K. J. E. HESSELMAN.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED OCT. 7, 1909.

963,225. Patented July 5, 1910.

Fig: 1.

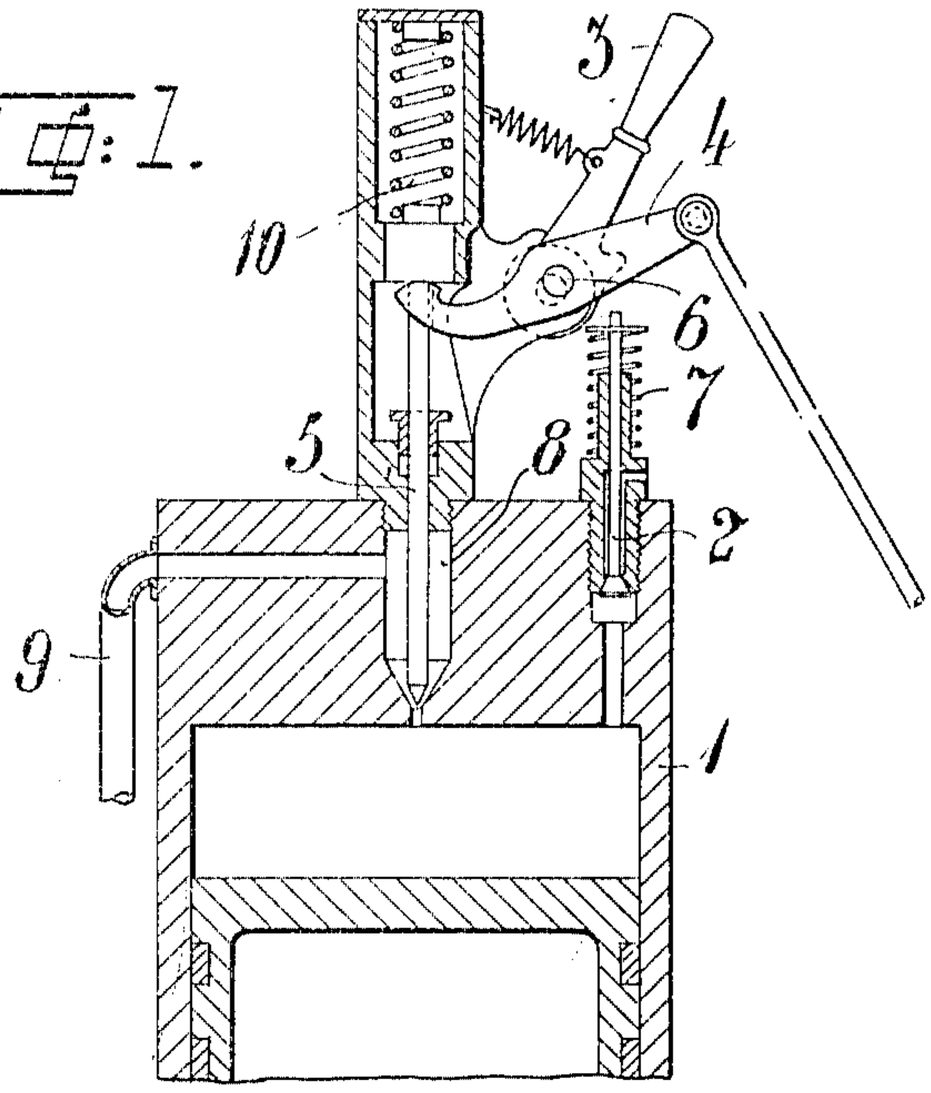
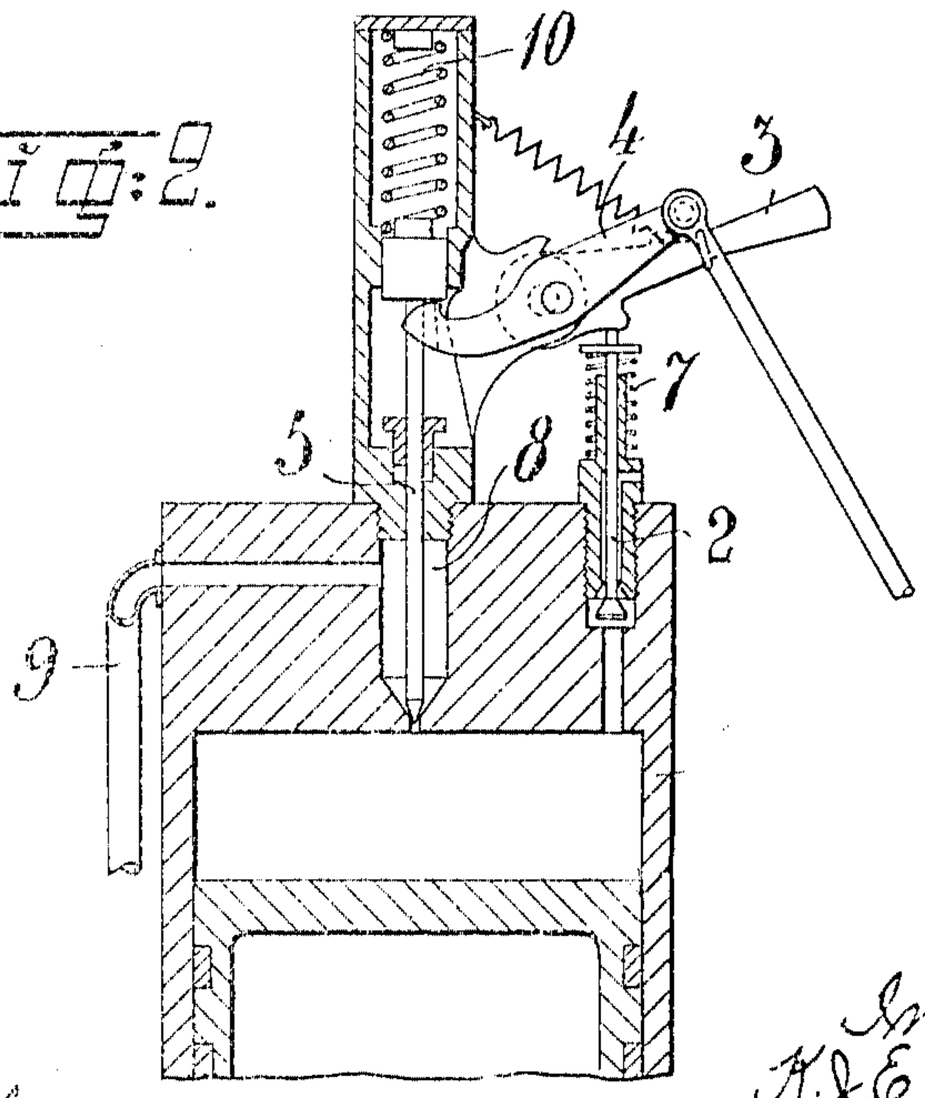


Fig: 2.



Witnesses.
N. C. Healy
Dan E. Tolfin

Inventor
K. J. E. Hesselman.
by James J. Shelby
Attorney.

UNITED STATES PATENT OFFICE.

KNUT JONAS ELIAS HESSELMAN, OF STOCKHOLM, SWEDEN.

INTERNAL-COMBUSTION ENGINE.

963,225. Specification of Letters Patent. Patented July 5, 1910.

Application filed October 7, 1908. Serial No. 456,641.

To all whom it may concern:

Be it known that I, KNUT JONAS ELIAS HESSELMAN, a citizen of the Kingdom of Sweden, residing at Saltsjö-Storängen, Stockholm, Sweden, have invented new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal combustion engines and more especially of the kind in which the fuel is introduced into the combustion chamber or chambers of the engine by means of compressed air or any other gaseous agent under pressure.

It has been proposed to provide internal combustion engines with manually operated exhaust valves by means of which it is possible when starting the engine to remove any pressure that may remain in the cylinder or cylinders so as by such removal of pressure to facilitate the starting of the engine.

Now the object of the present invention is to make such manually operated exhaust valves applicable to engines in which the fuel is introduced into the combustion chamber or chambers by means of compressed air, or the like. In such engines it is not sufficient in order to facilitate the starting to put the combustion chamber or chambers in communication with the atmosphere, but it is also necessary to cut off the supply of compressed air, or the like, to the said chamber or chambers. For this purpose I combine a manually operated exhaust valve and a fluid pressure inlet valve with means for operating said valves simultaneously in such a manner that the said fluid pressure inlet valve is closed or put out of operation when the manually operated exhaust valve is opened.

In the accompanying drawing I have shown one embodiment of my invention.

Figures 1 and 2 show sectional views of the improved valve device with the parts in two different positions.

Referring to the drawing, 1 indicates the cylinder of the engine and 2 an exhaust valve which normally is kept closed by a spring 7 (Fig. 1) and when opened puts the combustion chamber of the engine in communication with the atmosphere (Fig. 2). The said valve 2 may be operated by means of a hand lever 3, or the like, on which is journaled a two-armed lever 4 which in any well known manner is operated from any one of the moving parts of the engine so as to open an inlet valve 5 on required times, said valve serving to admit fuel and fluid under pressure to the combustion chamber. The fluid under pressure and fuel are admitted to the valve-chamber 8 through a pipe 9. The pivot 6 of the lever 4 is located eccentrically in relation to the pivot of the hand lever 3 in such a manner that the lever 4 when the hand lever is turned from the position in Fig. 1 to the position in Fig. 2 will be inactive on account of its pivot changing its position. When the hand lever 3 is turned down into the position shown in Fig. 2 it strikes the stem of the valve 2 and opens the latter, so that the pressure eventually remaining in the combustion chamber escapes through the valve 2. At the same time the valve 5 is closed under the action of its spring 10 and will remain closed until the hand lever is turned back into the position shown in Fig. 1, so that no fluid under pressure is admitted to the combustion chamber during the period of starting.

When starting the engine, the exhaust valve 2 is held open and the inlet valve 5 is kept closed incidental to the initial movement of the piston, and then subsequent to the said movement of the piston the hand lever 3 is turned back into the position shown in Fig. 1 resulting in the exhaust valve 2 being closed by its spring 7 and the valve 5 being released and adapted to work in the usual manner.

The device described may also suitably be used when it is necessary to increase in the air receivers the air pressure used for introducing the fuel into the engine. In such case the valve 5 is put out of operation in the manner described until the corresponding air pump has introduced the quantity of air required in the corresponding air receiver. Finally the device may in engines having a plurality of cylinders be used to put one or more cylinders out of operation in order thereby to have the engine run at a lower speed than the normal one.

The hand lever should suitably be spring actuated, as is shown, in such a manner that it automatically retakes the position shown in Fig. 1 when released.

Obviously the device described above may be modified in details without deviating from the principle of the invention.

Having now described my invention what

I claim as new and desire to secure by Letters Patent is:

In an internal combustion engine, the combination of a cylinder containing an explosion chamber, an outwardly seating exhaust valve suitably guided in the cylinder and extending outside the same and having an abutment on its outer portion, a spring interposed between the said abutment and the cylinder and normally holding the exhaust valve to its seat, a fluid-pressure inlet valve having its eduction opening in constant communication with the explosion chamber; said valve extending outside the cylinder and having an enlargement on its outer portion, a spring bearing at one end against the outer end of said valve, an abutment fixed to the cylinder and arranged at the opposite end of the spring with reference to said valve, a two-armed lever having means on one of its arms for connection to a moving part of the engine and also having its other arm disposed at the inner side of the enlargement on the fluid-pressure inlet valve, a hand lever arranged when moved in one direction to open the exhaust valve, a spring for moving the said hand lever in the opposite direction, and a pivot carrying the two-armed lever and carried by the hand lever and located eccentrically in relation to the pivot of said hand lever, all substantially as and for the purpose set forth.

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

KNUT JONAS ELIAS HESSELMAN.

Witnesses:
EWALD DELMAR,
JOHN DELMAR.