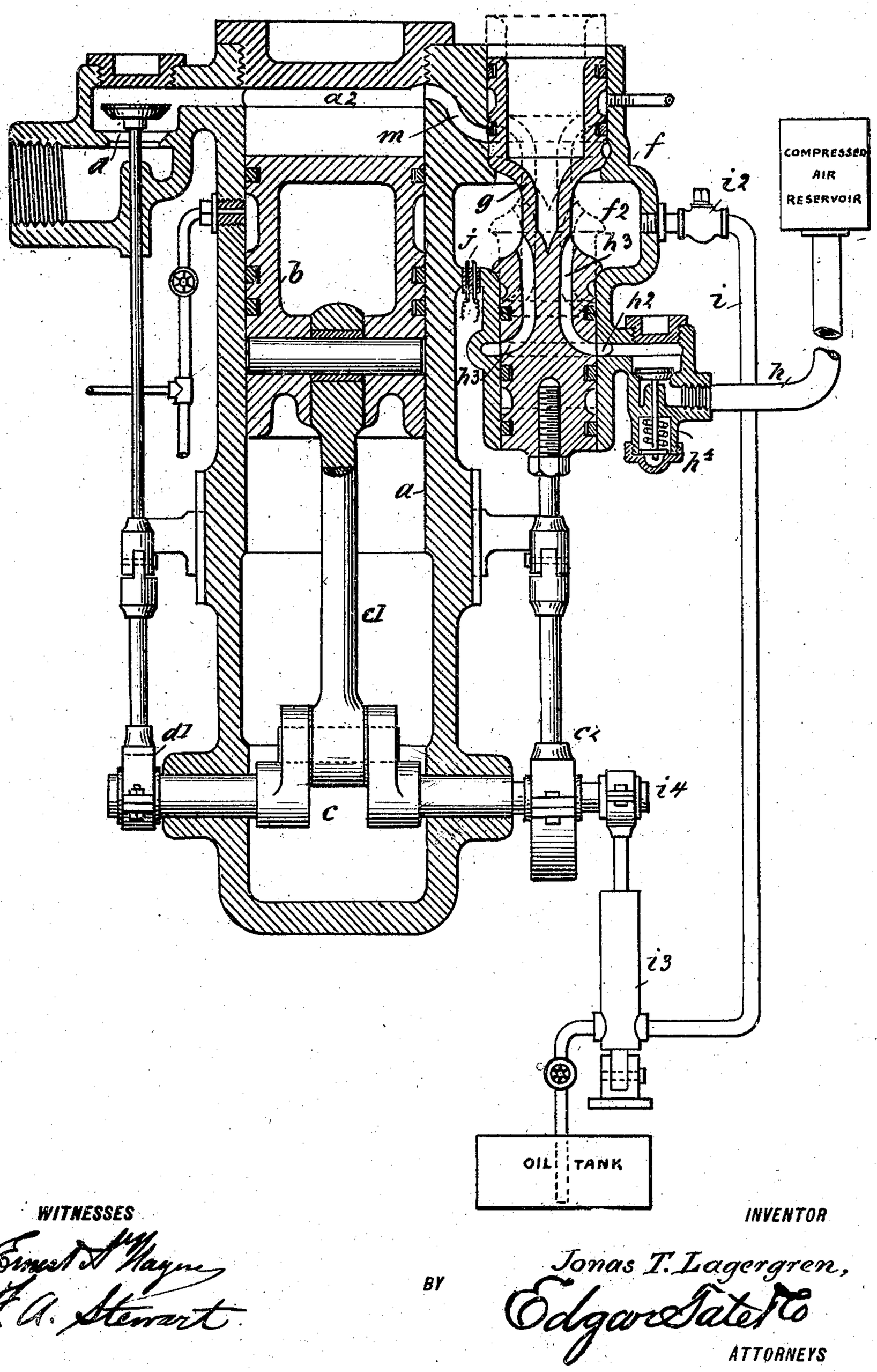
No. 858,726. PATENTED JULY 2, 1907.

J. T. LAGERGREN.

EXPLOSION ENGINE.

APPLICATION FILED APR. 20, 1906.



WITNESSES

Ernest A. Mayne

F. A. Stewart

INVENTOR

Jonas T. Lagergren,

BY Edgar Gates & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

JONAS T. LAGERGREN, OF NEW YORK, N. Y.

EXPLOSION-ENGINE.

No. 858,726. Specification of Letters Patent. Patented July 2, 1907.

Application filed April 29, 1905. Serial No. 257,984.

To all whom it may concern:

Be it known that I, JONAS T. LAGERGREN, a subject of the King of Sweden, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Explosion-Engines, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to what are known as explosion engines, and the object of the invention is to provide an improved engine of this class in which liquid fuel and air are used and in which the explosion takes place in an independent chamber separated from the main piston chamber and adapted to be placed in communication therewith at the moment the explosion is effected, this communication being controlled by a valve construction whereby the gases at the moment of explosion are led to the main cylinder to expand either in one or two stages; a further object being to provide an engine of the class specified with an explosion chamber into which air under pressure is passed, and into which liquid fuel under pressure is passed at the moment the explosion is desired, at which moment the communication between the main cylinder and the explosion chamber is established; and with these and other objects in view the invention consists in the improvement in an explosion engine as hereinafter described and claimed.

The invention is fully disclosed in the following specification of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters, said drawing being a sectional plan view of an explosion engine or motor constructed according to my invention.

In the application of my invention as shown in the drawing I provide an auxiliary piston cylinder *f* arranged preferably longitudinally to the main cylinder *a* of any form of fuel-pressure fluid or explosion engine. As illustrated the main cylinder *a* is provided with a piston *b* actuating in the usual manner the crank shaft *c* by means of the connecting rod c^1. The piston is shown as finishing its return stroke and the exploded gases are escaping as usual by means of an exhaust valve *d*, which latter is operated by means of an eccentric d^1 fastened to the main shaft *c*. As is usual with this style of engines the same is provided with packing rings, means for lubrication and so forth, all such features not forming a part of my invention and not being specifically claimed herein.

The auxiliary piston chamber *f* is provided with a spool-shaped reciprocating piston valve *g* and contains a centrally located chamber f^2 which is concentric to the central portion of the piston valve *g*. Compressed air from a reservoir as shown in the drawing or direct from an air compressor is admitted by means of a pipe *h* into the port h^2 of the piston cylinder *f*. A spring actuated check valve h^4 is interposed to intercept as is usual back pressure from the piston cylinder *f* into the compressed air reservoir. A pipe *i* provided with a check valve i^2 admits oil to the annular chamber f^2 of the piston cylinder *f*. As is shown in the drawing in this instance the oil is pumped direct from an oil tank by means of a small oil pump i^3 actuated by means of an eccentric or cam i^4 placed on the main shaft *c*. Instead of this construction any other devices such as an oil tank containing oil under pressure may be used for admitting the oil into the annular chamber f^2.

The air inlet port h^2 of the piston cylinder *f* communicates when in the position as shown in the drawing with communicating ports h^3 which form part of the piston *g*, and said ports h^3 enter into the annular chamber f^2 thereby establishing direct communication between the air compressed reservoir and said annular chamber f^2.

A port *m* is shown which forms part of the main cylinder *a* and serves to establish communication between the part a^2 of the main cylinder and the piston cylinder *f*, and the object of this construction is to establish communication between the main cylinder a^2 and a charge of explosive gases contained in the annular chamber f^2 whenever the piston *g* has been placed into the position as shown by dotted lines in the drawing.

In the operation of my invention compressed air is admitted by means of the pipe *h*, the port h^2 and supplemental ports h^3 into the annular chamber f^2. The eccentric c^2 which governs the reciprocating motion of the valve piston *g* is set in such a manner that when communication between the supplemental ports h^3 and the air inlet port h^2 has been cut off by the forward motion of the piston *g* and just prior to the establishment of intercommunication between the port *m* and the annular chamber f^2 a charge of oil is admitted and the same exploded by means of any of the well known devices, such as by means of the electrical igniter *j*. The intercommunication between a^2 and f^2 being at this time established, the exploded gases contained in the chamber f^2 will have free access to a^2 back of the cylinder *b* in order to produce by means of its expansion its actuating force against the main piston *b*. It will thus be seen that the explosion of the pressure fluid contained within the annular chamber *f* actually takes place within the latter instead of directly behind the piston thereby producing a more even expansion and longer duration of time in expanding than if the same would have been exploded within that part of the main piston cylinder a^2 as is usual in many cases of pressure engines of similar construction.

As above described the check valves i^2 and h^4 prevent back pressure and back explosion into the oil tank and air reservoir. At the return stroke of the valve piston *g* the inlet port *m* is cut off again and the ports h^3 are again placed in communication with the air inlet port h^2 for

the purpose of reëstablishing intercommunication between the annular chamber f^2 the compressed air reservoir and the oil supply for a repetition of the above described method of charging, igniting and exploding the combustible material needed for the operation of such an explosion engine.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

In an explosion engine which employs for internal combustion a combined mixture of oil and air, the combination of a cylinder having an inlet port therein, a valve casing which communicates with said port, a reciprocating valve piston within said valve casing, and means of actuating said valve piston, the valve casing being provided with a separate and normally open inlet port for the admission of oil brought thereto under pressure into a chamber formed by a part of said valve casing and surrounding a contracted neck of said valve piston which passes therethrough, the valve casing being furthermore provided with a separate inlet port for the admission of air under pressure, the admission of air to said air inlet port being regulated by the reciprocatory motion of the valve piston within the said valve casing and whereby air can be directed through communicating passages within the valve piston at predetermined intervals from said air inlet port to the aforesaid chamber to which oil is admitted, means for exploding the combined mixture of oil and air within said chamber, and means for establishing communication between said chamber and the cylinder inlet port.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 28th day of April 1905.

JONAS T. LAGERGREN.

Witnesses:

C. J. KLEIN,

F. A. STEWART.