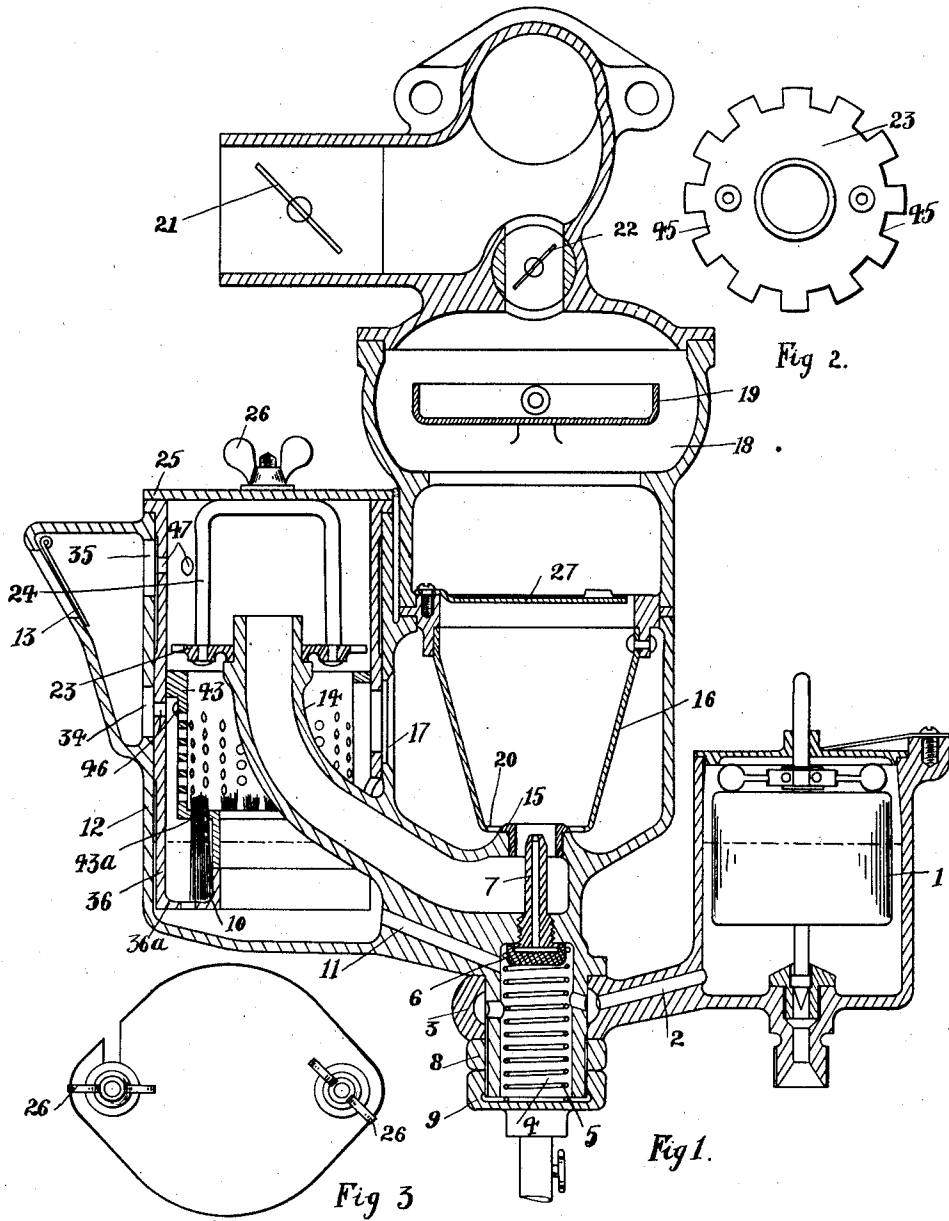


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GASEOUS FUEL GENERATOR.
APPLICATION FILED DEC. 15, 1919.

1,356,239.

Patented Oct. 19, 1920.

2 SHEETS—SHEET 1.



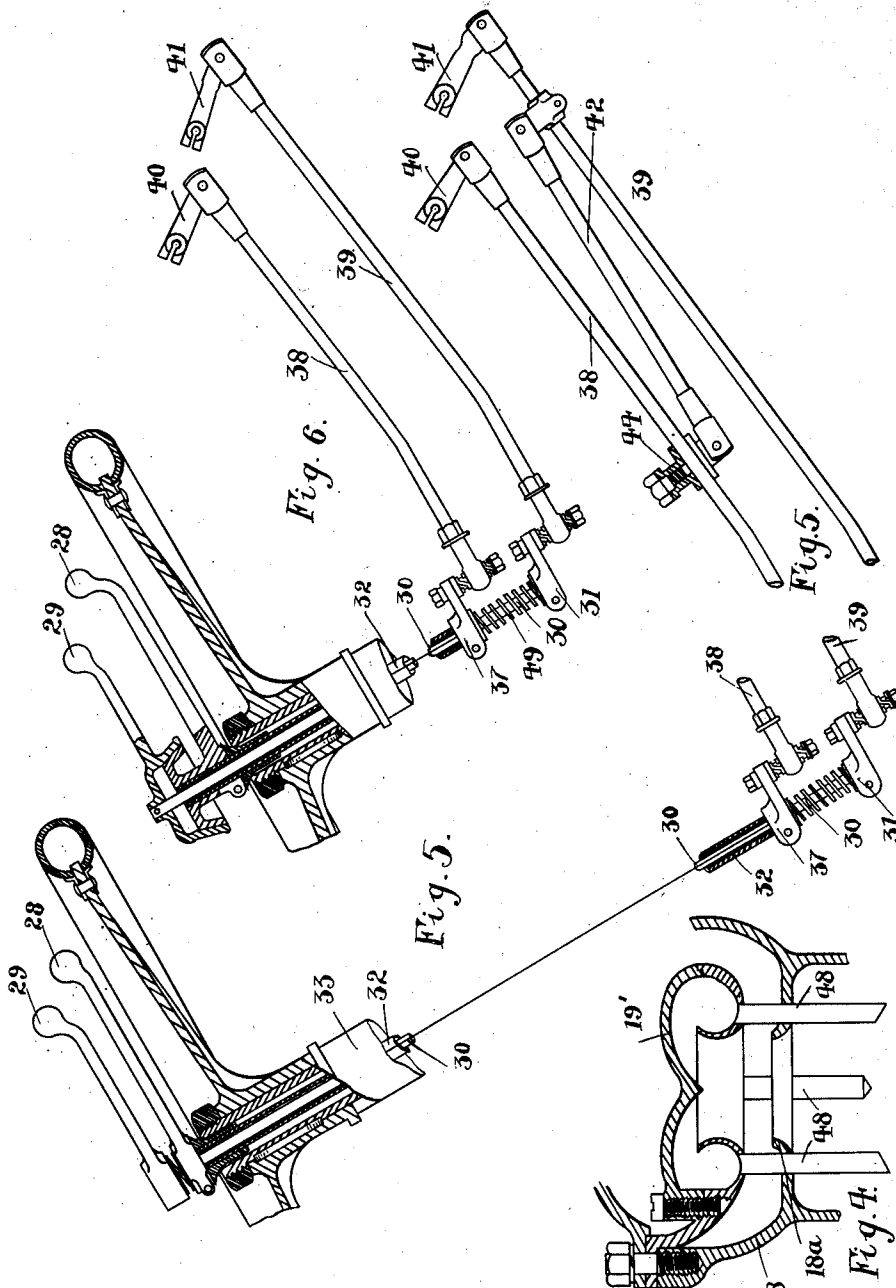
INVENTOR
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INVENTOR
Edward W. Thomas
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ATTORNEYS

UNITED STATES PATENT OFFICE.

EDWARD WILLIAM THOMAS, OF LUTON, ENGLAND, ASSIGNOR TO SOUTHEY GAS PRODUCERS LIMITED, OF LONDON, ENGLAND.

GASEOUS-FUEL GENERATOR.

1,356,239.

Specification of Letters Patent.

Patented Oct. 19, 1920.

Application filed December 15, 1919. Serial No. 344,813.

To all whom it may concern:

Be it known that I, EDWARD WILLIAM THOMAS, a subject of the King of Great Britain and Ireland, residing at Biscot Road, Luton, in the county of Bedford, England, have invented new and useful Improvements in Gaseous-Fuel Generators, of which the following is a specification.

This invention relates to apparatus for the production of gaseous fuel for internal combustion engines from such oils as paraffin, and in particular to apparatus of the type in which the oil is supplied to a wick chamber where it is burnt with air, the flames from the wicks being utilized to vaporize and partially burn a jet of liquid fuel issuing from a nozzle.

The improvements according to the present invention are directed among other objects, to securing a more efficient utilization of the oil fuel, to preventing sooting of the jet nozzle and the parts in its immediate neighborhood, to providing for the utilization of any excess liquid fuel which may be drawn into the producer over and above that which is required for immediate vaporization and consumption in the engine cylinders, to providing a gaseous mixture containing a proportion of inert gases which can be used at any required engine speed or load without causing knocking in the engine cylinders, and to providing convenient means for operating simultaneously and in fixed relationship to one another the throttles for gaseous mixture from the producer and the auxiliary air while retaining the means of varying their relationship to one another.

According to the present invention the jet nozzle is surrounded by the end of a supply pipe through which air, mixed with a proportion of inert gas or products of combustion from the wick chamber, is supplied, so as to support a limited combustion of the sprayed fuel in a chamber above the jet.

The supply pipe preferably reaches above the level of the jet nozzle, and being spaced therefrom it serves to protect the nozzle from the heat of combustion of the sprayed fuel and also from the heat of the flames coming from the wick chamber.

The air supply pipe is preferably led from the upper part of the wick chamber, to which the air is supplied by suitable

ports, and passes down through the flame area in the wick chamber to embrace the jet nozzle as described the air supply being heated in its passage. The quantity of air admitted to the upper part of the wick chamber and consequently the proportion of air to inert gas passing into the air supply to the lower part of the wick chamber, for supporting combustion may be varied in different apparatus to suit different engines and conditions.

From the wick chamber there leads a port through which the flames from the wick chamber are drawn into the combustion chamber above the jet nozzle.

The atomized fuel issuing from the jet nozzle passes into the combustion chamber, which is provided with a baffle plate at the top leaving narrow circumferential openings or slots for the passage of the gaseous fuel, and any unvaporized liquid fuel which after passing through the slots enter a second chamber having at the top a vessel into which the heavier particles of any liquid fuel still unvaporized fall. This vessel may be scroll shaped or may be a dished plate and a drainage pipe or pipes may be led from the vessel by which the collected fuel is delivered on to the baffle plate or other heated surface below.

From the second chamber the fuel is drawn into the engine cylinder past a valve and at the same time air is drawn in, its flow being controlled by another valve, both valves being preferably of the butterfly type. It is preferably arranged that the two valves can be operated by means of one lever, but means are provided for adjusting the extent of opening of one valve relatively to that of the other in order to allow for different running conditions. A by-pass may also be provided leading from the second chamber to the engine cylinder for use when the engine is running light.

Preferably the fuel, controlled by a float feed, is led to a chamber communicating with the jet nozzle and having a filter held in position at the top of the chamber by a spring, through which filter the fuel passes to the jet nozzle, and the fuel is allowed to pass through a passage leading from the top of the chamber below the jet to the vessel containing the wicks, which may be of asbestos.

In the accompanying drawings Figure 1

is a sectional elevation of a construction of gaseous fuel producer according to the present invention, Fig. 2 is a plan view of a baffle as used in the wick chamber. Fig.

3 is a plan of the top of the wick chamber. Fig. 4 is a sectional elevation of an alternative form of baffle in the combustion chamber. Figs. 5 and 6 illustrate the preferred means of controlling the gas and air mixture for the engine.

The supply of liquid fuel to the apparatus is controlled by an ordinary float feed chamber 1 and it passes from the float feed chamber by way of a passage 2 with a ring shaped end 3 to a chamber 4 from which leads the jet nozzle 7. In the chamber 4 is a spring 5 for the purpose of maintaining a filter 6 in position against the lower end of the jet nozzle.

The ring 3 is retained in its correct position around the chamber 4 by means of the fixing nut 8 and the cap 9, out of which may lead a draining cock. From the chamber 4 part of the fuel passes by way of the passage 11 to the wick chamber 12 containing wicks 10. A flap valve 13 covers a port at the side of the wick chamber through which air is drawn by the suction of the engine and passes through further ports 34 and 35 for the purpose of admitting air to the wicks 10 and to the upper portion of the wick chamber respectively. The air entering by port 35 is mixed with the inert gases which are the result of the wick flames, before passing by way of pipe 14 to the tube 15 surrounding the jet nozzle and thence to the combustion chamber 16. The presence of inert gases in the air supplied by the pipe 14 is found to have the effect of obviating "knocking" in the engine cylinders.

17 is a port in the side of the wick chamber through which are drawn the flames of the wicks into the space surrounding the chamber 16, and they enter the chamber 16 by openings 20 and ignite the fuel which is drawn by the suction of the engine from the chamber 4 through the jet nozzle 7 in the form of a fine spray into the chamber 16. The air entering the chamber 16 from the pipe 14 and tube 15 supports a limited combustion of the fuel. The chamber 16 is provided at the top with a baffle 27 against which strike the unvaporized, or still liquid particles of fuel and these are held till vaporized or are returned on to the hot walls of the chamber 16 and there vaporized. Around the baffle 27 are left narrow circumferential openings for the passage of the gaseous mixture to a second chamber 18 in which is arranged a dish shaped vessel 19 which serves to collect any fuel which is still in liquid form. The vessel 19 may be provided with a drainage pipe not shown in Fig. 1 for delivering any collected fuel on to the heated baffle plate

27. The gaseous mixture passes to the engine by the butterfly throttle 22 and is mixed with air admitted by a similar throttle 21.

It will be seen that as a result of any unvaporized liquid fuel from the spray striking the baffle 27 and being held by it till vaporized or being returned on to the hot walls of the chamber 16, and any further unvaporized liquid fuel striking and being collected by the vessel 19 and being also returned to the vaporizing zone below, provision is made for dealing with any excess of liquid fuel which may be drawn from the jet nozzle in excess of that required to be immediately vaporized and used in the engine. If an excess of liquid fuel is at any time drawn in from the nozzle, what is not vaporized at once is deposited on or redelivered to the heated walls of the combustion chamber and in turn vaporized and the vaporization of this excess fuel tends to reduce immediately the suction effect on the nozzle so that less fuel is drawn in until the excess is disposed of.

Returning now to the wick chamber, within the casing 12 is a sleeve 36 which has a number of openings or ports 46 and 47 at levels to register with the ports 34 and 35. The sleeve 36 is formed at the bottom with a gallery 36^a to hold the lower ends of the wicks. Within the sleeve 36 is the air distributor sleeve 43 which distributes the air over the wicks 10. The sleeve 43 has an off set lower portion resting on the gallery 36^a and between it and the main portion are a number of holes 43^a in which are carried the rope wicks 10. On the side toward the flame port 17 the sleeves 36 and 43 have openings to register therewith. Above the sleeve 43 is the lamp baffle 23, a plan view of which is shown in Fig. 2; it can be removed from the wick chamber by means of a U shaped handle 24. The chamber cover 25 is held down by means of wing nuts 26 (see Fig. 3). The baffle 23 serves to prevent the flames from the wicks 10 being drawn into the pipe 14; but the products of combustion pass upward through its circumferential slots 45.

In the modification shown in Fig. 4 the baffle 19' is scroll shaped and pipes 48 return the liquid fuel collected onto the baffle 27 below or the walls of chamber 16.

The shoulders 18^a (Fig. 4) of the chamber 18 are in this case made to deflect the liquid particles into the scroll shaped baffle.

The air throttle 21 and the gas throttle 22 which regulate the supply of explosive mixture to the cylinders of the engine are preferably arranged to be moved in unison, but with the relative extent of their opening variable and they may be controlled by means of hand levers arranged on the steering wheel.

Figs. 5 and 6 illustrate two different arrangements for carrying out this operation.

Referring to Fig. 5, 29 is a hand lever above the steering wheel pinned to a spindle 30 which passes through the whole length of the steering column 33 and to the bottom end of which is rigidly attached a lever 31. 28 is a second hand lever arranged just below the hand lever 29 and clamped to a tube 32 which surrounds the spindle 30 and also passes through the length of the steering column.

This tube or sleeve 32 is capable of moving freely around the spindle 30, and on its lower end is rigidly mounted a lever 37. Suitable friction gear not shown may be provided to retain the tube 32 in any position in which it may be left by the operator.

Rods 38 and 39 are connected to the levers 37 and 31 respectively, the former controlling the air throttle lever 40 and the latter the gas throttle lever 41.

A rod 42 is jointed at one end to the rod 39 and at the other end to a sleeve 44 surrounding the rod 38, and held against movement thereon by friction gear. It will be seen that the hand levers 28 and 29 can be moved separately until the desired proportion of air to gas, is obtained, after which the operation of the lower hand lever 28 can be used to move both the air and gas throttles simultaneously.

In the arrangement shown in Fig. 6 instead of connecting the throttle control rods 38 and 39 as in Fig. 3, the hand levers 28 and 29 are held in frictional engagement with one another by a cone and drum device, the necessary pressure being obtained by a spring 49 fitted between the levers 37 and 31. Suitable friction gear is provided in this case also to keep the tube 32 in the position in which it is left.

Thus the hand levers 28 and 29 can be operated separately to obtain the desired proportion of air to gas, after which the operation of the lever 28 is sufficient to open or close both the air and the gas throttles simultaneously.

What I claim as my invention is:—

1. In apparatus for the production of gaseous fuel for internal combustion engines, in which the flame from a wick is utilized to vaporize and burn partially a jet of liquid fuel, a combustion chamber above the jet nozzle, an air supply pipe leading to said chamber and extending above and surrounding the end of the jet nozzle, and a passage for the flame from the wick to the combustion chamber.

2. In apparatus of the type referred to, a wick chamber, a port admitting air thereto, a combustion chamber, a nozzle adapted to supply a jet of liquid fuel thereto, a passage for the flame from the wick chamber to the combustion chamber, and an air

supply pipe leading into the combustion chamber from the wick chamber.

3. In apparatus of the type referred to, a wick chamber, a jet nozzle in a chamber alongside said wick chamber, and a combustion chamber in which the jet of fuel is burnt by the wick flame in the presence of air and the products of combustion from the wick.

4. In apparatus of the type referred to, a combustion chamber, a nozzle supplying a jet of liquid fuel thereto, a wick, and an air supply pipe to the combustion chamber passing through the flame zone of the wick, in which the air is heated on its way to the combustion chamber.

5. In apparatus of the type referred to, a wick chamber, a combustion chamber adjoining the wick chamber, an air supply pipe passing from the wick chamber to the combustion chamber, a passage between the said chambers for the wick flames, and air ports in lower part of the wick chamber, through which air enters to support the combustion at the wick, and air ports in the upper part of the wick chamber through which the air enters that passes to the supply pipe to the combustion chamber.

6. In apparatus of the type referred to, a wick chamber, a liquid fuel jet nozzle and a combustion chamber in which the liquid fuel is burnt, an air supply pipe leading from the upper part of the wick chamber to the combustion chamber and affording at the same time a passage to the combustion chamber for the products of combustion from the wick.

7. In apparatus of the type referred to, a wick chamber, a wick within said chamber, air ports to the wick chamber, a sleeve within the wick chamber having a number of openings which register with the air ports to the wick chamber, and admitting air through those ports, and an air distributing cup within the sleeve, carrying the wicks.

8. In apparatus of the type referred to, a wick chamber, a wick therein, and a combustion chamber alongside the wick chamber and adapted to be heated externally by the flame from the wick.

9. In apparatus of the type referred to, a liquid fuel jet nozzle, a combustion chamber above the jet in which the fuel is burnt, and a baffle in said chamber which arrests the unvaporized particles of liquid fuel.

10. In apparatus of the type referred to, a jet nozzle, a combustion chamber above the jet, a baffle in said chamber, a second chamber above the baffle to which the vaporized fuel passes from the combustion chamber and a vessel therein adapted to retain particles of unvaporized fuel from the combustion chamber which pass the baffle.

11. In apparatus of the type referred to, a jet nozzle, a combustion chamber above

the jet, a baffle in said chamber, a second chamber above the baffle to which the vaporized fuel passes from the combustion chamber and a vessel therein scroll shaped in section adapted to retain particles of un-
5 vaporized fuel, and a return pipe therefrom for the collected liquid fuel.

12. In apparatus of the type referred to, a wick chamber, a jet nozzle, a combustion
10 chamber in which the jet of liquid fuel is burnt by the wick flame, a throttle adapted to control the flow of gaseous mixture from the combustion chamber to the engine, a

port admitting auxiliary air to the engine, a throttle controlling the admission of air by said port, the said throttles being themselves so controlled that while normally they move in unison under a single control they can nevertheless be moved independently and their relative extent of opening be adjusted
2 to suit varying running requirements.

EDWARD WILLIAM THOMAS.

Witnesses:

JANECO GEORGE GAUNT,
LOVELL WENTON RUDDIE.