W. JAY.

EXPLOSIVE ENGINE.

APPLICATION FILED JAN. 14, 1911.

1,052,826. Patented Feb. 11, 1913.

Fig. 1.

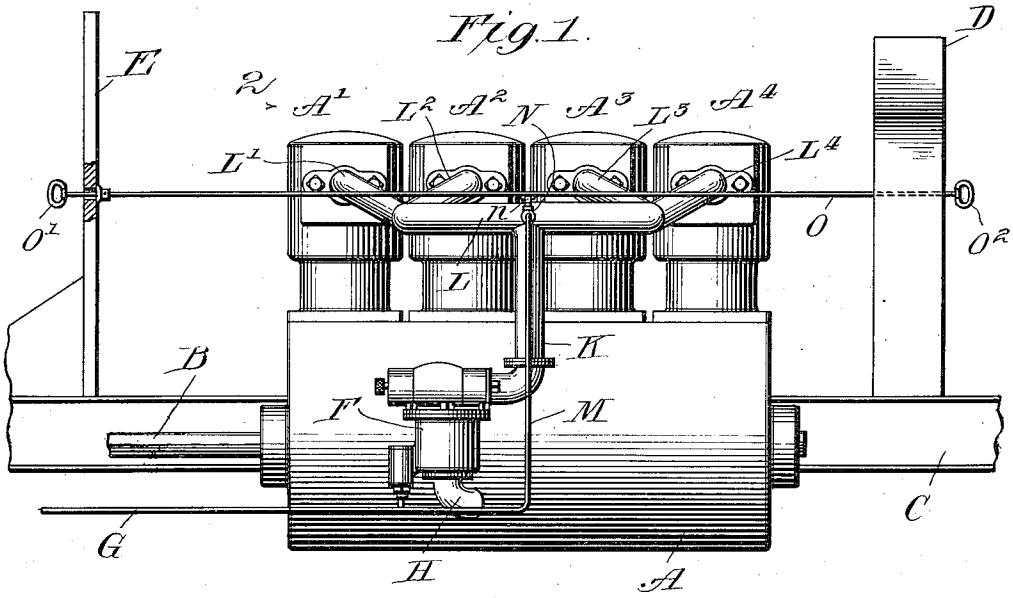


Fig. 4.

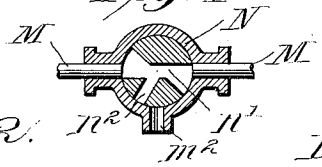
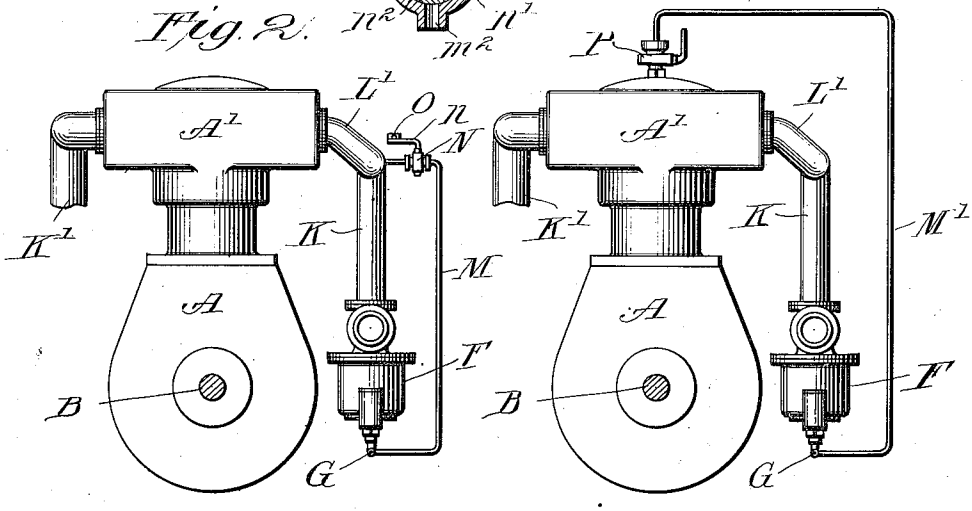


Fig. 3.

Fig. 2.



WITNESSES

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EXPLOSIVE-ENGINE.

1,052,826. Specification of Letters Patent. Patented Feb. 11, 1913.

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To all whom it may concern:

Be it known that I, WEBB JAY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Explosive-Engines, of which the following is a specification.

My invention relates in general to explosive engines, and more particularly to means for facilitating the starting of such engines.

Considerable difficulty is often experienced in starting explosive engines, such, for instance, as those commonly used to propel automobiles, especially in cold weather, when the liquid hydrocarbon does not vaporize as readily as in warm weather. The relative proportions of fluid hydrocarbon and air which form the most efficient explosive mixture for running an engine after it has started, are often not sufficiently highly explosive to initiate the explosions when the engine is cranked. It is, therefore, frequently necessary to inject directly into an engine cylinder a small quantity of liquid hydrocarbon in order that the explosions may be started. This requires considerable trouble and delay.

The primary object of my invention is to provide an explosive engine with means for initially supplying to the cylinder, or cylinders, a more highly explosive fluid when the engine is cranked than is desirable after the explosions have started.

A further object of my invention is to provide a by-pass conduit around the usual carbureter of an explosive engine through which explosive fluid will be automatically supplied to the cylinder, or cylinders, by the suction created in the cylinders in starting the engine.

My invention will be more fully disclosed hereinafter with reference to the accompanying drawing, in which the same is illustrated as embodied in two convenient and practical forms, and in which—

Figure 1 is a side elevational view of a four-cylinder engine provided with one form of my improvement; Fig. 2, a sectional view on line 2, Fig. 1; Fig. 3, a view similar to Fig. 2, showing a slightly modified form of my improvement applied to the engine; and Fig. 4, a sectional view.

Similar reference characters are used to designate similar parts in the several figures of the drawing.

Reference letter A indicates the crank case, and reference characters A′, A^2, A^3 and A^4 designate the cylinders of a four-cylinder engine.

B designates the crank shaft, and C a portion of the supporting frame of the engine.

D indicates the radiator, and E the dashboard at the front of an automobile, between which and the radiator it is usual to locate the engine in automobiles as generally constructed.

F designates the carbureter to which leads the conduit G extending from a supply of gasolene, or other liquid hydrocarbon.

H indicates the air intake leading to the carbureter.

K designates the conduit leading from the carbureter through which the explosive mixture is supplied to the engine cylinders.

L indicates a manifold with which the conduit K communicates and from which extend branch conduits L′, L^2, L^3 and L^4, to the respective cylinders.

The parts above described do not in themselves constitute my invention, as they are such as are commonly used in propelling automobiles.

While I have illustrated and described the above parts of an automobile engine as consisting in certain specific structures, yet it will be understood that my invention is not limited in its application to any particular form of specific engine or of its constituent parts, but is applicable to explosive engines generally, whether employed to propel automobiles, or for other purposes.

M indicates a conduit for supplying the motive fluid, whether it be gasolene or other forms of liquid hydrocarbons, directly to the engine cylinders. In Fig. 1 the conduit M is shown as extending from the conduit G at a point intermediate of the carbureter and the fuel tank, and connected at its other end with the manifold L from which the branch conduits lead to the engine cylinders. The conduit M, therefore, serves as a by-pass around the carbureter, in this form of my invention. A valve N is provided in the conduit M which, when open, affords a passageway for the explosive fluid through the conduit M to the manifold L, and thence to the engine cylinders.

In order to facilitate the movement of the valve N, it is preferably provided with operating means extending to points con-

venient for the operator. I have shown a rod O pivotally connected with the lever n of the valve N, which extends through the dash-board E, and is provided with a handle O′ which may be readily grasped by the operator when in his seat. The rod O may also be extended through the radiator D and provided with the handle O^2, which may be readily grasped to operate the valve N when the operator is in position to crank the engine.

The operation of my improvement is as follows: Prior to cranking the engine, the valve N is opened, so as to afford a more or less restricted passageway for the fuel to pass through the conduit M and manifold L into the engine cylinders. The usual throttle valve is preferably closed, and the engine cranked in the usual manner. The reciprocations of the pistons in the cylinders, due to the cranking, draws the highly explosive fluid directly into the cylinders so that the series of explosions instantly commence, and the engine thereby started without the amount of cranking frequently required when the usual explosive mixture passing from the carbureter to the engine cylinders is relied upon to initiate the explosions. After the engine has started, the valve N is closed and the usual throttle valve opened in the manner customary in the operation of automobiles and other explosive engines. The valve N may however remain open after the engine is started for a sufficient length of time to enable the cylinders to become warm and the engine to acquire its normal operation.

If desired, the valve N may be so constructed as to permit a small quantity of air to mix with the liquid hydrocarbon passing directly to the engine cylinders, in order that the explosive mixture for starting may not consist entirely of the unadulterated liquid hydrocarbon, but at the same time be of a more highly explosive nature than the mixture formed when the fluid passes through the carbureter. In Fig. 4 the valve N is shown as provided with a passageway n' having flaring ends, and with a restricted radial passage n^2 leading therefrom through the valve. When the valve is in the position shown at Fig. 4, liquid hydrocarbon passes directly to the engine cylinders without any air being mixed therewith. A further movement of the valve, however, brings the radial passage n^2 into register with the air port m^2, thereby permitting air to be mixed with the liquid hydrocarbon passing directly to the engine cylinders. It will be observed that the passageway n' having the flaring ends continues the communication between the portions of the conduit M on opposite sides of the valve N, even when the valve is so turned as to connect the passage n^2 with the port m^2.

In Fig. 3, I have illustrated a slightly modified form of my improvement, in which the conduit for directly supplying to the engine cylinders the highly explosive fluid, is designated by reference character M′, and leads to the usual pet cock opening. The pet cock P, therefore, serves to control the direct communication of the conduit M′ with the interior of the engine cylinder, and may be manipulated in the manner above described, in connection with the valve M, to control the direct supply of a highly explosive fluid to the engine cylinders in starting the engine. It will also be apparent to those skilled in the art that my improvement may be provided in other specific forms than those herein illustrated and described.

I found in practice that my improvement may be advantageously utilized by opening the valve N before the engine stops, thereby resulting in a sufficient quantity of the highly explosive starting mixture to be drawn into the cylinders to instantly start the explosions when the engine is again cranked. The only advantage in this procedure is that the operation of the engine itself before it is stopped does the work of pumping the highly explosive starting mixture into the cylinders, thereby avoiding the slight cranking which would otherwise be necessary to supply to the engine cylinders the highly explosive starting fluid when the engine is to be put in operation.

From the foregoing description it will be observed that I have invented an improvement in explosive engines, whereby the engine may be readily started without the labor of prolonged cranking frequently necessary, especially in cold weather, inasmuch as my invention effects the supply to the engine cylinders, solely by the suction created in the cylinders themselves of a more highly explosive fluid for starting the engine than is desirable for use in the running of the engine after it has been started.

I claim.

1. An internal combustion engine comprising a cylinder and reciprocating piston, a carbureter, a hydrocarbon supply communicating with said carbureter, means operated by the suction stroke of said piston for drawing into said cylinder a supply of hydrocarbon additional to that supplied through said carbureter, said means comprising a by-pass conduit leading from said hydrocarbon supply around said carbureter to said cylinder, and a valve in said by-pass conduit, whereby when said valve is open the partial vacuum created by the suction stroke of said piston extends to said hydrocarbon supply and draws hydrocarbon through said by-pass conduit directly into said cylinder.

2. An internal combustion engine comprising a cylinder and reciprocating piston,

a carbureter, a hydrocarbon supply communicating with said carbureter, a by-pass conduit leading from said hydrocarbon supply around said carbureter and communicating with said cylinder, and valve mechanism controlling said by-pass conduit and also an air supply port, whereby the partial vacuum created by the movement of said piston extends to said hydrocarbon supply and draws hydrocarbon through said by-pass conduit around said carbureter directly to said cylinder and also draws a predetermined quantity of air into the cylinder with the hydrocarbon.

In testimony whereof, I have subscribed my name.

WEBB JAY.

Witnesses:
GEO. L. WILKINSON,
ANNA L. WALTON.