

E. N. PAGELSEN.
 STARTING DEVICE FOR EXPLOSION ENGINES.
 APPLICATION FILED-SEPT. 23, 1909.

960,690.

Patented June 7, 1910.

3 SHEETS-SHEET 1.

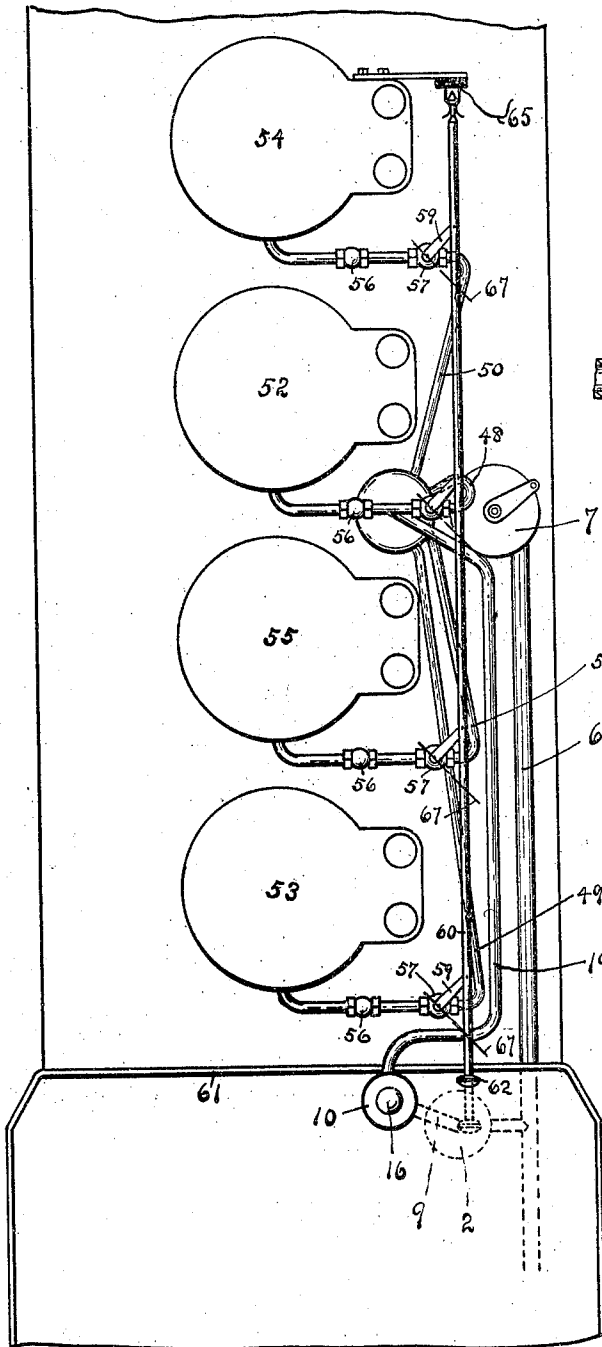


Fig. 2.

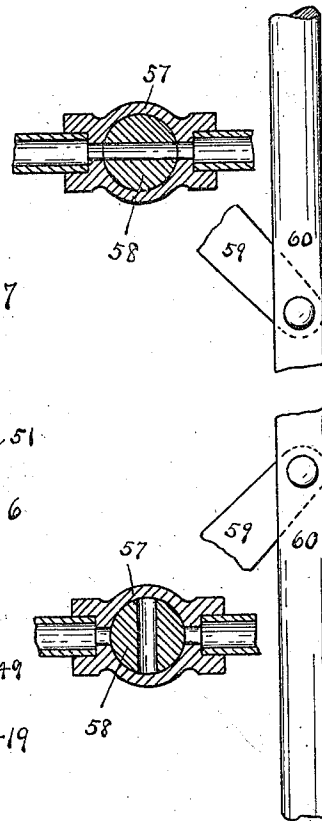


Fig. 3.

Fig. 1.

Witnesses:

J. H. Perrault
E. M. Brown.

Inventor

Edward N. Pagelsen

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3 SHEETS—SHEET 2.

Fig. 4.

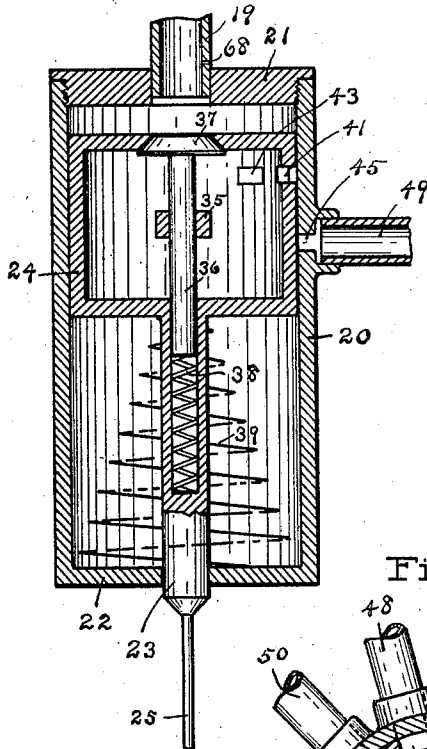


Fig. 5.

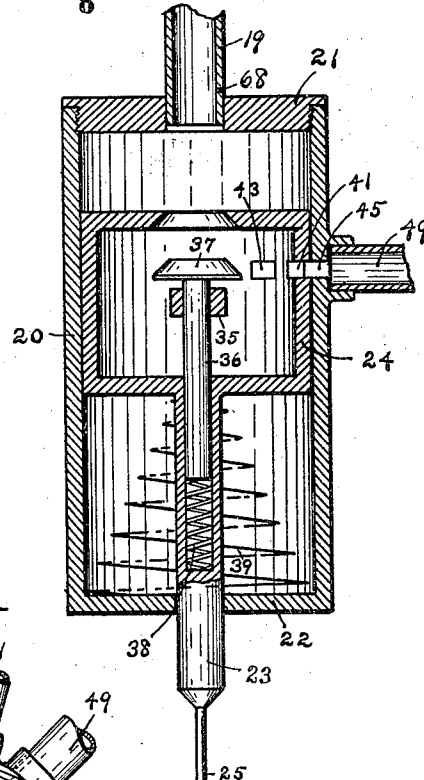


Fig. 6.

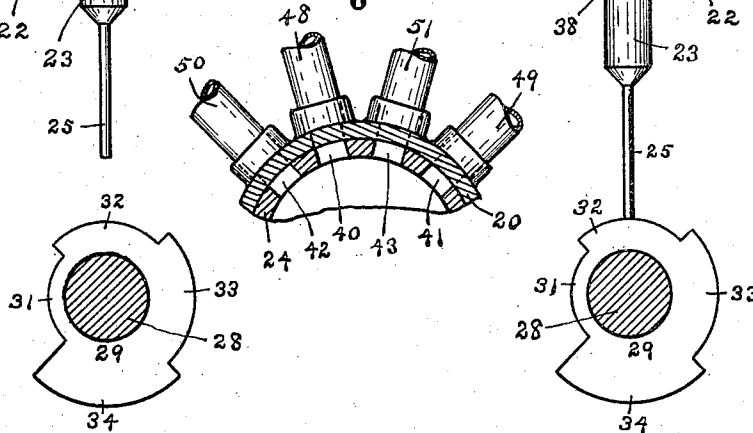
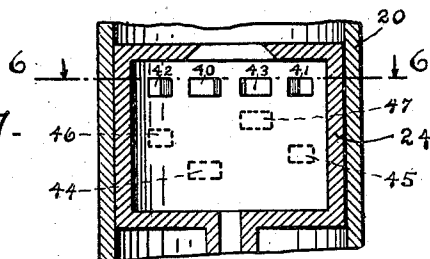


Fig. 7.



Witnesses
W. Herrault
E. M. Brown

Inventor
Edward N. Pagelsen

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3 SHEETS—SHEET 3.

Fig. 8.

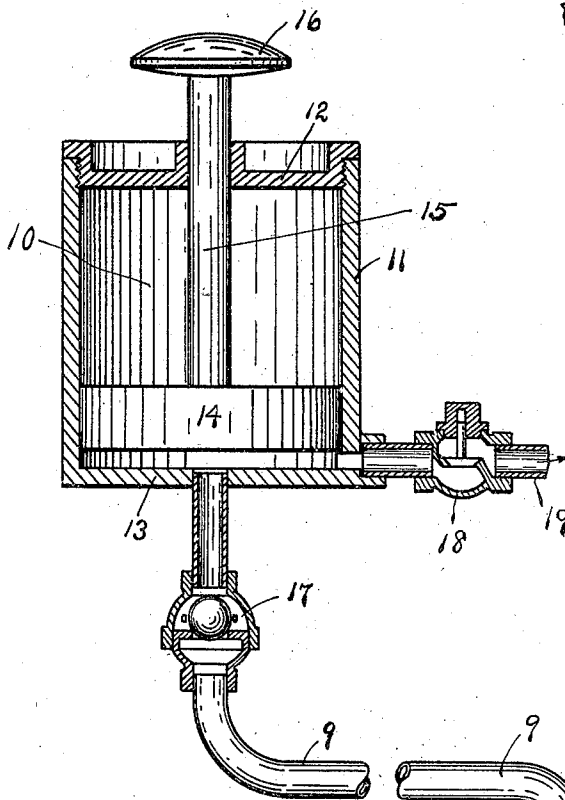


Fig. 10.

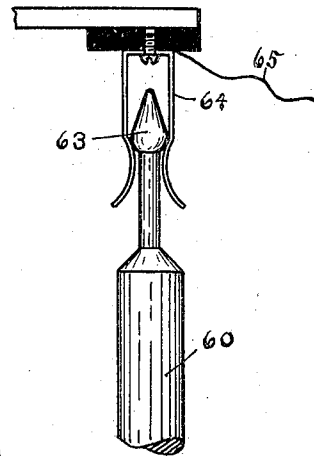
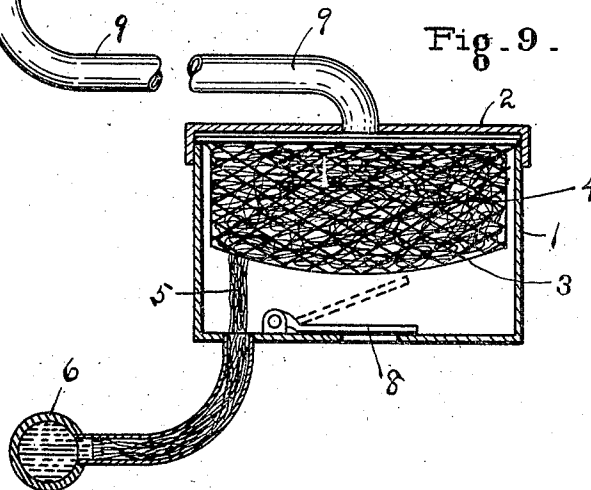


Fig. 9.



Witnesses:
J. H. Herrault
E. M. Brown

Inventor
Edward N. Pagelsen

UNITED STATES PATENT OFFICE.

EDWARD N. PAGELSEN, OF DETROIT, MICHIGAN.

STARTING DEVICE FOR EXPLOSION-ENGINES.

960,690.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed September 23, 1909. Serial No. 519,207.

To all whom it may concern:

Be it known that I, EDWARD N. PAGELSEN, a citizen of the United States, and a resident of the city of Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Starting Device for Explosion-Engines, of which the following is a specification.

This invention relates to means for introducing a charge of explosive mixture into the explosion chamber of internal-combustion engines, and the object of my improvements is to provide a device whereby the charge will be led to the proper cylinder and no other.

My invention consists in combination with a carbureter and hand pump, of pipes for conducting the explosive charge to the various cylinders, of a valve for selecting the pipe through which the charge shall pass actuated by the pump, and an automatic controlling device for the valve.

My invention further consists in combination with this charging device, of means for opening and closing valves in said pipes and simultaneously opening and closing the electric igniting circuit.

In the accompanying drawings, Figure 1 is a plan of an explosion engine with my improved starting device in position. Figs. 2 and 3 are details of valves in the feed pipes. Figs. 4 and 5 are central vertical cross sections of the selecting valve and the cam for controlling the same. Fig. 6 is a cross section on the line 6-6 of Fig. 7. Fig. 7 is a detail of the selecting valve. Fig. 8 is a cross section of the pump. Fig. 9 is a cross section of a carbureter. Fig. 10 is a detail of a switch.

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

To start a "dead" multi-cylinder, automobile engine an explosive charge must be introduced into the proper cylinder. By means of the construction shown and described, this can be done by the chauffeur without leaving his seat. The construction comprises a carbureter and a hand pump of any desired type, a selecting valve controlled by the engine itself, preferably through a cam on the cam shaft, and a pipe leading from the selecting valve to each explosion cylinder.

The carbureter shown in Fig. 9 has a body 1, a cover 2, and a wire receptacle 3 within the body which holds a body 4 of

loose cotton waste or other absorbent material. A wick 5 connects to this absorbent material and extends to a source of supply, preferably to the main fuel supply pipe 6, which connects to the main engine carbureter 7. (Fig. 1). A valve 8 in the bottom of the carbureter body 1 admits air to the same while a pipe 9 connects to the pump. Any other desired carbureter may be employed and mounted in any convenient place.

The pump 10 shown in Fig. 8 has a cylinder 11, upper head 12, lower head 13, piston 14, piston rod 15 with knob 16 on the outer end, inlet valve 17 connecting to the carbureter by the pipe 9, and outlet valve 18 connecting to the selecting valve by means of the pipe 19. Any other pump may be employed and mounted in any convenient position.

The selecting valve has a body 20, an upper head 21, a lower head 22, a hollow piston 24, a cored piston rod 23, and an extension or finder 25 at the lower end of the piston rod. This selecting valve will be mounted adjacent to a constantly moving part of the engine, and on four-cycle engines, preferably adjacent the cam shaft which actuates the valves, as this shaft usually revolves once for each complete operation of the engine. On this cam shaft 28 is secured a cam 29 having steps 31, 32, 33 and 34. Which step is adjacent the finder will depend upon the position of the movable parts of the engine, that is, will depend upon in which cylinder the next explosion is due. It is obvious that the cam should be so positioned on the cam-shaft that when the finder 25 engages it, the valve 24 will be so positioned that the explosive mixture will be forced into the proper cylinder. In a four-cylinder, four-cycle engine, the cam shaft makes one revolution for each four explosions, so that four steps on the cam 29 will properly position the valve 24 when the finder is forced down in contact with the cam during the operation of the charging mechanism.

Within the piston 24 is a perforated cross bar 35, in which and in a bore of the piston rod 23 is mounted a stem 36 having an inlet valve 37 at its upper end, normally held against its seat by the spring 38. The spring 39 normally holds the piston 24 up and holds the finder 25 away from the cam 29. The piston 24 has four outlet apertures 40-41-42 and 43 which register respectively with the

ports 44—45—46 and 47 in the wall of the valve body. Pipes 48—49—50 and 51 connect these ports to the explosion chambers of the cylinders 52—53—54 and 55 respectively. Check valves 56 in these pipes adjacent the cylinders prevent the passage of burned gases from the explosion chambers to the selecting valve, while stop-cocks 57 may be placed in these pipes for ample security. The plugs 58 of these stop-cocks have levers 59 which all connect to the rod 60 extending through the dash-board 61, when used on an automobile, where the rod has a knob 62. This rod may be employed to break the igniting circuit of the engine. The rod may be "grounded" on the engine. At some convenient place, preferably near the end 63 of the rod, an insulated switch member 64 is mounted and connected to it is the wire 65 forming a portion of the igniting circuit. The end of the rod 60 may be properly formed to close the circuit as shown in Fig. 10. The operation of the device is as follows.

When it is desired to start a "dead" engine, the operator pulls the knob 62 inward thereby turning the levers 59 to the positions shown in Fig. 2 and indicated in the dotted lines 67 in Fig. 1, thus opening all the stop-cocks 57 and opening the igniting circuit. It will be understood that this may be either the primary or secondary circuit when a double circuit system is employed. The operator next actuates the pump 10, drawing air through the saturated fiber 4 and forcing the resulting explosive mixture to the selecting valve through the pipe 19. As pressure accumulates within the body 20, the piston 24 is forced down until the finder 25 rests on the cam 29, thus properly positioning the valve 24. As the spring 38 is stiffer than the spring 39 the valve 37 will remain seated until the valve 24 is positioned. Increased pressure in the pipe 19 will force the inlet valve 37 from its seat when the explosive mixture will flow through the proper aperture in the valve 24 and port in the body 20, and through the selected pipe to the proper cylinder. After the cylinder has been properly charged, the pump is stopped. The pressure above the valve 24 immediately falls because of the very small vent 68 in the pipe 19, shown in Figs. 4 and 5. The valve 37 will promptly close and the valve 24 rise, lifting the finder 25 from the cam. The rod 60 is then pushed forward, closing the stop-cocks 57 and the igniting circuit. The explosion of the charge thus introduced starts the engine.

The location of the pipes 48—49—50 and 51 will depend upon the circumstances. Their diameter may be quite small, and one inch is usually a sufficient diameter for the selecting-valve piston 24.

The details of construction and mounting

of this device may be varied by those skilled in the art without departing from the spirit of my invention.

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

1. In a starting device for multi-cylinder explosion engines, the combination of a carbureter and pump, a selecting valve controlled by the engine and actuated by the pump, and pipes extending from the selecting valve to the cylinders of the engine.

2. In a starting device for multi-cylinder explosion engines, the combination of a selecting valve comprising a body having a series of ports, a pipe connecting each port to an engine cylinder, a movable member within the body adapted to open the proper port according to the position of the engine, a carbureter, a pump to draw an explosive charge from the carbureter and force it into and through the selecting valve and its movable member to the engine cylinder, said movable member being provided with means to resist the flow of the explosive charge therethrough whereby said movable member is positioned by the pressure of said charge.

3. In a starting device for multi-cylinder explosion engines, the combination of a valve body having a port for each cylinder of the engine, a pipe connecting each port to a cylinder, a hollow piston valve having an inlet and outlet apertures adapted to register with said ports, a spring to normally hold the piston to close the ports, a valve to close the inlet of the piston, a spring to hold said valve on its seat, a carbureter, a pump to cause the flow of explosive mixture from the carbureter to the selecting valve, and through the same to the proper cylinder, and means to properly position the selecting valve piston.

4. In a starting device for explosion engines, the combination of a carbureter and a pump, a cylindrical valve casing having outlet ports, pipes connecting the outlet ports to the cylinders of the engine, a head for the cylindrical casing having an inlet port, a pipe connecting the inlet port and the pump, a hollow cylindrical valve within the casing and having inlet and outlet openings, said outlet openings positioned so as to register with the outlet ports of the casing in succession, and means to limit the movement of said valve.

5. In a starting device for explosion engines, the combination of a source of explosive vapor, a cylindrical valve casing having outlet ports and an inlet port, pipes connecting the outlet ports to the cylinders of the engine and the inlet port and the vapor source, a hollow cylindrical valve within the casing and having inlet and outlet openings, said outlet openings positioned so as to regis-

ter with the outlet ports of the casing in succession, means to limit the movement of said valve, and means to close the inlet opening of the cylindrical valve.

5 6. In a starting device for multi-cylinder explosion engines, the combination of a carbureter and pump, a selecting valve, a cam for controlling said valve and having steps corresponding in number to the cylinders of the engine, and pipes extending from the
10 selecting valve to the cylinders of the engine through which the explosive fluid may be forced by the pump to proper cylinder.

7. In a starting device for multi-cylinder explosion engines, the combination of a
15 source of explosive vapor, a pump for moving the same, a valve controlled in its movement by the engine and positioned by the pressure of the vapor, and pipes for conducting the vapor from the pump to the
20 valve and from the valve to the different cylinders.

8. In a starting device for multi-cylinder explosion engines, the combination of a
25 source of explosive vapor, a valve controlled in its movements by said engine and positioned by the pressure of the vapor, and pipes for conducting the vapor to the valve and from the valve to each of the cylinders.

30 9. In a starting device for explosion engines, the combination of a cylindrical valve

body having an inlet port and a plurality of outlet ports, pipes connecting the outlet ports to different explosion chambers, a piston valve within the cylinder adapted to
35 open the different outlet ports in succession, a pipe connecting the inlet port to a source of supply of explosive vapor under pressure whereby the piston valve may be moved to
40 open a port, and means to control the movement of the valve.

10. In a starting device for multi-cylinder explosion engines, the combination of a valve body having outlet ports, a pipe connecting
45 each explosion cylinder with an outlet port of the valve body, a valve to open said ports in succession, said valve body having an inlet port, a source of explosive vapor under pressure, a pipe connecting the same to the
50 inlet port of the valve body, a governing cam, and a stem connected to said valve and adapted to engage the cam to stop the valve at the proper position when moved by the pressure of the explosive vapor.

In testimony whereof I have signed this
55 specification in the presence of two subscribing witnesses.

EDWARD N. PAGELSEN.

Witnesses:

ELIZABETH M. BROWN,
MARY HAWTHORNE.