H. A. BERTHEAU.

EXPLOSION MOTOR.

APPLICATION FILED MAR. 10, 1906.

905,279.

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Fig. 1

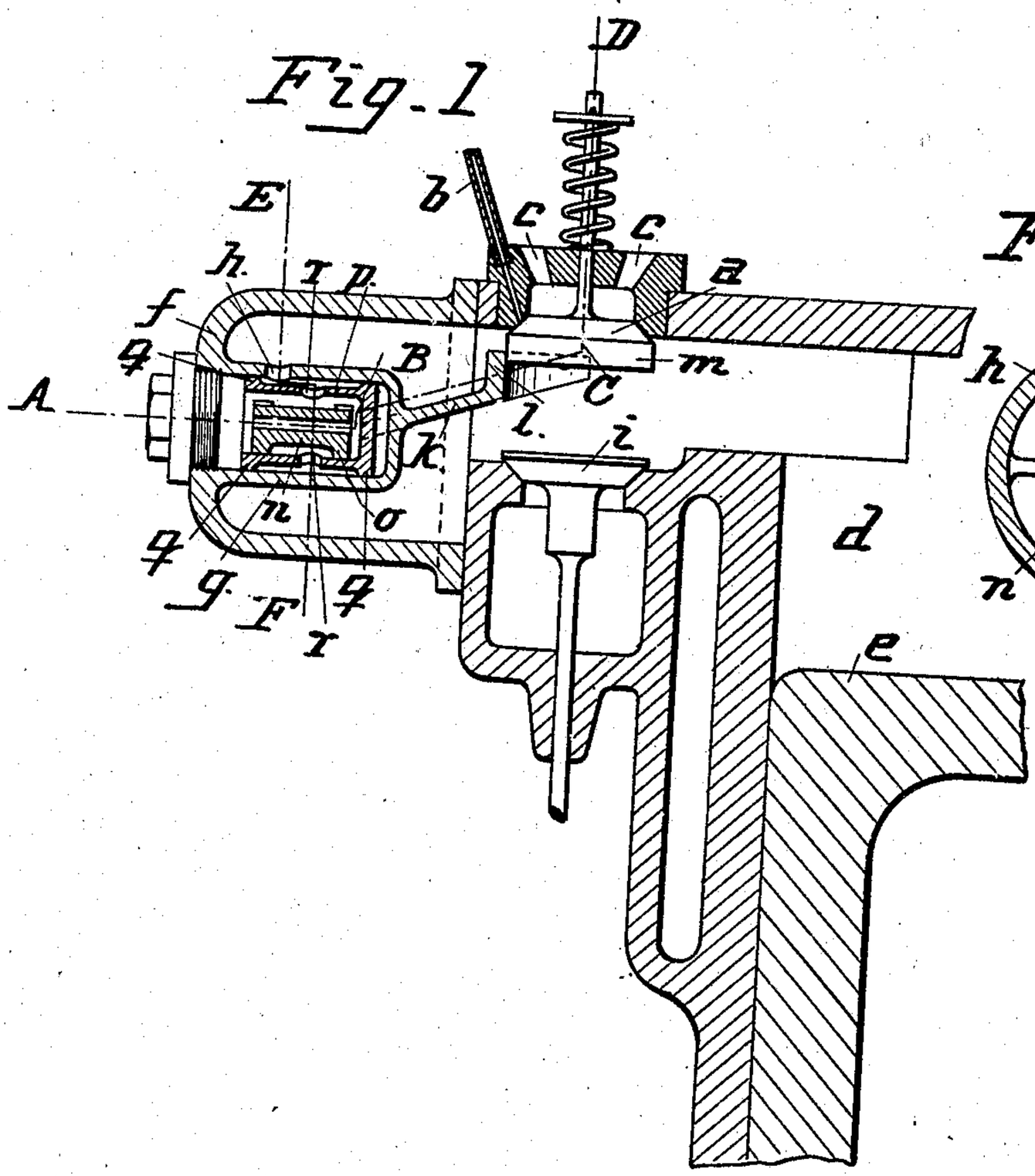


Fig. 3

E. F

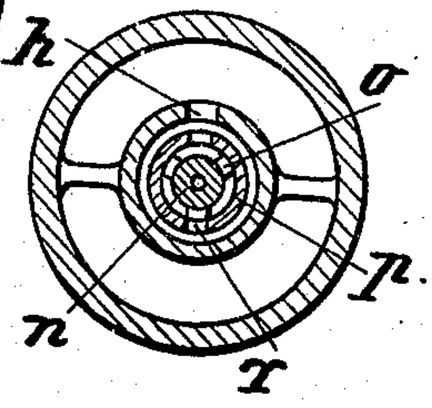
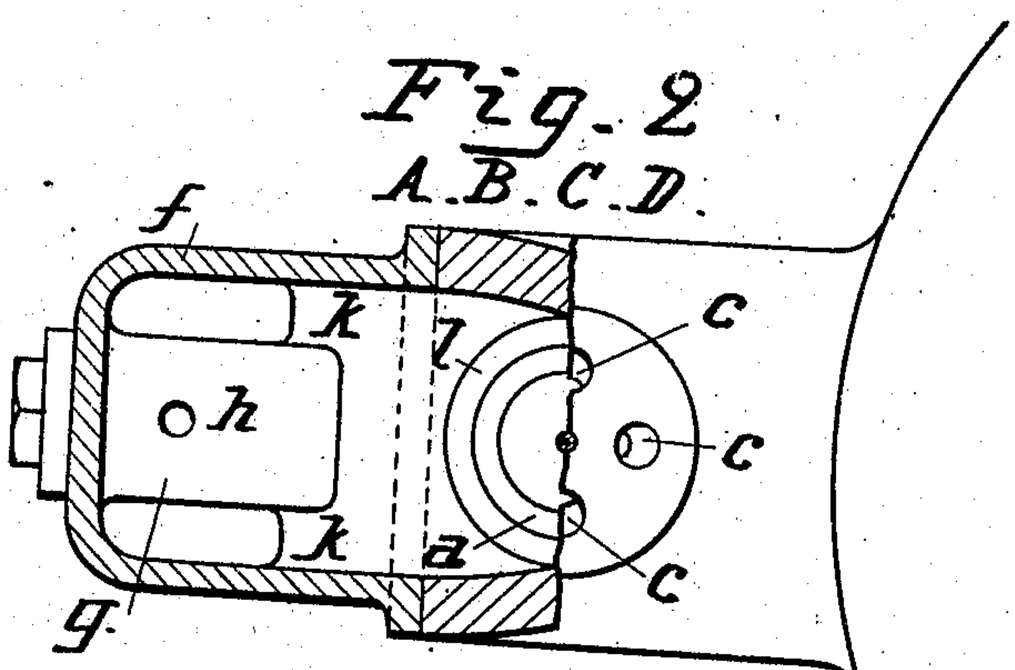


Fig. 2

A. B. C. D.



Witnesses.

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EXPLOSION-MOTOR.

No. 905,279. Specification of Letters Patent. Patented Dec. 1, 1908.

Application filed March 10, 1906. Serial No. 305,325.

To all whom it may concern:

Be it known that I, HENRIK AUGUST BERTHEAU, a subject of the King of Sweden, residing at 6A Urvädersgränd, Stockholm, Sweden, have invented certain new and useful Improvements in Explosion-Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in explosion motors, in which air and fuel are sucked in by one and the same valve.

Heretofore where the fuel-passage opens into the valve seat the fuel is passed over by the air, which enters at the same time with great rapidity taking the fuel along with it. A direct consequence of this arrangement is, that air and fuel are, during the suction, so thoroughly mixed with each other, that the mixture is ready for ignition at the completion of the compression stroke without any further mixing.

As is well known, it often occurs that the ignition takes place too early, that is, before the motor-piston has reached the dead-point position. This is usually caused by the ignition-body becoming too highly heated after the motor has been running some time. To prevent this excessive heating of the ignition-body, in order to avoid too early ignition, offers many practical difficulties.

The object of this invention is to so proportion the composition of the air and gas mixture that it is not made ignitable before the moment of the highest compression. It is therefore so arranged that the components of the mixture, air and fuel, do not mix together, or only in a very small degree when simultaneously sucked in. The fuel evaporates and is afterwards, by degrees, mixed with air only during the compression stroke, and only at the highest point of compression has there been a sufficient mixing to form a perfect mixture ready for ignition.

In the accompanying drawing—Figure 1 is a vertical section of a motor embodying my invention. Fig. 2 is a horizontal section along lines A—B—C—D in Fig. 1, and Fig. 3 is a cross-section on line E—F, Fig. 1.

a designates the valve which controls a port for admitting air and fuel, which latter enters through a conduit *b* opening into the valve seat, while atmospheric air is sucked in through orifices *c* formed in a cover of the port.

d designates a portion of a motor cylinder containing the piston *e*. An evaporation chamber, as *f*, which is also the mixing chamber, contains an ignition chamber *g* which communicates with the chamber through an orifice *h*. The escapement of the combustion gases from the cylinder is regulated by the valve *i*.

Heretofore in the arrangement of motors, the admission valve has been placed at the outer end of the evaporation chamber. Air and fuel have thus entered and mixed together in said chamber and escaped from there directly to the motor cylinder after the evaporation of the fuel. According to the present invention valve *a* is now placed between the evaporation chamber and the cylinder, and between the cylinder and the evaporation chamber is placed a partition *k*, as shown on the drawing. The fuel conduit *b* is placed on the same side of the valve opening as partition *k*, and said partition is provided with an upward bent edge *l*, which fits closely against the outer edge of the valve. The latter is preferably provided with an extension *m* reaching downward against the edge *l*. It is evident that if the valve port be opened, the fuel entering through conduit *b* will strike against the beveled face *a'* of the valve *a* and is deflected into the chamber *f*. Evaporation takes place in the chamber *f* and it becomes filled with thick gas, of which only an unimportant part will enter into the cylinder *d* said gas being held in check by the partition *k*. When the piston returns for the compression, the atmospheric air previously sucked into the cylinder is driven past the under side of the partition *k* through passages *k'*, see Fig. 2, and into the upper part of the evaporation chamber *f*, where it mixes with the thick gas. The gas is thus mixed with the air in the same degree as the compression proceeds, and the mixture cannot on this account, provided the motor is properly constructed, be perfected before the completion of the compression, or what is the same, the gas mixture is not ready for ignition before the completion of the compression stroke, and the ignition cannot take place too soon. A part

of the air-gas mixture generated in the evaporation chamber *f* is driven through orifice *h* into the ignition chamber *g*, in which latter, naturally, the pressure and mixing conditions will be the same as in the evaporation chamber and the cylinder.

The ignition body may consist of a small cylinder *n* of some fire-proof heat-absorbing material, preferably of soap-stone. The cylinder *n*, which is provided on the outside with brackets or studs *o*, is mounted in a larger cylinder *p*, also preferably of soap-stone, and this latter cylinder being provided with edge flanges *q* on the outside, is put into the cylindrical ignition chamber *g*. As is evident from the above description, there is a space between the curved surfaces of the cylinders as well as between the ends of the same, and the driving-gas mixture, entering first through orifice *h* and afterwards through orifice *r*, may be spread around both of the soap-stone cylinders before the mixture is ignited. After having run awhile the cylinders are heated to a very high degree, especially the innermost one, which, being first surrounded by the cylinder *p* and further by the ignition chamber *g*, is as fully as possible protected against cooling-off and remains incandescent, thus constantly insuring a quick and sure ignition.

I claim—

1. In an explosion motor the combination with a cylinder, a reciprocating piston therein, and an evaporator chamber communicating with the cylinder, of means between the cylinder and chamber to simultaneously supply fuel to the chamber and air to the cylinder, means to subsequently direct the air from the cylinder to the chamber, and means to retard the flow of fuel from the chamber whereby the mixing of the air and fuel takes place in the chamber and is compressed therein to ignition pressure.

2. In an explosion motor, the combination with a cylinder, a reciprocating piston therein, and an evaporation chamber communicating with the cylinder, of means between the cylinder and chamber to simultaneously supply fuel to the chamber and air to the cylinder, and a partition in the chamber adapted to retard the passage of fuel therefrom during the suction stroke of the piston and to permit the entrance of air into the chamber on the compression stroke of the piston.

3. In an explosion motor, the combination with a cylinder, a reciprocating piston therein, and an evaporation chamber communicating with the cylinder, of means between the cylinder and chamber to simultaneously supply fuel to the chamber and air to the cylinder on the suction stroke of the piston, a partition in the chamber adapted to retard the passage of fuel therefrom during said suction and provided with apertures to permit the entrance of air to the chamber during the compression stroke of the piston, and an ignition device mounted in the chamber.

4. In an explosion engine, the combination with a cylinder and a reciprocating piston therein, of an evaporation chamber communicating with the cylinder, a single valve controlling both the air and fuel ports situated between the cylinder and chamber, means on the valve to direct the entering fuel into the chamber and the air into the cylinder, and means to subsequently direct the air from the cylinder to the chamber.

5. In an explosion engine, the combination of a cylinder having a port therein, a cover for said port forming a valve seat having fuel and air passages therein, an evaporation chamber having passages communicating with the port and cylinder, and a valve on the seat controlling both the fuel and air passages and adapted to direct the fuel into one of said passages and the air to the cylinder.

6. An explosion engine comprising a cylinder having a port therein, an evaporation chamber, a partition therein forming a fuel passage communicating with the port and a passage communicating with the cylinder, a cover for said port forming a valve-seat having a fuel passage terminating in the seat and air passages in its top, a valve on the seat adapted to simultaneously open or close both fuel passages.

7. In an explosion motor, the combination with a cylinder, a reciprocating piston therein and an evaporation chamber communicating with the cylinder, of means to simultaneously supply fuel to the chamber and air to the cylinder, an ignition cylinder mounted in the evaporation cylinder and communicating therewith through an aperture in the top of the ignition cylinder, and a partition in the evaporation cylinder forming fuel and air passages.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

HENRIK AUGUST BERTHEAU.

Witnesses:

CARL FRIBERG,

HJ. ZETTERSTROM.