C. F. JENKINS.

EXPLOSION MOTOR.

APPLICATION FILED NOV. 24, 1909.

972,379. Patented Oct. 11, 1910.

Fig. 1.

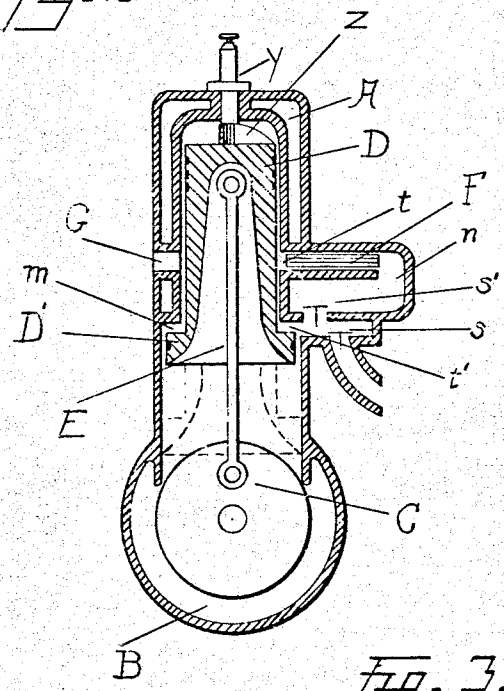


Fig. 4.

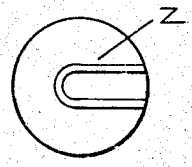


Fig. 5.

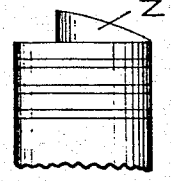


Fig. 3.

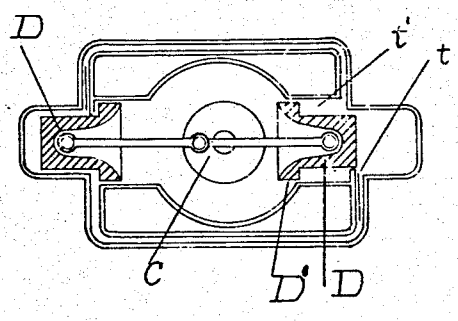
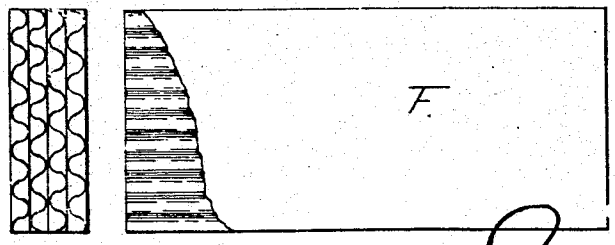


Fig. 2.



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EXPLOSION-MOTOR.

972,379. Specification of Letters Patent. Patented Oct. 11, 1910.

Application filed November 24, 1909. Serial No. 523,736.

To all whom it may concern:

Be it known that I, CHARLES FRANCIS JENKINS, citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Explosion-Motors, of which the following is a specification.

This invention relates to improvements in what are commonly known as explosion motors, or gas engines, and it has especial reference to that class of motors known as "two-cycle engines" in which an indrawn explosive mixture of gas and air is permitted to enter the cylinder on the uncovering of the inlet port by the downward travel of the piston, and has for its main object the prevention of the ignition of the mixture in the compression chamber by the flame generated in the cylinder. This compression chamber may be the crank-case or another container. Such explosions are known as "back-firing" and the means heretofore employed is a fine-mesh screen located in the by-pass or transfer passage between the compression chamber and the cylinder. This screen to be of any value must be of very fine gauze to prevent the flame from passing through it and igniting the combustible charge in the crank-case. Such fine gauze, however, limits the charge and retards the passage of the mixture from the crank-case to the cylinder. Also because of the fine mesh the screen soon chokes with a carbon residue which, impinging on the screen in a highly heated state, clings tenaciously thereto and is very difficult to remove, without destroying the delicate screen. Again, this fine-mesh screen not infrequently breaks down under the force of the exploding charge when the intake port is opened at the end of the working stroke. This latter difficulty is partly overcome in some makes of motors by some form of support for the screen, although this adds a further obstruction to the free passage of the gas.

Although not the best means, miniature perforations of one kind or another, most commonly gauze or fine-mesh screens, are the generally accepted means in many different apparatus for preventing the ignition of a combustible gas from an otherwise unprotected flame, as in "Bunsen" burners, "Davy" miners' safety lamps, etc.

It has been found that these perforations can be made larger and larger as the length of the perforation is made longer and longer. Thus, a flame will not pass through a tube or other narrow channel if it is of considerable length, that is, many times its diameter, and this phenomenon does not entirely depend on whether it is a perfect or an imperfect mixture for the flame is chilled to a non-inflammable degree. It has also been found that the pressure in the compression chamber and the uniformity of this pressure has a very important bearing on back-firing and on the uniformity of the succeeding charges, that is, on the smooth running of the engine. To produce this uniformity of pressure for driving the gas through the preventive device, is, therefore, a further object of this invention. It has also been found that to inclose or partially inclose the ignition device, for example, the spark plug, so that the gas next the inlet port shall ignite first adds materially to the prevention of back-firing. Upon these three phenomena, singly and especially in conjunction, the present invention depends, and by their use the most unobstructed and uniform passage of gas is effected with perfect immunity from back-firing. It is rendered effective by the employment of corrugated or crinkly sheets of metal or other suitable material situated longitudinally in the by-pass between the crank-case and the cylinder. Such channels present practically no obstruction whatever to the freest passage of the gas through the transfer passage and absolutely prevent ignition in the crank-case or other compression chamber, and on examination after thousands of miles of use in an automobile motor, no carbon deposit was found at any point in the passages.

The invention is fully illustrated in the accompanying drawings, forming a part of this application in which—

Figure 1 is a sectional elevation of a motor equipped with this invention; Fig. 2, an end and longitudinal section of the by-pass "filler" or back-fire preventing device thereof, that is, means used in conjunction with the subdivided by-pass to secure uniformity of gas pressure therethrough; Fig. 3, a rotary cylinder engine (diagrammatically shown) which this combination of back-fire preventive devices permits, and Figs. 4 and 5 details of certain features.

The main portion of the motor includes a cylinder A, A' having its lower part of greater diameter than the upper portion, with an annular offset from one part to the

other. Below the cylinder is a crank-case B, serving in this instance merely to protect certain parts. Within the cylinder works a correspondingly offset piston connected to a crank C on the power shaft by a pitman E. The upper portion, D, of this piston fits in the smaller upper portion or explosion chamber of the cylinder, while the larger lower part works in the corresponding portion of the cylinder and serves to draw into the annular chamber M and then compress successive charges of explosive mixture. Such mixture, when the piston descends, enters through a passage t' provided with an inwardly opening valve s, and upon the return of the piston is compressed and forced past a valve s' into a suitable chamber n which communicates, through a long straight passage t of rectangular cross-section, with the lower part of the explosion chamber, when the piston is near the lower limit of its path. In this passage removably fits a thin box F open at each end and filled with thin, longitudinally corrugated plates F' alternating with thin plane plates F^2, whereby the passage is divided into many long, parallel narrow passages through which flame does not readily pass.

As a further safeguard, the spark-plug y is placed in the upper portion of the cylinder and the piston is provided with a correspondingly located recess, peripherally open and adapted to measurably confine a small portion of the charge which at the moment of ignition surrounds the sparking point. As shown, this recess is formed by providing the terminal face of the piston with a projecting wall z of U-shape, the free ends of the wall extending approximately to the periphery of the piston, and the space between those ends, or the outer end of the recess, alines with the inlet t when the piston descends. The mixture in this recess is ignited first, burns and converts its heat into work slightly in advance of the remainder of the charge, and is retained in the recess until the port t is reached. Thus that port is in some degree protected from the area of most active combustion and highest heat, and the probability of back-firing is lessened. It is also to be noted that the waiting charge in the chamber n is usually under high compression and for that reason resists outward movement of gases in the screen passages, thus affording an additional safeguard.

The construction secures entire immunity from back firing, and by simple and inexpensive means rarely needing attention or repairs.

In Fig. 3 is diagrammatically illustrated a "double-opposed motor," in which the enlarged end of the piston of one motor charges the cylinder of the other motor, permitting the construction of a rotary cylinder motor, that is, a motor in which the crank shaft is stationary and the cylinders revolve around it. It is quite obvious that a four-cylinder motor could thus readily be constructed.

What I claim as my invention, is—

The combination with an engine cylinder having its lower portion of greater diameter than its upper portion, of a piston correspondingly offset to fit both portions and provided at its upper end with a peripherally open recess, a valved conduit leading to the annular chamber in the lower portion, a second chamber outside the cylinder, a valved conduit leading from the first chamber to the second, an inlet passage leading from the second chamber into the explosion chamber near its lower end, a screen, in the last named passage, consisting of an elongated box open at each end and filled with longitudinally corrugated plates alternating with plane plates, and a sparking device in position to lie within the walls of said recess at the moment of ignition, the inlet screened passage opening being in position to aline with the open peripheral side of said recess when the piston descends.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES FRANCIS JENKINS.

Witnesses:

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HARRY F. RUETH.