

No. 701,026.

Patented May 27, 1902.

G. R. ELLIOTT.
HYDROCARBON BURNER.

(Application filed Aug. 30, 1901.)

(No Model.)

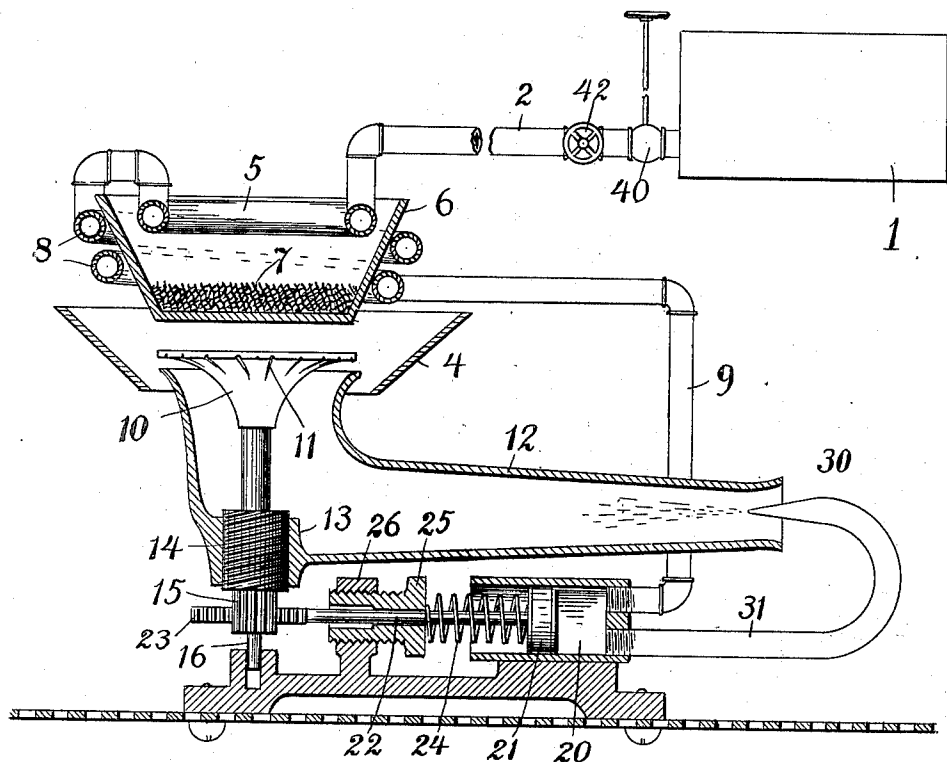


Fig. 1

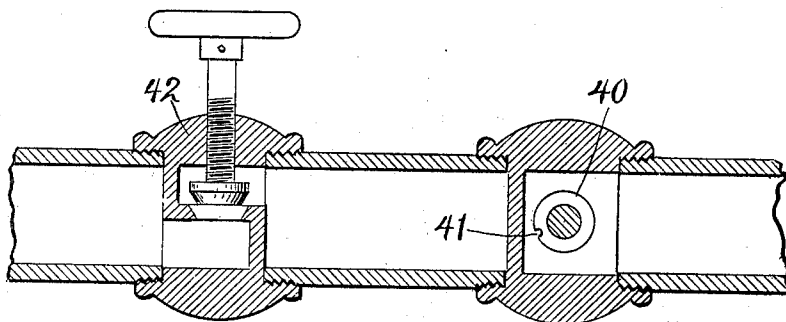


Fig. 2

Witnesses;

M. W. Upham.

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Inventor,

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UNITED STATES PATENT OFFICE.

GILBERT R. ELLIOTT, OF BOSTON, MASSACHUSETTS.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 701,026, dated May 27, 1902.

Application filed August 30, 1901. Serial No. 73,825. (No model.)

To all whom it may concern:

Be it known that I, GILBERT R. ELLIOTT, a subject of the King of Great Britain, residing at the city of Boston, county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a full, clear, and exact description.

In the use of hydrocarbon-burners of what is termed the "Bunsen" type it is found quite difficult to reduce the flame to any material extent without causing the same to "flash back," as it is called, and the vapor to burn at the nozzle of the vapor-inlet. This danger is especially imminent in the case of the heavier hydrocarbons, as kerosene, and it is particularly objectionable when employed for steam-power automobiles.

The object of this invention is the construction of means for preventing this flashing back of the flame, the same being accomplished by the devices hereinafter set forth, and illustrated in the drawing forming part of this specification, in which the figure is a sectional side elevation of the complete burner and my improvements applied thereto.

Referring to the figure, the reference-numeral 1 designates the hydrocarbon-tank. 2 is the outlet-pipe to the initial vaporizing-coil 5, which is located within the cup 6, having asbestos 7 upon its bottom after the usual manner. Exterior to said cup are the balance of the vaporizing or generating coils 8, suitably connected with the inner coil 5. Ordinarily said coils are connected directly with the nozzle 30, discharging into the mouth of the mixing-chamber 12; but this is not done in my construction, as further described. The ignition-mouth of said chamber 12 is immediately below said cup 6 and is surrounded with the inverted cone 4 in the usual manner. Fitted to said ignition mouth or opening is the deflector 10, fixed upon the upper end of the stem 16, and on this stem is fixed or formed a steep-pitched screw-thread 14 and an elongated pinion 15. Said screw-threads loosely fit the correspondingly-threaded bearing 13, so that a turn of said stem in one or the other direction moves the deflector toward or from the ignition-opening, and thereby closes or opens the same. Meshing with said pinion is a rack-bar 23, secured to or formed

as a part of the piston-rod 22, which terminates in the piston or plunger 21, movable in the cylinder 20. The generator-coils 8 being connected by the tube 9 to said cylinder and the nozzle 30 being similarly connected therewith through the tube 31, whatever the pressure of vapor in the generator-coils there will be the same pressure within the cylinder 20 and against the plunger 21. A helical spring 24 serves to counterbalance the plunger against said pressure. In this manner the increase of pressure in the generator-coils serves to move the rack-bar to the left, and thereby screw the deflector 10 higher up and produce a wider ignition-opening, while a diminution in pressure permits the spring 24 to move the rack-bar toward the right and decrease the ignition-opening.

Inasmuch as an increase in the vapor-pressure in the generator-coils forces the vapor with more velocity from the nozzle 30 into the mixing-chamber 12, then by means of the construction above described the greater the amount of vapor delivered to the mixing-chamber the wider the ignition-opening, and vice versa. The function accomplished by this is as follows: I have discovered that whenever the ignition-opening is too large in relation to the current of air and vapor entering at the receiving-mouth of the mixing-chamber then occurs what I have referred to as a "flashing back" of the flame from the ignition-opening to the nozzle itself. As a corollary it results that if the ignition-opening is closed in proportion to the diminution in inflow of vapor through the nozzle then no such flashing back occurs. This I have found to be the fact, and hence by making the reduction in opening to automatically equal the reduction in inflow the burner works perfectly, even at its lowest point.

To further insure perfect combustion at the ignition-opening, even when the burner is turned down to its lowest limit, I form the contacting surface of the deflector 10 with several slight grooves 11, in order that when the deflector is down solidly upon the mouth of the mixing-chamber there is a number of slight pilot-flames issuing from said grooves and each so near to its neighbors that no gas or vapor can issue from the same without igniting from the neighboring flames. Hence

there can be no odor of unburned gas nor flashing and flickering of flame issuing fitfully from a very narrow crevice, as there is in the old form of burner.

- 5 In adapting my burner to an automobile I provide the tube 2 by which the kerosene passes under pressure from the tank 1 to the generator-coils with two valves 40 and 42. One of these valves is of the usual construction, as the valve 42, and can be tightly closed.
10 The other valve, however, I so construct that it cannot be wholly closed, but will still permit the passage of a slight stream of the liquid fuel even when closed tightly as possible.
15 In beginning afresh the driver first fills the cup 6 with alcohol and lights it to heat up the generator-coils 5. This being done, he opens the valve 42 wide and then the valve 40 until steam is up and the vehicle ready to
20 start.

What I claim as my invention, and for which I desire Letters Patent, is as follows, to wit:

1. In a burner, the combination with the vapor-generator, of the mixing-chamber having an adjustable ignition-opening, and means, operated by the variations of pressure within the vapor-generator, to automatically proportion the extent of ignition-opening to said pressure, substantially as described.
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30 2. In a burner, the combination with the vapor-generator, of the mixing-chamber receiving the vapor from the generator and provided with an adjustable ignition-opening, a vapor-receiver connected with said generator and means connected with said receiver to automatically adjust the extent of ignition-opening to accord with the vapor-pressure within said receiver and generator, substantially as described.
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40 3. In a burner, the combination with the vapor-generator, of the mixing-chamber having an adjustable ignition-opening, an expansible vapor-receiver connected with said generator, and a rod reciprocated by said expansible receiver and constructed to open and close said ignition-opening, substantially as described.
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50 4. In a burner, the combination with the vapor-generator, of the mixing-chamber receiving vapor from said generator and having a circular ignition-opening, a circular deflector therefor having a threaded stem turning in correspondingly-threaded bearings, an expansible vapor-receiver connected with the
55 vapor-generator, and a rod reciprocated by said expansible receiver and constructed to rotate said stem and thereby raise and lower

the deflector in accordance with the pressure within the generator, substantially as described.

5. In a burner, the combination with the vapor-generator, of the mixing-chamber receiving vapor from said generator and having a circular ignition-opening, a circular deflector therefor having a threaded stem turning in correspondingly-threaded bearings, a pinion rigid with said stem, an expansible vapor-receiver connected with said generator, a rod reciprocated by said receiver and having a rack-bar meshing with said pinion, and a spring acting on said plunger against the vapor-pressure within it, substantially as described.

6. In a burner, the combination with the vapor-generator, of the mixing-chamber receiving vapor from said generator and having an adjustable ignition-opening, a vapor-receiving cylinder connected with said generator, a plunger within the cylinder constructed when reciprocated to open and close said ignition-opening, a helical spring acting against said plunger, and a threaded shoulder for said spring turning in a correspondingly-threaded fixed support, substantially as described.

7. In a burner, the combination with the vapor-generator, of the mixing-chamber receiving vapor from said generator and having a circular ignition-opening, a circular deflector therefor having a threaded stem turning in correspondingly-threaded bearings, a pinion rigid with said stem, a cylinder receiving vapor from said generator, a plunger fitting in said cylinder and having a rack-bar meshing with said pinion, an externally-threaded shoulder, a helical spring between said spring and plunger-head, and a fixed internally-threaded support for said shoulder, said shoulder being centrally apertured to receive and support the stem of said plunger, substantially as described.

8. In a burner, the combination with the mixing-chamber, of the deflector fitted to the ignition-opening thereof and movable into contact therewith, the contacting surface of said deflector being formed with outwardly-opening grooves, substantially as described.

In testimony that I claim the foregoing invention I have hereunto set my hand this 28th day of August, 1901.

GILBERT R. ELLIOTT.

Witnesses:

GEO. M. POWER,
A. B. UPHAM.