

N. B. WALES.
VAPORIZER FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED DEC. 28, 1912.

1,060,042.

Patented Apr. 29, 1913.

2 SHEETS-SHEET 1.

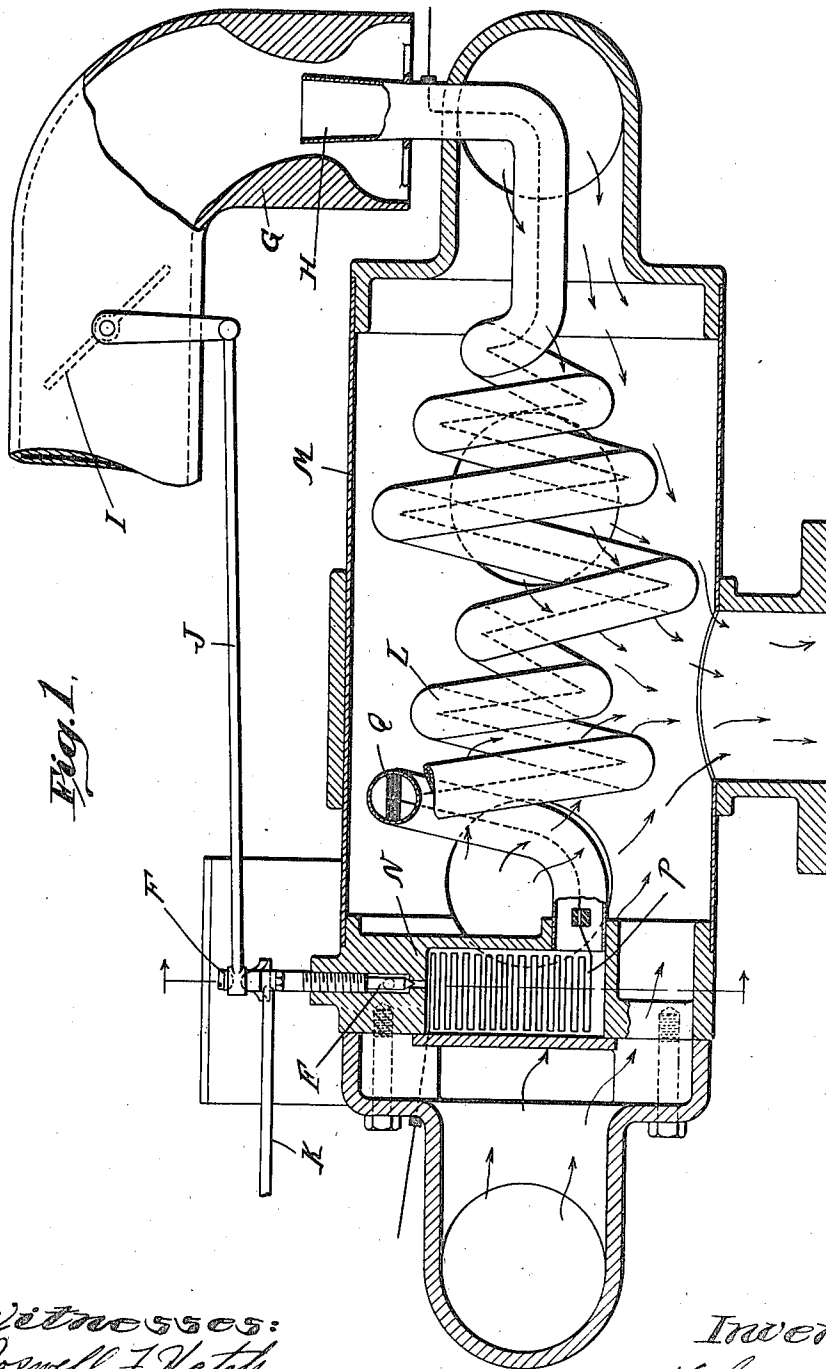


Fig. 1.

Witnesses:
Rowell F. Hatch
Anna C. Connolly.

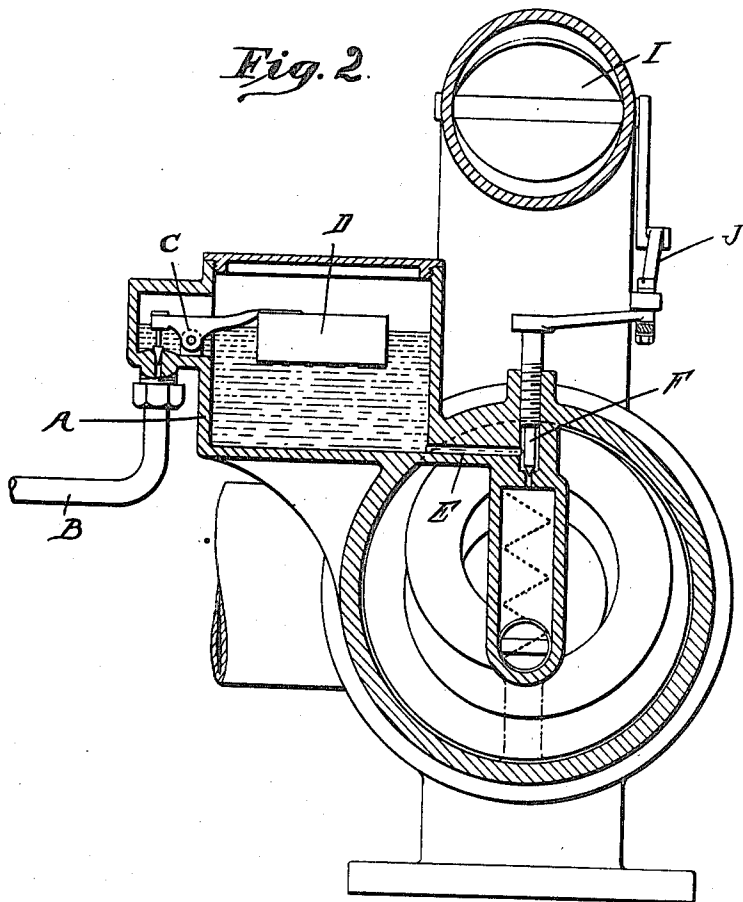
Inventor:
Nathan B. Wales

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Powell F. Hatch.
Anna Connolly

Inventor:
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UNITED STATES PATENT OFFICE.

NATHANIEL B. WALES, OF BOSTON, MASSACHUSETTS.

VAPORIZER FOR INTERNAL-COMBUSTION ENGINES.

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Specification of Letters Patent. Patented Apr. 29, 1913.

Application filed December 28, 1912. Serial No. 739,004.

To all whom it may concern:

Be it known that I, NATHANIEL B. WALES, a citizen of the United States of America, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Vaporizers for Internal-Combustion Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to vaporizers for internal combustion engines, being particularly designed for use where a relatively heavy liquid fuel—such as kerosene—is used in the carbureter.

It is the object of the invention to obtain a construction which, when the engine is in full operation under normal loads, will vaporize the oil by the waste heat of combustion; while, on the other hand, when the engine is first started or operating under light loads, auxiliary means is employed for effecting the vaporization.

It is a further object to so combine the main and auxiliary heating means that the one will not in any way interfere with the operation of the other.

With these objects in view, the invention consists in the construction as hereinafter set forth.

In the drawings: Figure 1 is a longitudinal section through the vaporizer. Fig. 2 is a cross section thereof.

A is the float-chamber of a carbureter; B the supply conduit therefor; C the valve controlled by the float D; and E is a discharge duct for the oil which is controlled by the valve F.

G is the air and vapor mixing-tube into which projects the vapor discharge-nozzle H.

I is a throttle-valve controlling the conduit G.

J is an operating connection between the valves I and F; and K is a common actuating rod by which the openings of the two valves may be proportionately varied. To effect vaporization of the oil, I provide intermediate the valve F and the vapor discharge-nozzle H a duct L, which is subjected alternatively or conjointly to the internally-developed heat of the engine and another source of heat—preferably electrical. The arrangement is such that whichever source of heat is used the heating effect will be produced throughout the entire

length of the duct so as to avoid condensation of the vapor in any portion thereof.

In the specific construction shown, M is a cylindrical casing forming the exhaust manifold for the engine and within which the conduit L is coiled.

N is a header at one end of the conduit L, which is shown as integral with the case of the valve F, while the opposite end of the conduit L is bent to extend out from the casing M and to form the nozzle H.

P is an electrical heating unit or resistor which extends throughout the entire length of the conduit L. This is preferably arranged with a relatively large amount of heating surface located in the header N; while from there on the resistor extends longitudinally within the convolutions of the conduit L to a point near to the nozzle H. The resistor may be electrically insulated and supported at suitable points by insulator bridges Q.

In operation, when the engine is to be started, the conduit L as well as the surrounding casing M is cold and the initial heat is supplied by passing an electric current through the resistor P. This will first vaporize the oil as it is discharged from the valve F into the header N, while the portion of the resistor extending through the convolutions of the conduit L will maintain the heat and prevent condensation of the vapor during its progress through the conduit. The result is that a dry gas will be discharged from the nozzle H and mixed with air in the conduit G to form a combustible mixture. As soon as the engine is started the exhaust gases passing through the manifold M will heat the conduit L externally, so that the auxiliary heat of the resistor P is no longer needed. There may, however, be occasions—as, for instance, where the engine is running on very light loads—where it is desirable to still supplement the engine heat by electrical heat. This may be readily accomplished by the arrangement of a controlling switch, not shown, for connecting the resistor to a source of current.

What I claim as my invention is:

1. The combination with the exhaust manifold of an internal combustion engine of a liquid-fuel vaporizer including a duct arranged within said exhaust manifold and terminating in a vapor discharge-nozzle, and an electric heater arranged within said

duct and extending therethrough into proximity to said vapor discharge-nozzle.

2. The combination with the exhaust conduit of an internal combustion engine of a liquid-fuel vaporizer, comprising a coil arranged in said exhaust conduit and terminating in a vapor discharge-nozzle, an electric heater arranged within and extending longitudinally of said coil, and insulator supports for the resistor at a plurality of points in its length.

3. The combination with the exhaust conduit of an internal combustion engine of a vaporizer for the liquid-fuel, comprising a coil within said exhaust conduit and in the path of the exhaust gases, one end of said

coil terminating in a vapor discharge-nozzle, a chambered header to which the other end of said coil is connected, an electrical resistor arranged within the chamber of said header in the path of the liquid-fuel, an extension of said resistor extending centrally within said coil longitudinally thereof, and insulator supports for said resistor throughout said coil.

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

NATHANIEL B. WALES.

Witnesses:

HENRY C. ADAMS,
R. H. THOMAS.