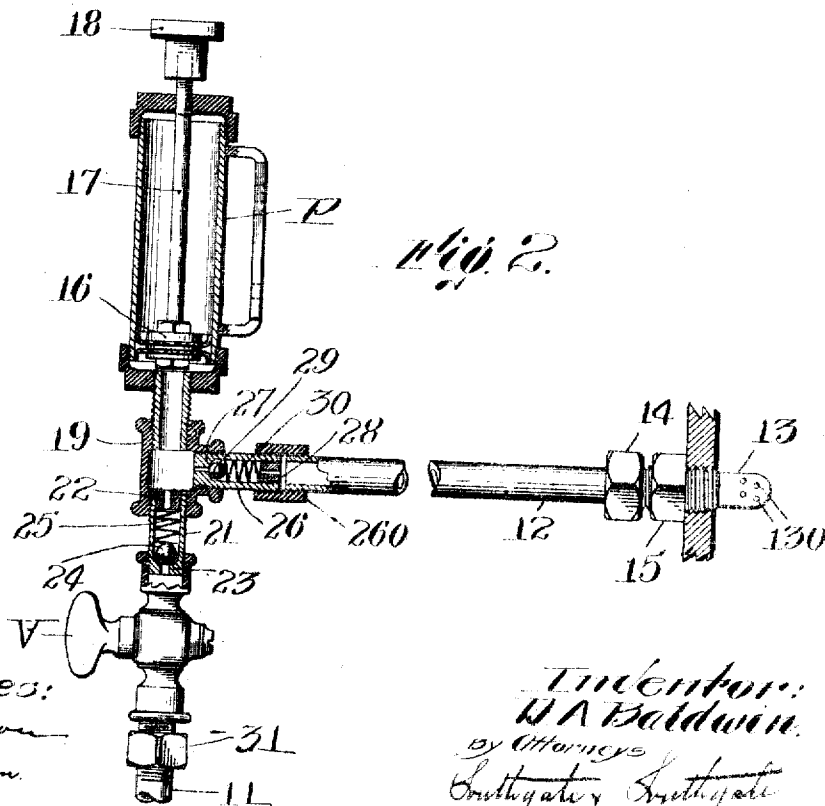
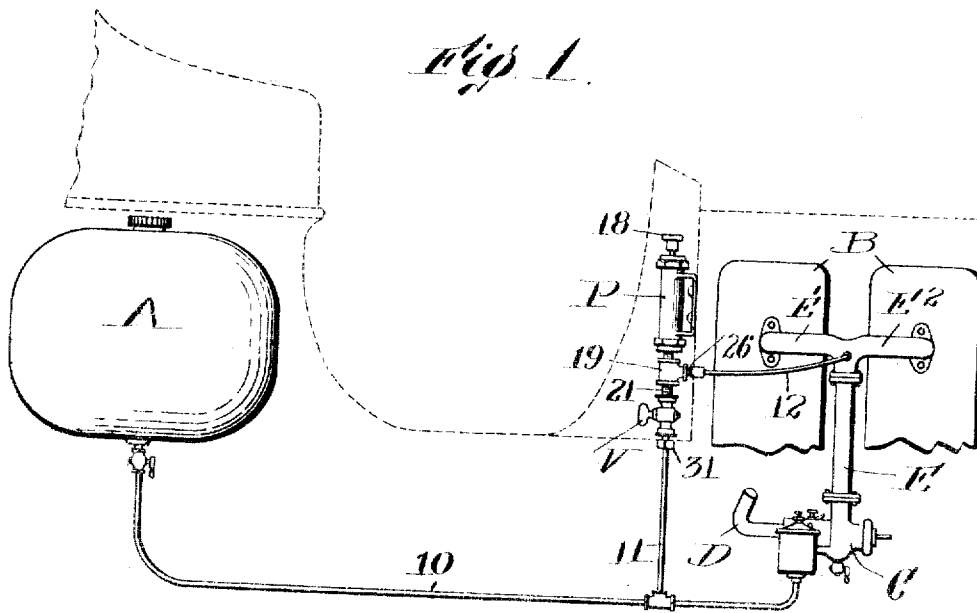


D. A. BALDWIN.
 STARTING DEVICE FOR GAS ENGINES.
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1,009,011.

Patented Nov. 14, 1911.



Witnesses:

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STARTING DEVICE FOR GAS-ENGINES.

1,909,011.

Specification of Letters Patent. Patented Nov. 14, 1911.

Application filed February 24, 1908. Serial No. 417,548.

To all whom it may concern:

Be it known that I, DAYTON A. BALDWIN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Starting Device for Gas-Engines, of which the following is a specification.

The object of this invention is to provide a new and improved starting device for a gas engine by which the engine can have gasolene supplied thereto independently of the carbureter.

The device has been designed particularly for automobiles.

The invention is illustrated in the accompanying drawing, referring to which,

Figure 1 is a diagrammatic view showing my invention applied to an automobile, and Fig. 2 is an enlarged sectional view showing the construction of my improvement.

Sometimes it is very difficult to start or crank a gas engine when the same is cold or after it has been standing for a long time. This is usually occasioned by failure to get the proper amount of gasolene into the cylinders or to get the gasolene properly vaporized. To overcome this objection I extend a branch pipe-line from the supply and connect the same to a spray nozzle in the in-take pipe, and arrange a forcing device such as a pump in this branch line. A valve is also arranged in this branch line. Then when it is desired to prime or start the engine, the valve is opened and the pump is worked to force gasolene in the form of spray into the in-take pipe. As there is usually plenty of air in the cylinders and in-take pipe, the next crank or so of the engine will draw a proper mixture into the cylinders and compress the same whereby the motor will be easily started.

The invention has further advantages hereinafter pointed out.

Referring to the drawing and in detail, A designates the supply or gasolene tank, B the cylinders of the engine which may be four in number cast in two pairs or any other desired number and arrangement, C the carbureter, D the air inlet pipe for the carbureter, and E the in-take pipe extending from the carbureter and connecting with a double branch pipe E' and E'' leading to each pair of cylinders. A supply pipe 10 connects the

gasolene tank with the carbureter. These parts are arranged in the usual way and need no further description.

The way my improvement is applied is as follows:—The supply pipe 10 is tapped and extending therefrom is a pipe 11 which connects through the forcing device to a pipe 12, which latter is connected to a spraying nozzle 13. This nozzle 13 is threaded into the in-take at the point where the same branches out into the two branches E' and E''. The nozzle is provided with a number of minute openings 130 so as to form a spraying nozzle. The nozzle is connected by a coupling 14 to the pipe 12 and a check-nut 15 is arranged to keep the same rigidly in position.

The forcing device or pump P preferably is arranged on the dash of the automobile and is constructed as follows:—A piston 16 which preferably has cup-leathers turned both upwardly and downwardly is mounted on the end of a piston rod 17 which extends out through a cap screwed on the pump barrel, which piston rod has an operating handle 18 on the end thereof. A T-coupling 19 is connected by a screw-threaded nipple to a nut threaded on the bottom of the pump barrel. Screwed in the bottom of this T-coupling 19 is a nipple 21 and screwed into the end of the nipple is a plug 22 having a hole through the same. The bottom of the nipple 21 is formed into a valve seat 23 engaging which is a ball-valve 24 which is pressed to its seat by spring 25 arranged under the plug 22. A nipple 26 is screw-threaded into the T-coupling 19 and is connected by a coupling 260 with the pipe 12. A plug 28 having a hole through the same is screwed into the nipple 26. The end of the nipple 26 is shaped to form a valve-seat 27 engaging which is a ball-valve 29 which is pressed to its seat by a spring 30 held in place by the plug 28. The holes through the valve-seat 27 and plug 28 are made somewhat smaller than the holes through the valve-seat 23 and plug 22 so that the inlet to the pump will be freer than the outlet. A valve V is screwed to the nipple 21 and is connected to the pipe 11 by a coupling 31.

When it is desired to start the engine, the valve V is opened and the pump piston is given one or more reciprocations. This will

force the raw gasolene into the spraying nozzle 13 where it will be delivered in the form of fine jets or vapor. This delivery can be easily accomplished, as the branch pipe line goes around and is independent of the carbureter. The cylinders are usually filled with air and as the vapor or supply of gasolene is introduced at a point of access to all the cylinders, the next crank or so of the motor will get a proper mixture in one or more cylinders and compress the same so that the engine will easily start. The cranking of the motor can always draw plenty of air in through the air pipe D and the difficulty in starting is usually in getting the gasolene to vaporize in the carbureter.

If the carbureter is in proper condition, it is usually the best practice to close the valve V as soon as the cylinders are primed so that the carbureter will be brought into action as soon as possible. In case the carbureter does not start easily, the valve V may be gradually closed so that the nozzle 13 will act as a carbureter. As the valves 24 and 29 open toward the engine the action thereof will suck the gasolene out through the nozzle 13. In case of derangement of the carbureter, by gradually adjusting the valve V the motor can be run by using the nozzle 13 as a crude carbureter, the air being drawn in through air inlet pipe D and thus sometimes it is possible to get out of an emergency. By locating the nozzle at the point indicated, it is easy to get the proper mixture into the cylinders.

The details and arrangements herein shown and described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

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

1. The combination of a gas engine, a carbureter, an in-take pipe extending from the carbureter to the gas engine, a gasolene supply, a pipe connecting therefrom to the carbureter, a branch pipe line extending from the supply and connected to the in-take pipe, and means for forcing gasolene through the branch pipe into the in-take.

2. The combination of a gas engine, a carbureter, an in-take pipe extending from the carbureter to the gas engine and having branches extending to the cylinders of the engine, a gasolene supply, a pipe connected therefrom to the carbureter, a branch pipe line extending from the supply and connected to the in-take pipe at the point where the same branches to the cylinders, and means for forcing gasolene through the branch pipe into said in-take pipe.

3. The combination of a gas engine, a carbureter, an in-take pipe extending from the carbureter to the gas engine, a gasolene

supply, a pipe connecting therefrom to the carbureter, a spraying nozzle discharging into the in-take pipe, a branch pipe line extending from the supply and connected to said spraying nozzle, and means for forcing gasolene through the branch pipe into said spraying nozzle.

4. The combination of a gas engine, a carbureter, an in-take pipe extending from the carbureter to the gas engine, a gasolene supply, a pipe connecting therefrom to the carbureter, a branch pipe line extending from the supply and connected to the in-take pipe, and a pump in this branch line for forcing gasolene into the in-take pipe.

5. The combination of a gas engine, a carbureter, an in-take pipe extending from the carbureter to the gas engine, a gasolene supply, a pipe connecting therefrom to the carbureter, a branch pipe extending from the supply and discharging into the in-take pipe, and a pump in said pipe line having valves opening toward the in-take pipe.

6. The combination of a gas engine, a carbureter, an in-take pipe extending from the carbureter to the gas engine, a gasolene supply, a pipe connecting therefrom to the carbureter, a branch pipe extending from the supply and connected to the in-take pipe, a pump in the pipe line having valves opening toward the in-take pipe, and a valve in the branch pipe line below the pump.

7. The combination in an automobile of a gas engine, a carbureter, an in-take pipe extending from the carbureter to the gas engine, a gasolene supply, a pipe extending therefrom to the carbureter, a branch pipe line extending from the supply to the in-take pipe and a pump in this branch arranged on the dash of the automobile.

8. The combination with a gas engine, of a gasolene supply, an in-take pipe connected with the gas engine, a branch pipe for conducting fuel from the supply to the in-take pipe, and a carbureter connected with the supply and in-take pipe independently of the branch pipe and between the in-take pipe and the connection of the branch pipe with the supply.

9. The combination with a gas engine, of a gasolene supply, an in-take pipe connected with the gas engine, a branch pipe for conducting fuel from the supply to the in-take pipe, and a carbureter connected with the supply and in-take pipe independently of the branch pipe and between the in-take pipe and the connection of the branch pipe with the supply, and a pump connected with said branch pipe.

10. The combination with an internal combustion engine utilizing liquid hydrocarbon as fuel, and which engine is provided with the usual intake pipe, carbureter and liquid hydrocarbon supply pipe leading to the carbureter, of an auxiliary pipe lead-

ing from the liquid hydrocarbon supply pipe to the interior of the intake pipe at a point adjacent where the same is connected to the engine, a pump located in the auxiliary pipe, and valves located in the auxiliary pipe adjacent the pump.

In testimony whereof I have hereunto set

my hand, in the presence of two subscribing witnesses.

D. A. BALDWIN.

Witnesses:

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C. FORREST WESSON.