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A. B. GOODSPEED.

CARBURETER AND IGNITER FOR HYDROCARBON ENGINES.

APPLICATION FILED MAR. 10, 1904. RENEWED JUNE 9, 1905.

Fig. 1.

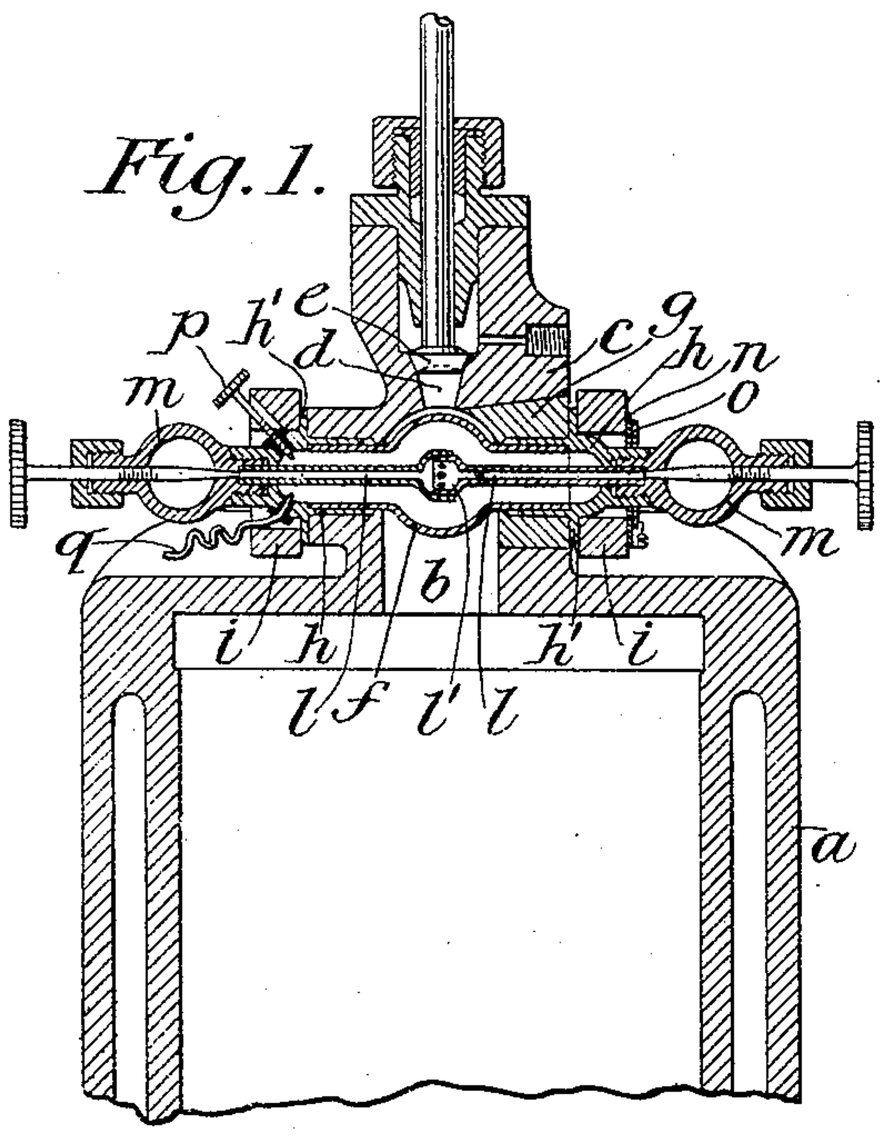


Fig. 2.

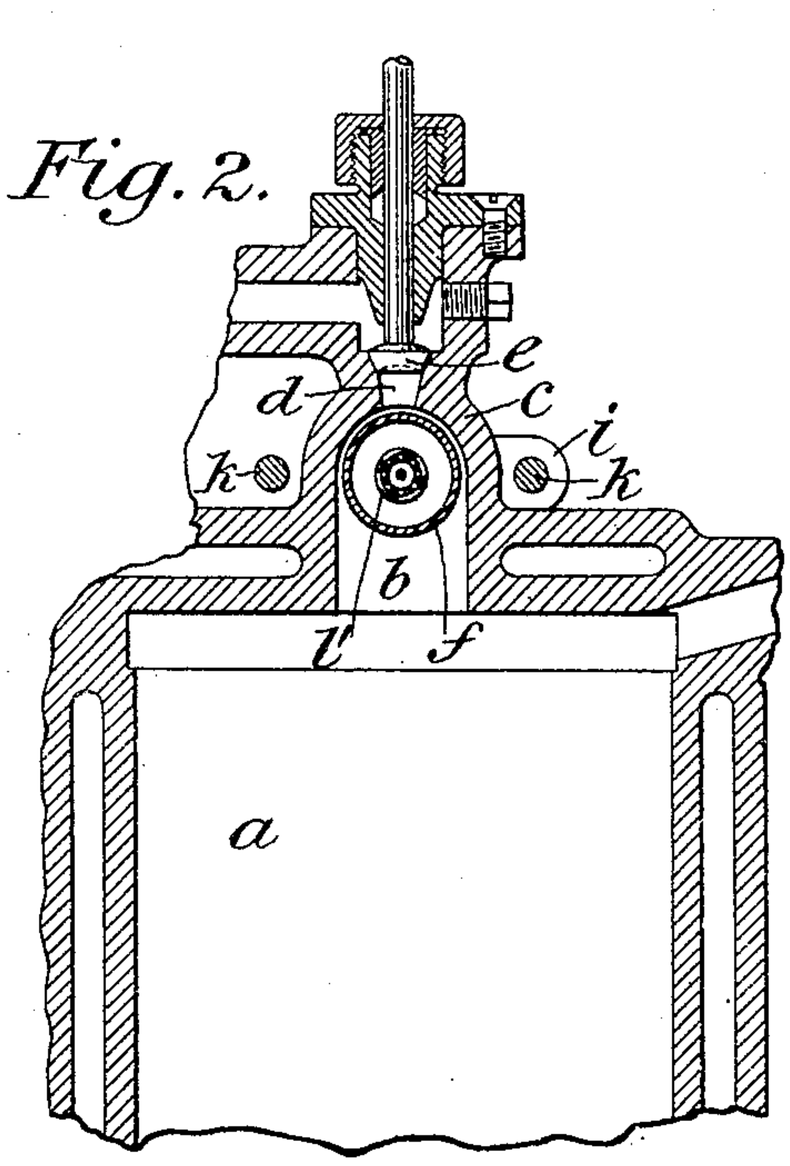


Fig. 3.

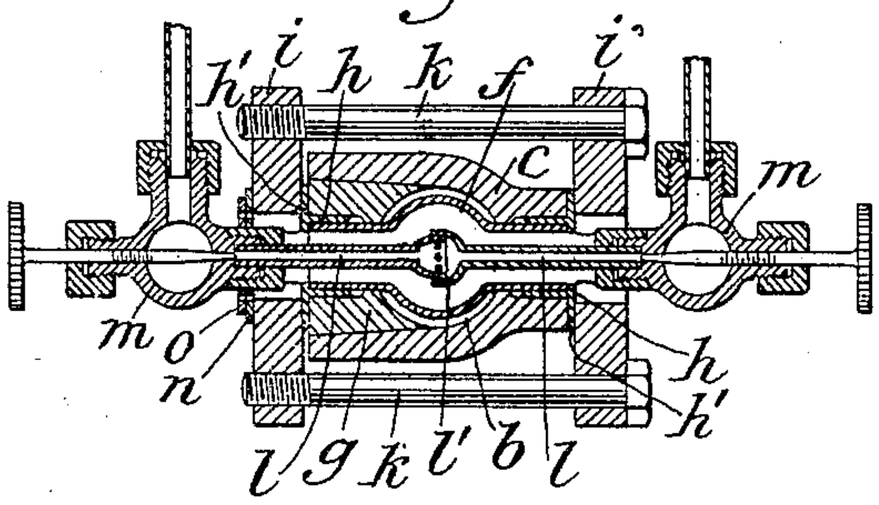
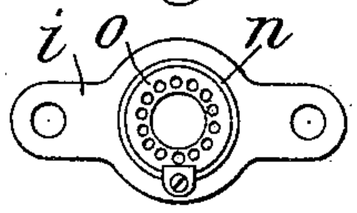


Fig. 4.



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UNITED STATES PATENT OFFICE.

ARTHUR B. GOODSPEED, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO INDUSTRIAL DEVELOPMENT COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

CARBURETER AND IGNITER FOR HYDROCARBON-ENGINES.

No. 808,915. Specification of Letters Patent. Patented Jan. 2, 1906.

Application filed March 10, 1904. Renewed June 9, 1905. Serial No. 264,531.

To all whom it may concern:

Be it known that I, ARTHUR B. GOODSPEED, a citizen of the United States, residing in East Orange, in the State of New Jersey, have invented certain new and useful Improvements in Carbureters and Igniters for Hydrocarbon-Engines &c., of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The object chiefly in view in this invention is the production of an improved igniter for use with explosive-engines, particularly with such engines as require, at least in starting up, a flame or an incandescent igniter which is usually heated by an external flame.

It will be evident that the particular type of engine with which the improved igniter may be employed is not material to the present invention, but that the igniter is capable of application to engines of different types, as well as in other uses, which will readily suggest themselves.

The improved igniter embodies a shell capable of being made incandescent and exposed externally to the gases to be ignited and an internal source of heat, which is preferably a hydrocarbon-burner, the air which supports the combustion being carbureted within the burner itself.

The invention will be more fully described hereinafter with reference to the accompanying drawings, in which for purposes of illustration and explanation of the nature of the invention the improved igniter and carbureter is represented as applied in a convenient and practical form to a cylinder-head of an explosive-engine, and in which—

Figure 1 is a sectional view in a plane including the axis of the engine-cylinder and the longitudinal axis of the igniter and carbureter. Fig. 2 is a similar view in a plane at right angles to the plane of Fig. 1. Fig. 3 is a view in horizontal section in the plane of the axis of the igniter and carbureter. Fig. 4 is a detail view in elevation, showing one of the plates for supporting the igniter and the device for regulating the admission of air within the shell.

In the embodiment of the invention represented in the drawings the cylinder *a* of an explosion-engine of ordinary type is shown as having formed on or applied to its head and communicating with the working cylinder a chamber *b*, the same being formed in a casting *c*, provided with a port *d* and an inlet-valve *e*, through which the charge is admitted to the cylinder. The casting *c* is also cored transversely to receive the igniter, which is shown as a shell *f*, preferably globular at its middle portion and having its end portions fitted closely in the seats prepared therefor in the casting. For convenience in manufacture one end of the shell *f* is seated in a filling-piece *g*, which is held to its seat in the casting as hereinafter described. It will be understood that the shell *f* is exposed externally to the pressure within the cylinder, and the end portions of the shell must therefore be fitted tightly to prevent any leakage around them. Preferably each end of the shell is fitted in a cap *h*, which enters the casting *c* or the filling-piece *g* and is flanged, as at *h'*, to bear against the casting or the filling-piece, as the case may be. As clearly shown in Fig. 3, each cap is open, so that the interior of the shell *g* communicates freely with the atmosphere. Against the flange of each cap rests a plate *i*, the two plates *i* on opposite sides of the casting being held tightly toward each end and the caps thereby held tightly against their seats by bolts *k*.

Within the shell *f* is disposed the hydrocarbon-burner by which the shell is raised to the temperature required for the ignition of the charge in the cylinder or for such other purpose as the device may be employed. This burner, which is also a carbureter, comprises two tubular parts *l*, which are preferably enlarged at their inner ends and arranged to telescope one within the other, as clearly shown in Figs. 1 and 3; the enlargements being provided with perforations, as at *l'*, for the escape of the carbureted air or hydrocarbon mixture that it may be burned in the space between the burner and the shell *f*. The two tubular portions of the burner pass, respectively, through the bridges of the caps *h* and communicate, respectively, with needle-valves *m*, by which the supply of air and hydrocarbon, respectively, to the burner

is regulated. Each needle-valve may be threaded into the corresponding cap *h*, as shown.

For the purpose of regulating the escape of the dead gases from the interior of the shell *f* or the admission of air thereto a device of an ordinary character may be employed, as shown in Figs. 1 and 3, comprising an inner perforated plate *n* and an outer perforated plate *o*, revoluble upon the inner plate.

If desired, an electric igniter may be provided for the purpose of igniting the gas from the burner within the shell *f*, such igniter comprising, as usual, two electrodes *p* and *q*, which may be suitably mounted in one of the caps *h*.

In assembling the improved igniter and carbureter the shell *f* is first placed within the chamber of the casting *c*, the filling-piece *g* is put in place, and the ends of the shell *f* are engaged with the caps *h*, in each of which has been placed a corresponding member of the burner and carbureter, secured to the corresponding needle-valve, so that the enlarged ends of the latter shall telescope, as shown in Figs. 1 and 3. The parts of the burner are so related as to make proper allowance for expansion of the burner when heated. The plates *i* are then applied and are held together by setting up the bolts *k*, thereby pressing the caps *h* firmly against the ends of the shell *f* and against their seats on the casting and filling-piece, respectively, and holding the latter tightly in its seat. The needle-valves can then be secured to the caps as usual. Should any part of the device be required to be renewed or repaired, it will be obvious that all of the parts can be separated by simply removing the bolts *k*.

In the use of the device in the application thereof illustrated in the drawings the hydrocarbon mixture formed within the burner-tubes *l* and issuing from the burner-holes *l'* is ignited, and burning with an intense flame the shell *f* is quickly heated to the temperature required for ignition of the charge which is delivered through the valve-port *d* upon the globular portion of the shell and is immediately vaporized thereby and ignited. The pressure within the working cylinder, as will be observed, is external to the igniter-shell, and the products of combustion within the igniter-shell are allowed to escape at either end thereof into the surrounding atmosphere. As the oil is admitted through its burner-tube *l* it meets at the extremity of the tube the opposing blast of air from the alined air-supply tube and is thereby not only completely vaporized, but, being vaporized, is spread radially, so that the flame of the burning mixture is driven radially from the centrally-located burner against the walls of the shell, thereby bringing the same quickly to an intense heat, sufficient for the ignition of the charge in contact with the outer surface of the shell. It will further be observed that by the globular enlargement of the shell located within the chamber *b* in front of the inlet *d* for the charge the latter is immediately spread and ignited.

It will be understood that the form and relation of the several parts of the improved igniter and carbureter may be varied as may be required by the conditions of use of the device without departing from the spirit of the invention.

I claim as my invention—

1. An igniter for internal-combustion engines, &c., comprising a shell for external contact with the charge to be ignited and communicating internally with the external air and a carbureter and burner placed within said shell and comprising alined tubular members connected respectively with a hydrocarbon-supply and an air-supply and terminating centrally within said shell and means for spreading radially the burning gases, substantially as described.

2. An igniter for internal-combustion engines, &c., comprising a shell having a globular enlargement for external contact with the charge to be ignited and communicating internally with the external air, and a carbureter and burner placed within said shell and comprising alined tubular members connected respectively with a hydrocarbon-supply and an air-supply and terminating centrally within said globular enlargement and means for spreading radially the burning gases, substantially as described.

3. An igniter for internal-combustion engines, &c., comprising a shell for external contact with the charge to be ignited and communicating internally with the external air and a carbureter and burner placed within said shell and comprising tubular members connected respectively with a hydrocarbon-supply and an air-supply and terminating centrally and end to end within said shell whereby the burning gases are spread radially within the shell, substantially as described.

4. An igniter for internal-combustion engines, &c., comprising a shell having a globular enlargement for external contact with the charge to be ignited and communicating internally with the external air and a carbureter and burner placed within said shell and comprising alined tubular members connected respectively with a hydrocarbon-supply and an air-supply and terminating centrally and end to end within said globular enlargement whereby the burning gases are spread radially within said globular enlargement, substantially as described.

5. An igniter for internal-combustion engines, &c., comprising a shell for external contact with the charge to be ignited and

communicating internally with the external air and a carbureter and burner placed within said shell and comprising alined tubular members connected respectively from opposite directions with a hydrocarbon-supply and an air-supply and enlarged and perforated at their opposing ends to form a burner-chamber centrally within said shell, substantially as described.

6. The combination with a cylinder of an internal-combustion engine having a chamber and an inlet for the charge, of an igniter comprising a shell having a globular enlargement located within said chamber to spread and ignite the charge admitted through said inlet and communicating internally with the external air and a carbureter and burner placed centrally within said shell and provided with means for spreading radially the burning gases, substantially as described.

7. The combination with a cylinder of an internal-combustion engine of an igniter comprising a shell subjected externally to the pressure within the cylinder and open for communication with the external air, and a hydrocarbon-burner within said shell, and means to regulate the escape of gases and the admission of air from and to the interior of said shell, substantially as described.

8. The combination with a cylinder of an internal-combustion engine having a chamber and an inlet for the charge, of an igniter comprising a shell having a globular enlargement located within said chamber to spread and ignite the charge admitted through said inlet, and communicating internally with the external air and a carbureter and burner placed centrally within said shell, substantially as described.

This specification signed and witnessed this 5th day of March, A. D. 1904.

ARTHUR B. GOODSPEED.

In presence of—
ANTHONY N. JESBERA,
M. A. BRAYLEY.