J. & F. O. PETERSON.

EXPLOSION ENGINE.

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926,892. Patented July 6, 1909.

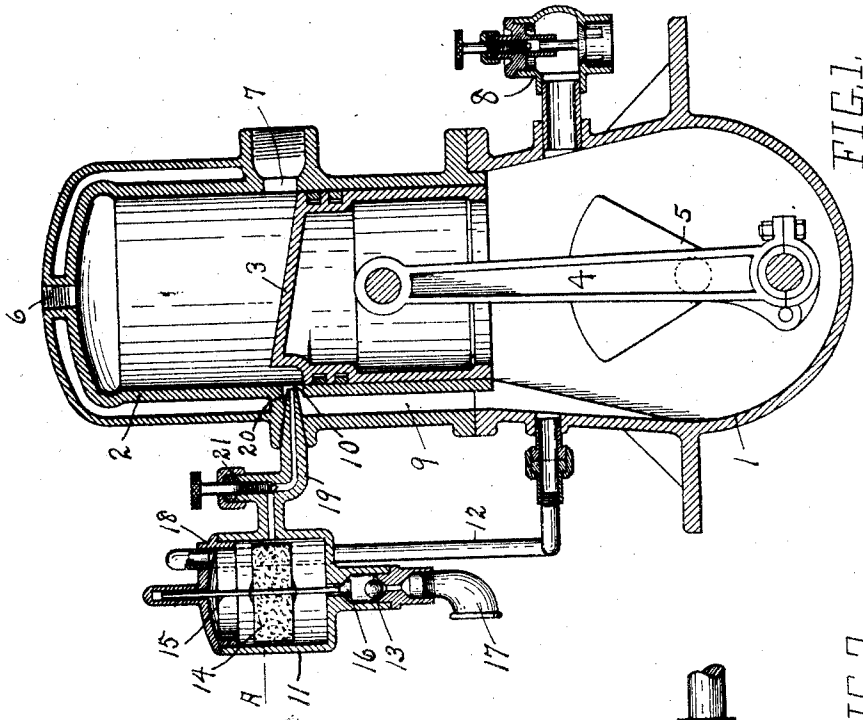


FIG. 1.

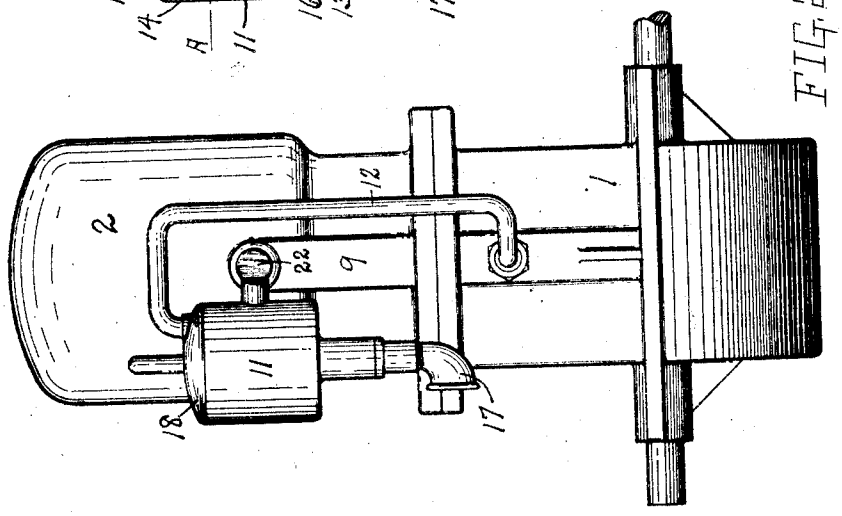


FIG. 2.

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UNITED STATES PATENT OFFICE.

JOHN PETERSON AND FREDERICK O. PETERSON, OF DETROIT, MICHIGAN.

EXPLOSION-ENGINE.

No. 926,892. Specification of Letters Patent. Patented July 6, 1909.

Application filed February 24, 1908. Serial No. 417,273.

To all whom it may concern:

Be it known that we, JOHN PETERSON and FREDERICK O. PETERSON, citizens of the United States, and residents of Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Explosion-Engine, of which the following is a specification.

Our invention relates to fuel feeding means for internal combustion, explosion engines of the two-cycle type, and the object of our improvements is to provide a liquid fuel feeding device which shall be simple in construction, under absolute control as to amount of feed, and which shall be equally well adapted for any kind of liquid fuel.

Our invention consists of an engine embodying novel means through which the amount of fuel fed into the explosion chamber is in proportion to the air passing into the cylinder, and depends upon the average of pressure in the compression chamber during the time the inlet port of the cylinder is open.

Our invention further consists in a two cycle engine provided with a compression chamber and a fuel receptacle, the amount of fuel in the receptacle being kept practically constant, and the amount of fuel passing from the receptacle depending upon the difference in the air pressure in the fuel receptacle and at the inlet port of the cylinder.

Our invention further consists in the novel details shown in the accompanying drawings, in which

Figure 1 is a central vertical cross section of our improved engine. Fig. 2 is a side elevation of an engine provided with a slightly modified form of fuel feeding device.

Similar reference characters refer to like parts throughout the several views.

In the accompanying drawings which show a two-cycle explosion engine, 1 is the crank case, 2 the cylinder, 3 the piston, 4 the connecting rod, 5 the crank, 6 the threaded opening for the spark plug, 7 the exhaust port, and 8 the intake valve, all of any usual and well known construction. The passage 9 connecting to the crank case, which is the compression chamber, connects to the cylinder bore by means of the intake port 10.

A liquid fuel receptacle 11 is mounted adjacent the cylinder and is kept filled from any source of supply through a connection 17, the fuel being prevented from flowing back by means of the ball valve 13, and its height in the receptacle 11 being limited by the float 14 on the stem 15, which stem has a valve 16 at its lower end. A pipe 12 connects to the cover 18 of this receptacle and to the crank case, through which pipe the pressure in the fuel receptacle will always be the same as the air pressure in the crank case.

Extending from the receptacle is a connection 19 terminating in a nozzle 20 which is adapted to be screwed into a threaded opening in the wall of the passage 9. The location of this opening depends upon the fuel employed, and for such fuels as are easily volatilized, the position of the nozzle 20 relative to the port 10 is not material, but for such fuels as do not volatilize easily, the nozzle 20 should be placed where shown in Fig. 1, so the fuel will be discharged immediately onto the hot piston. A needle valve 21 determines the normal maximum of fuel to be used and will be changed only with change of fuel or in case of great change in duty. The connection 19 instead of bending in a vertical plane as shown in Fig. 1 may be bent in any other manner desired. In Fig. 2 it is shown adapted to receive a horizontal needle valve stem 22. The other parts remain as before.

The operation of this mechanism is as follows. Through the operation of the float 14, the fuel remains practically at the level indicated by the line A in Fig. 1. As there is a partial vacuum in the compression chamber during each compression stroke of the piston, the fuel will readily flow into the receptacle 11 and remain at proper height. During the working stroke of the piston, pressure will be generated in the compression chamber and in the receptacle 11, but the valve 13 will prevent the fuel flowing back. So long as the port 10 is closed by the piston, the pressure on the fuel in the nozzle 20 will be the same as in the receptacle 11, and because of the small size of the passage, hardly more than a few drops will flow from the nozzle. But at the end of the working stroke, when the port 10 is opened, the pressure at this point, and the pressure in the passage 9 also, will be less than the pressure in the compression chamber and in the receptacle 11. The result is a free discharge of fuel from the nozzle 20. Heavy oil will fall on the piston and permit the air in the crank case to scavenge the cylinder before evaporating. While the pressure in the compression chamber falls during the entire time the port 10 is open, there is

always an excess of pressure above that in the cylinder, and the total flow of fuel will be in proportion to the average of this excess of pressure. The maximum of this flow will depend upon the needle valve 21, but the pressure in the compression chamber will regulate the flow of the fuel. As this pressure also regulates the amount of air passing into the cylinder, this construction will insure equal proportions of fuel and air, the amount of air being regulated by the valve 8, and the amount of fuel depending upon the amount of air, so the valve 8 will regulate the power of the engine. As before stated, the needle valve 21 must first be adjusted according to the fuel.

Constant pressure in the fuel chamber would cause increased amounts of fuel to enter the cylinder, at each stroke, with decreased speed. With this engine there is a discharge of fuel only when the port 10 is open and while there is excess of pressure in the crank case. With slow speed, this excess ceases as quickly as with high speed, and if the slow speed is caused by lack of air the flow of fuel stops also.

Having now explained our improvements, what we claim as our invention and desire to secure by Letters Patent is:

1. In an explosion engine, the combination of a cylinder and piston therein, a crank case, said cylinder and crank case connected by a port, a valve to control the admission of air to the crank case, a liquid fuel receptacle, a connection to admit fuel into the receptacle, a valve to prevent a return flow of the same, a float valve to control the height and maintain a substantially constant level of the fuel in the receptacle, a pipe connecting said receptacle and crank case whereby the two are in constant communication, and a connection between the fuel receptacle and the inlet port of the cylinder, including a valve to regulate the maximum flow of the fuel.

2. In an explosion engine, the combination of a cylinder having an intake port, an air compression chamber connected to the cylinder by means of said port, a fuel receptacle in constant communication with the air compression chamber, means for automatically feeding liquid fuel to the receptacle and keeping substantially a constant level therein, a valve to prevent return flow of the fuel, means to control the admission of air to the compression chamber, and a connection between the fuel receptacle and the intake port of the cylinder whereby fuel may pass to the cylinder, the rate of flow being in proportion to the difference in pressure in the compression chamber and at the discharge end of said connection.

3. In an explosion engine, the combination of a cylinder, an air compression chamber connected to the cylinder by a port, a piston in said cylinder adapted to open and close said port, a fuel receptacle, means for automatically supplying fuel to the receptacle and keeping substantially a constant level therein, a connection whereby the compression chamber and fuel receptacle are in constant communication, and a fuel pipe leading from the fuel receptacle to the port of the cylinder, through which the fuel is fed.

4. In an explosion engine, the combination of a cylinder and a piston therein, an air compression chamber connected to the cylinder by a port adapted to be opened and closed by the piston, a fuel receptacle, means for automatically supplying fuel to the receptacle, a connection whereby the compression chamber and fuel receptacle are in constant communication, and a fuel pipe extending from the fuel receptacle and adapted to convey fuel to the cylinder port where it may be evaporated by the air passing into the cylinder, the quantity of fuel thus conveyed at each revolution of the engine being controlled by the difference in pressure in the fuel receptacle and at the discharge end of the fuel pipe.

5. In an explosion engine, the combination of a cylinder and a piston therein, a crank case wherein air may be compressed by said piston, the crank case connected to the cylinder by a port adapted to be opened and closed by the piston, a fuel receptacle in constant uninterrupted communication with the crank case, a pipe to convey fuel from the receptacle to the cylinder, a float valve to control the height of fuel in the receptacle, the discharge of fuel from the receptacle being dependent on the difference in pressure in the fuel receptacle and at the discharge end of the fuel pipe.

In testimony whereof, we have signed this specification in the presence of two subscribing witnesses.

JOHN PETERSON.
FREDERICK O. PETERSON

Witnesses:
ELIZABETH M. BROWN,
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