

H. E. COFFIN.
 STARTING DEVICE FOR EXPLOSION ENGINES.
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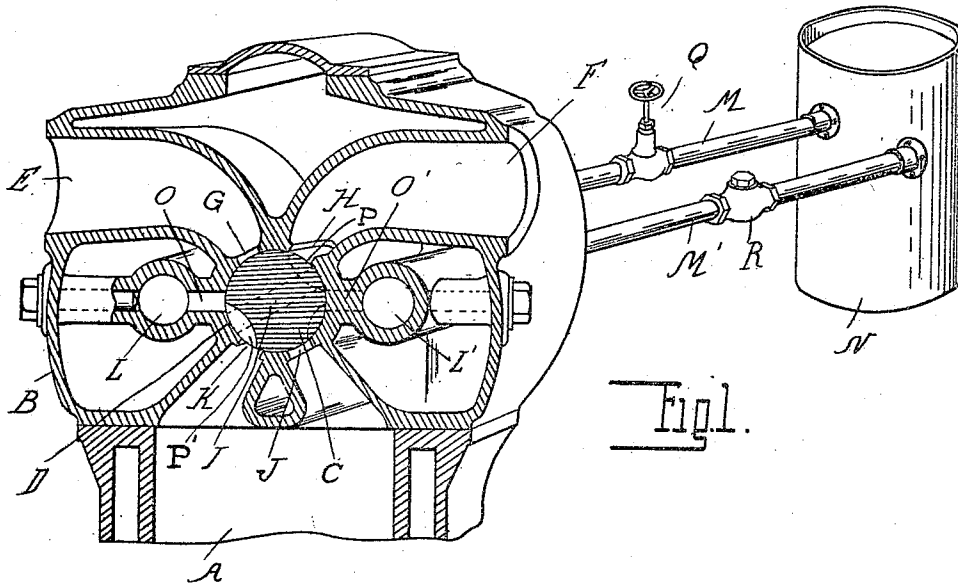


Fig. 1.

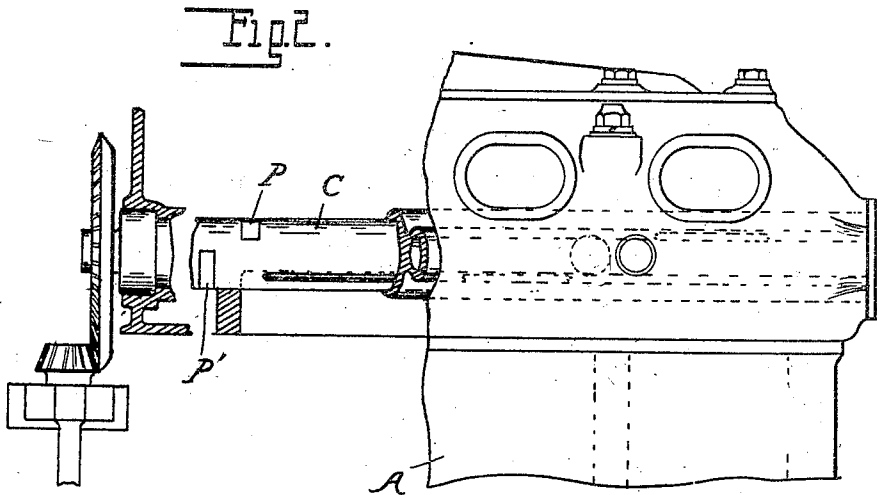


Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

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STARTING DEVICE FOR EXPLOSION-ENGINES.

1,060,820.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HOWARD E. COFFIN, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Starting Devices for Explosion-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to explosion engines of that type in which the ports are controlled by a rotary valve, and it is the object of the invention to obtain a simple construction of starting device applicable thereto.

To this end the invention consists in the means employed for storing a portion of the compressed gases of explosion and for distributing the stored charge to the several cylinders of the engine to effect the starting.

The invention further consists in various details of construction as hereinafter set forth.

In the drawings,—Figure 1 is a sectional perspective view of an explosion engine embodying my invention; Fig. 2 is a sectional side elevation thereof.

A are the cylinders of an explosion engine, B is a head for said cylinders, C is a rotary valve preferably of cylindrical form and engaging a corresponding seat or case D in the head B. The valve C controls both the inlet and exhaust passages to and from the engine cylinder, and as shown the inlet passage E is arranged on one side of the head B and the exhaust passage F on the opposite side thereof. These passages communicate with ports G and H in the valve chest preferably arranged in the path of a common port I in the valve so as to be registered alternatively therewith. Upon the opposite side of the valve case D are ports J and K leading to the cylinder and connected through the valve port I respectively with the inlet passage E and exhaust passage F.

With the arrangement as thus far described, the valve C is driven through a suitable drive train (not shown) so as to open the inlet and exhaust passages of the several cylinders in properly timed relation. This valve I also employ for controlling the engine starting device, the construction being as follows:

L and L' are passages in the head D upon opposite sides of the valve case D and which are connected by conduits M and M' with a storage tank N. These passages L and L' communicate with ports O and O' in the valve case which are arranged out of the path of rotation of the valve port I, as for instance in the space intermediate the ports I of adjacent cylinders.

P and P' are segmental slots or recesses formed in the valve C and adapted in the rotation thereof to register with the ports O and O' to couple the same with the ports J and K leading to the cylinder. These ports P and P' are so positioned and proportioned that during one or more explosion strokes in each cycle of the engine the port J will be coupled to the port O', establishing communication between the cylinder and tank N through the intermediate passage L' and conduit M' and permitting a portion of the compressed gases of explosion to pass in and be stored in said tank. The port P for each cylinder will also be registered with the ports O and K during the initial explosion stroke, permitting the passage of compressed gases in the tank N through the conduits M, passage L and ports O, P and K to the cylinder. There is however, a valve Q in the conduit M which is normally closed and therefore, prevents the passage of gas there-through as just described, also preferably one or more check valves R.

Whenever the engine is in operation a supply of compressed gas will be stored in the tank N for subsequent use in starting and escape of this gas is prevented by the closure of the valve Q. To start the engine it is merely necessary to open the valve Q which will admit the gas under pressure to the passage L and to a port P, one of which will always be in registration therewith, and thence to the cylinder. This will actuate the piston with sufficient force to cause the compression of an explosive charge in another cylinder and the subsequent explosion thereof.

In order to arrange the ports controlling the storage and distribution of compressed gases for starting so as to avoid interference with the normal function of the engine, these ports J and K are preferably arranged intermediate the ends of the ports I. The ports J and K are of sufficient length to register with the ports P and P',

and the latter are so positioned in the circumference of the valve cylinder as to secure the proper timing.

What I claim as my invention is:

- 5 1. In an explosion engine, the combination with a rotary valve having a port extending therethrough utilized in the normal operation of the engine, of a port out of the path of movement of said first mentioned port, a valve case having a port leading to the engine cylinder with which both of said valve ports register, and a port communicating with a storage tank adapted to be connected to said cylinder port by said second mentioned valve port.
- 10 2. In an explosion engine, the combination of a rotary valve having a port therethrough utilized in the normal operation of the engine, and a recess port out of the path of movement of said first mentioned port, a valve case having a port leading to the engine cylinder and with which both of said valve ports register, and a port communicating with a reservoir for compressed gases positioned to be coupled by said second mentioned valve port with the engine cylinder.
- 15 3. In a multi-cylinder explosion engine, a rotary valve for controlling a plurality of cylinders and having ports therethrough utilized in the normal operation of the engine by the respective cylinders, and a port intermediate said first mentioned ports, a valve case having a cylinder connecting port adapted to register with said last mentioned valve port and one of the first mentioned ports, and connecting with a storage for compressed gases coupled by said last mentioned valve port with said cylinder port.
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4. In a multi-cylinder explosion engine, a cylindrical valve and corresponding valve case having successively registering ports utilized by the several cylinders of the engine in the normal operation thereof, recess ports in the valve adjacent to said first mentioned valve ports and intermediate the same, and ports out of the path of movement of said first mentioned valve ports connected with the storage for compressed gases and adapted to be coupled by said recessed valve ports with the ports of the respective cylinders.

5. In an explosion engine, the combination with a rotary valve having a port utilized in the normal operation of the engine, a second port out of the path of movement of said first mentioned port, a cylinder port with which both of said valve ports register, and a port communicating with a storage for compressed gases, positioned to be connected to said cylinder port by said second mentioned valve port.

6. In an explosion engine, the combination with a cylinder provided with a port utilized in the normal operation of the engine and having a second port connected to a storage for compressed gases for starting, a rotary valve having a port utilized in the normal operation of the engine and adapted to register with the first-mentioned cylinder port and having a second port adapted to connect said cylinder ports.

In testimony whereof I affix my signature in presence of two witnesses.

HOWARD E. COFFIN.

Witnesses:

JAMES P. BARRY,
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