with auxiliary exhaust ports, these auxiliary ports communicating respectively with the inlet and exhaust ports of the rotor.

10. A rotary engine comprising a casing, a rotor, and heads secured to the ends of the casing, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of

the casing, the rotor being provided in its periphery with a plurality of suction chambers and with a plurality of combustion chambers, a plurality of sliding valves carried by the casing and engageable with the suction chambers and the combustion chambers, one of the heads being provided with auxiliary inlet ports, and the other of said heads being provided with auxiliary exhaust ports, these auxiliary ports communicating respectively with the inlet and exhaust ports of the rotor, and a manifold provided on each head and connecting the auxiliary ports of that head.

11. A rotary engine comprising a casing and a rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being provided in its periphery with diametrically opposite inlet and exhaust chambers, arranged to communicate with the compression ports and chambers of the casing, and a plurality of sliding valves carried by the casing and engageable with the periphery of the rotor.

12. A rotary engine comprising a cylindrical casing and a cylindrical rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being formed in its periphery with inlet chambers, on one side of each of which is provided a combustion chamber and on the other side of each of which is provided a suction chamber, the combustion chambers and suction chambers being formed in the periphery of the rotor.

13. A rotary engine comprising a casing and a rotor, the casing being provided with a plurality of compression chambers, and a compression port connecting each end of each of such chambers with the interior of the casing, the rotor being formed in its periphery with inlet chambers, on each side of each of which is provided a combustion chamber and on the other side of each of which is provided a suction chamber, the combustion chambers and suction chambers being formed in the periphery of the rotor, and an exhaust chamber formed in the periphery of the rotor and arranged to open into each of the combustion chambers and into the periphery of the rotor.

In testimony whereof, I have hereunto signed my name.

HERMAN A. WEIDENBACH.