J. C. & R. T. PETERSON.

ROTARY EXPLOSIVE ENGINE.

APPLICATION FILED SEPT. 19, 1910.

987,486.

Patented Mar. 21, 1911.

2 SHEETS—SHEET 1.

FIG. 1

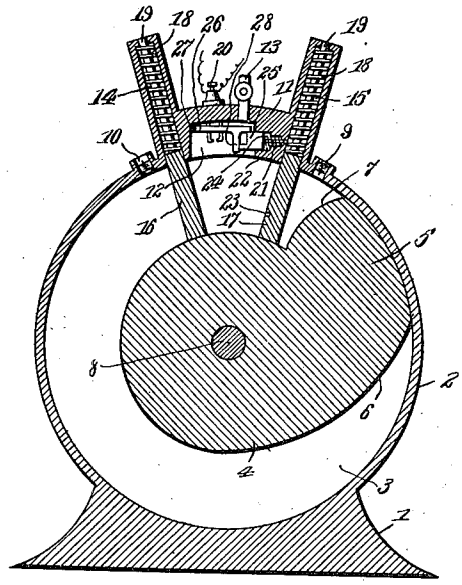
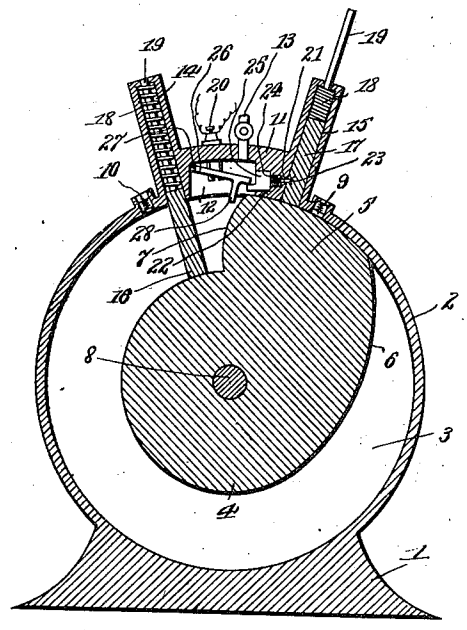


FIG. 3



Witnesses

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2 SHEETS—SHEET 2.

FIG 2

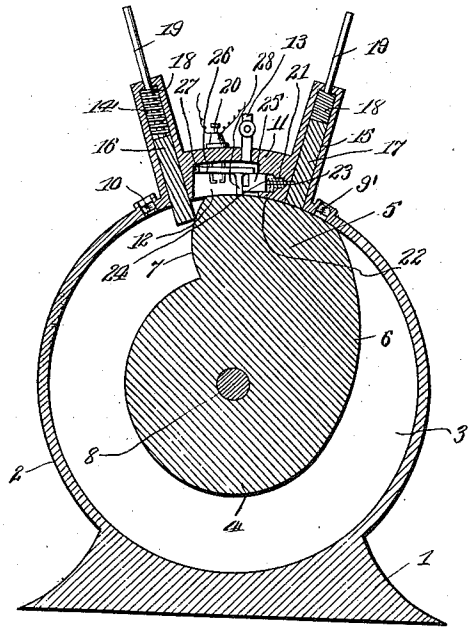


FIG 4

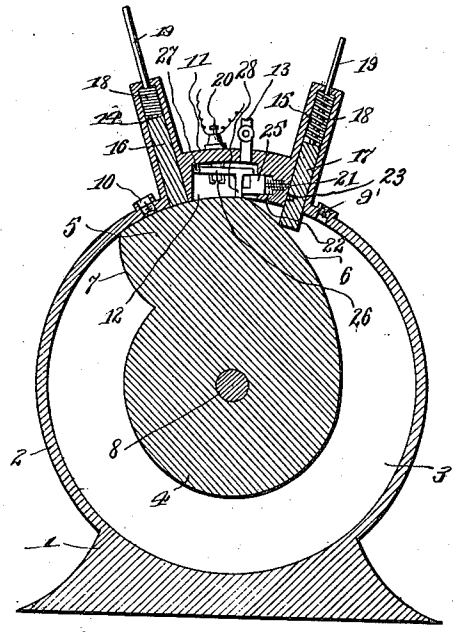
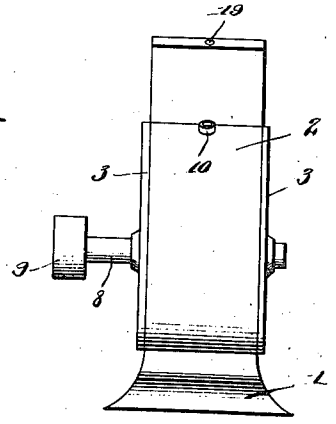


FIG 5



Witnesses

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UNITED STATES PATENT OFFICE.

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ROTARY EXPLOSIVE-ENGINE.

987,486. Specification of Letters Patent. Patented Mar. 21, 1911.

Application filed September 19, 1910. Serial No. 582,772.

To all whom it may concern:

Be it known that we, JAMES C. PETERSON and ROBERT T. PETERSON, citizens of Alberta, Canada, residing at Gleichen, in the Province of Alberta and Dominion of Canada, have invented new and useful Improvements in Rotary Explosive-Engines, of which the following is a specification.

This invention relates to rotary engines, and more particularly to rotary explosive engines of that type in which the explosive charge is compressed before being ignited.

The invention has for one of its objects to improve and simplify the construction and operation of apparatus of this character so as to be comparatively simple and inexpensive to manufacture, highly efficient in operation, and composed of comparatively few parts.

Another object of the invention is the provision of novel means for admitting and compressing explosive mixture to the piston chamber so that the charge will be effectively compressed before ignition and the fired gases operate on the piston throughout alternate revolutions to produce a powerful torque.

With these objects in view and others, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawings, which illustrate one embodiment of the invention, Figure 1 is a vertical transverse section of the engine showing the parts in a position immediately subsequent to the intake of a charge of gas. Fig. 2 is a similar view with the operating parts in the position they occupy when the charge is compressed. Fig. 3 is a view showing the position of the parts immediately after firing the compressed charge. Fig. 4 is a view showing the parts in the position they occupy toward the end of the power stroke. Fig. 5 is a side view of the engine drawn on a reduced scale.

Similar reference characters are employed to designate corresponding parts throughout the views.

Referring to the drawings, 1 designates the base or bed of the engine on which is mounted a cylindrical casing or piston chamber that is composed of a cylindrical shell 2 and heads 3, and in this chamber is mounted a concentric cylinder or drum 4 which has a piston wing 5 extending outwardly to have a working engagement with the internal surface of the shell 2. The face 6 of the wing merges gradually into the drum 4 and is tangential therewith, while the rear or opposite face 7 is curved on a line that approximately intersects the axis of rotation and lies more nearly in a radial line. The piston 4 is fastened to a shaft 8 that extends horizontally through the axis of the cylindrical casing, and on this shaft may be arranged a pulley 9 by which power can be taken from the shaft. In the shell of the casing is a valve controlled air inlet 9 and an exhaust outlet 10, the said inlet and outlet being disposed at approximately forty-five degrees apart adjacent the top of the casing. Between the ports 9 and 10, the casing is formed with a boss or enlargement 11 in which is formed a compression chamber 12 that opens into the chamber of the piston casing, and this chamber 12 is connected by a pipe 13 with a carbureter or other device for producing an explosive gas. In the thickened portion 11 of the shell 2 are approximately radially-disposed guideways 14 and 15 in which move sliding valves 16 and 17, respectively, that are urged inwardly against the revolving piston 4 by springs 18 disposed in the guides 14 and 15, the said springs being coiled around rods 19 secured to the sliding valves. These valves 16 and 17 are disposed at opposite sides of the compression chamber 12 and they move inwardly and outwardly as the wing 5 of the piston passes under them. In the compression chamber is an ignition device such as a spark plug 20 connected with a suitable electric ignition system so as to fire the charge at the proper instant in the revolution of the piston.

It is necessary to hold the valve 17 raised or indrawn at the time of explosion so that the fired gases can operate on the piston wing, and for this purpose a catch pin 21 is slidably mounted in an opening 22 in one side of the chamber 12 so that the inner end of the pin can enter a depression or equivalent means 23 in one side face of the slide valve 17, the said depression being in line with the catch or locking pin when the valve is raised to its full extent. The pin 21 is pressed away from the valve by a spring 24 arranged behind the head 25 of the pin. The pin is held in locking position by a dog

26 that is pivoted at 27 in the chamber 12 at one side and extends to the opposite side thereof, and depending from this dog is a finger or projection 28 which drops into the path of the piston wing when the free end of the dog engages behind the head of the pin 21 when the same is in locking position, and being in the path of the piston wing the dog will be raised so as to release the locking pin and allow the valve 17 to be released at the end of the working period and before the next charge is drawn in.

When the parts are in the position shown in Fig. 1, the piston wing has just passed under the valves 16 and 17 and caused a charge of gas to be drawn into the chamber 12 and the space inclosed between the two valves 16 and 17, the piston revolving in a clockwise direction. As the piston continues to revolve, air is drawn into the continually enlarging space between the valve 17 and piston wing 5. The space between the piston wing 5 and valve 16 is filled with spent gases which are driven out through the exhaust port 10 as the piston wing continuously decreases this space. As the wing 5 reaches the valve 16, the bottom edge of the latter rides on the tangential surface 6 until the valve is completely raised. The piston wing, during this opening of the valve 16, compresses the charge of gas confined between it and the valve 17 into the chamber 12 and this compressed charge is held in the compression chamber by the concentric peripheral portion of the wing. During this compression of the charge, the valve 17 is raised or moved open immediately thereafter and held in this position by the concentric peripheral portion of the piston. As the piston continues to rotate, the wing 5 passes from under the valve 16 so that the same will ride down the curved rear face 7 of the ring. After this point is reached in the revolution of the piston, the compressed charge is ignited by the spark plug 20 and as the result an impulse is imparted to the piston wing to rotate the piston and at the same time the high pressure ignited gases operate on the head or piston 25 of the locking pin 21 and force the pin into the socket 23 of the raised valve 17. When the piston 25 is pressed inwardly to engage the pin 21 with the valve 17, the locking device 26 drops so that its free end will be disposed behind the head 25 and the depending finger 28 disposed in the path of the piston wing 5. As soon as the tail end of the piston wing uncovers the exhaust port 10, the spent gases will discharge from the engine, and upon the wing 5 striking the finger 28, the device 26 will be released from the head of the locking pin 21 so that the valve 17 can move closed after the wing 5 has drawn in the next charge and passed under the valve 17. During the next revolution, a charge of air is drawn in behind the wing 5 through the port 9 and then finally discharged through the exhaust port 10 like the previous spent gases. When the new charge of gas is compressed, it will be ignited at the proper moment so as to produce another impulse on the piston. The cycle of operation above described continues as long as fuel is supplied to the engine.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while we have described the principle of operation of the invention, together with the apparatus which we now consider to be the best embodiment thereof, we desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when desired as are within the claims appended hereto.

Having thus described the invention, what we claim is:—

1. A rotary explosive engine comprising a casing, a rotary element therein having a piston wing, sliding valves for confining the charge of explosive mixture, one of the valves forming a fixed abutment against which the exploded charge re-acts to drive the piston wing, and means for automatically holding the other valve open during the working period of the engine.

2. An explosive engine comprising a casing, a rotary piston therein having a wing, sliding valves extending into the casing to engage the piston and movable inwardly and outwardly by the wing passing the valves, means for admitting a charge of explosive mixture between the valves as the piston passes the same, a chamber between the valves and in which the mixture is compressed by the piston wing, means for firing the compressed mixture, and a device actuated by the exploded mixture for holding one of the valves open while the other valve forms an abutment against which the exploded mixture re-acts on the wing to rotate the piston.

3. An explosive engine comprising a casing, a rotary piston therein having a wing, sliding valves extending into the casing to engage the piston and movable inwardly and outwardly by the wing passing the valves, means for admitting a charge of explosive mixture between the valves as the piston passes the same, a chamber between the valves and in which the mixture is compressed by the piston wing, means for firing the compressed mixture, a device actuated by the exploded mixture for holding one of the valves open while the other valve forms an abutment against which the exploded mixture re-acts on the wing to rotate the

piston, and means arranged to set automatically for holding the said device in locking position and adapted to be released by the piston wing to permit the device to disengage the valve.

4. An engine comprising a casing, a piston mounted therein having a wing, approximately radially disposed sliding valves extending into the casing and adapted to bear on the piston and its wing, means for yieldingly holding the valves in closed position against the piston, said casing having a compression chamber disposed between the valves, means for admitting a charge of explosive mixture to the chamber, means for admitting air at the side of one of the valves opposite from the compression chamber, an exhaust port arranged at the side of the other valve opposite from the compression chamber, and a device for automatically holding open the valve located between the air-admitting means and compression chamber after the compressed charge ignites.

5. An engine comprising a casing, a piston mounted therein having a wing, approximately radially disposed sliding valves extending into the casing and adapted to bear on the piston and its wing, means for yieldingly holding the valves in closed position against the piston, said casing having a compression chamber disposed between the valves, means for admitting a charge of explosive mixture to the chamber, means for admitting air at the side of one of the valves opposite from the compression chamber, an exhaust port arranged at the side of the other valve opposite from the compression chamber, a device for automatically holding open the valve located between the air-admitting means and compression chamber after the compressed charge ignites, said last-mentioned means comprising a locking pin adapted to engage the said valve when in open position, means tending to unlock the pin from the valve, and a device in the compression chamber adapted to set automatically for holding the pin in locking position and to be released by the piston wing after the completion of the working period and before the admission of a new charge to the compression chamber.

6. An engine comprising a casing, a rotary piston therein having an eccentric wing, a sliding valve extending from the wall of the casing to the piston and movable outwardly by the piston wing, means for moving the valve inwardly, said valve forming an abutment against which the exploded charge re-acts for rotating the piston, an exhaust port at one side of the valve, a compression chamber at the opposite side of the valve, means for admitting an explosive mixture to the chamber, a second similarly operated valve spaced from the first and located at the opposite side of the compression chamber and forming means for interrupting the suction of the explosive mixture to the compression chamber and space between the valves, means for admitting air between the second valve and the piston wing as the latter passes the valve, and automatically-actuated means for holding the second valve open during the period in which the exploded mixture operates on the piston.

7. In an engine of the class described, the combination of a casing, a rotary piston therein having a wing, a wing-actuated valve, a chamber in which a charge is compressed and exploded, and means actuated by the pressure of the exploded gases for holding the valve in a position removed from the exploded gases acting on the piston wing.

8. In an engine of the class described, the combination of a casing, a rotary piston therein having a wing, a wing-actuated valve, a chamber in which a charge is compressed and exploded, means actuated by the pressure of the exploded gases for holding the valve in a position removed from the exploded gases acting on the piston wing, a device for holding the said means in locking position during the working period and adapted to be released by the piston wing to permit the said means to disengage the valve.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES C. PETERSON.
ROBERT T. PETERSON.

Witnesses:
E. S. HOTCHKISS,
HOLGER SUNDSLEY.