

No. 681,833.

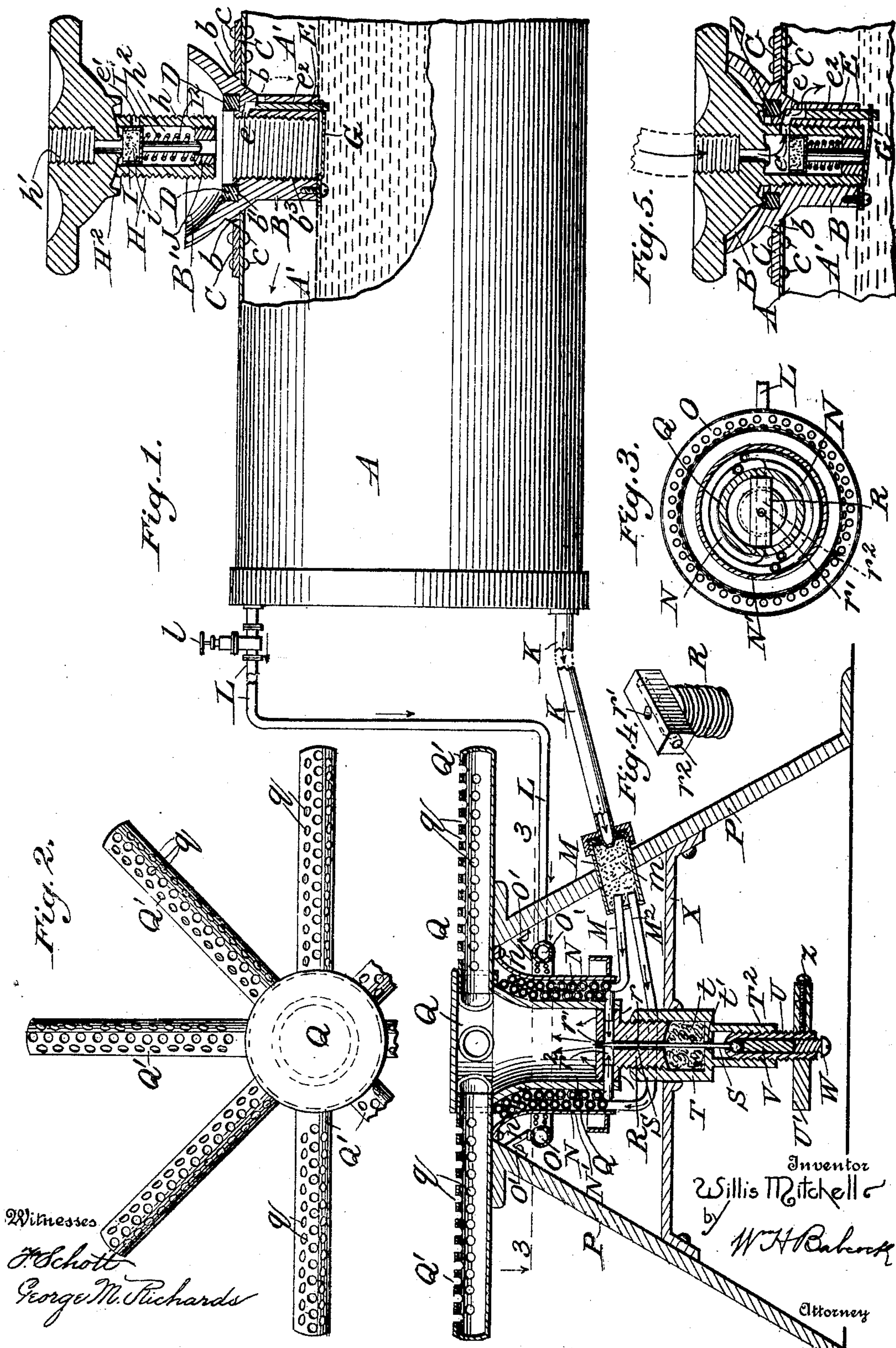
Patented Sept. 3, 1901.

W. MITCHELL.

VAPOR BURNER.

(Application filed July 24, 1900.)

(No Model.)



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VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 681,833, dated September 3, 1901.

Application filed July 24, 1900. Serial No. 24,697. (No model.)

To all whom it may concern:

Be it known that I, WILLIS MITCHELL, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Vapor-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to hydrocarbon-vapor burners for steam-boilers and other places where quick and steady heat is required. It is especially intended for automobiles, although not by any means confined thereto.

The said invention consists in certain improvements in the burner and generator and in the means for supplying the same, heating them to start the automatic operation of the burner, and regulating the same.

The aforesaid improvements will be hereinafter more particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a vertical longitudinal section through the burner and auxiliary devices. Fig. 2 represents a detail plan view of the burner, partly broken away. Fig. 3 represents a section on line 3 3 of Fig. 1, showing the auxiliary burner; and Fig. 4 represents a detail perspective view of the jet-block. Fig. 5 represents a detail vertical sectional view of the inlet-tube closed by the screw-plug and the proximate part of the tank.

A designates the tank or receptacle for gasoline or other inflammable volatile liquid. This is supplied through an inlet-tube B of considerable diameter extending down through the top of the same a sufficient distance to insure an air and vapor space A' of considerable dimensions above the surface of the liquid when the tank is fully charged. The upper end of this tube is flared out to form a bowl or cup B' above the said tank. At the junction of this bowl to the cylindrical body of the tube an external annular flange or shoulder b is formed, which has a horizontal lower face resting on the top of said tank and a downwardly and outwardly beveled periph-

eral face adapted to be overlapped by a corresponding face of the inner edge of an annular fastening-plate C, which is secured to the top of said tank by rivets c. The inner face of the said bowl at the junction of the said tube therewith is provided with an annular recess b', which receives a packing-ring D. A doubly-bent air vent or passage e, having approximately the shape of the letter Z, extends through the wall of said inlet-tube at its upper end. A continuation e² of the vertical part of this angular air vent or passage extends down through the wall of the said tube to the lower end thereof, and a valve E of rod or pin form is arranged in this extension so as to be movable up or down for closing or opening the said vent. This valve or rod is mounted on the free end of a spring G, which extends across the said tube, being attached at its other end to the bottom thereof. The said tube is internally screw-threaded at b³ to receive the external screw-threads h of the stem of the screw-plug H, the top of which is expanded to form a cap resting upon the top of the said bowl B' when the said screw-plug is in its lower position. This screw-plug is tubular, the upper end of its bore being enlarged and screw-threaded at h' for the attachment of a coupling through which air may be forced into the interior of the said tank. The lower part of the said bore is also enlarged, forming an elongated chamber h², within which works a valve in the form of an open box containing cork packing i and normally forced by a spring I', which surrounds the stem I² of said valve, against the material of the said plug at the top of the said chamber h², so as to prevent the inflow of air. A screw J, having a central bore to receive loosely the stem aforesaid, engages with internal screw-threads at the lower end of the stem of the said screw-plug and serves to adjust the resistance of the said spring by being screwed up or down more or less. When air is forced in, overcoming the resistance of the said valve and spring, it passes down through the annular space between the valve-stem and the wall of the bore of the adjusting-screw. At the upper end of the enlargement or chamber h² of the bore a lateral vent

e' is formed through the wall of the hollow stem of the screw-plug, the same being arranged to register with the vent e aforesaid when the said plug is turned down to its lowest position. At the same time the lower end of the stem of the said plug bears against the spring C and forces it down, withdrawing the pin or valve E from the vertical part of the vent or passage e , so as to open the same and allow the exit of air through the apertures ee' into the bore of the screw-plug, from which it may escape when air is not forced into the said bore and the valve therein is not wholly closed. On the under side of the head or cap of the said screw-plug is formed an annular bead H^2 , arranged to be forced into the annular packing hereinbefore described and spread the same, so as to make a tight joint between the plug and the inlet-tube. In case the screw-plug should not be turned quite home the joint may not be quite air-tight or liquid-tight, and it becomes important to prevent the leakage of liquid through the same. In such circumstances the vent e will allow the air and vapor of the upper chamber A' to escape from the said tank, thereby relieving the pressure on the liquid gasolene to a sufficient extent to prevent the latter from being forced up through the said joint. At one end of the said tank a gasolene-tube K extends from the lower part thereof to a filter-box M , containing suitable filtering material m , whence two supply-pipes M' M^2 extend to the two lower ends of a continuous pipe wound in concentric helices to form a tubular generator N . A tube L for supplying air and gasolene-vapor is similarly connected with an annular perforated tubular burner O , which surrounds the said generator and directs the blaze from its perforations against the cylindrical outer casing N' thereof. This burner is used merely for starting the self-supplying action of the main burner, hereinafter described, and I therefore denominate it the "auxiliary" burner. It is supported by rigid arms or brackets O' from a rigid frame P , on which the main burner Q rests. The vertical cylindrical body of this burner Q extends down within the said generator, forming a hollow core therefor. From said body, at the upper end, extend radial communicating tubular arms Q' , each of which is provided on its upper side with a series of perforations q , through which it discharges flame against a boiler or anything else which it may be designed to heat. These tubular arms are of any convenient number, eight of them being shown in Fig. 2 of the drawings arranged after the fashion of star-rays. The casing N' aforesaid is fastened at the top by screws n to these tubes or rays. At its bottom the said casing has an annular trough or receptacle formed with and around it for the reception of alcohol, which may be used as an alternative means for heating the generator and starting the automatic action of the main burner in case the auxiliary burner should

fail to work satisfactorily or it is thought best for any reason to leave said auxiliary burner out of use. The pipe L is provided with a cock l , whereby communication between the air and vapor chamber A' and said auxiliary burner may be cut off when this choice is made.

The upper end of a jet-block R is fitted into the lower end of the tubular body of burner Q . This block is provided with a vertical central bore r , terminating in a jet-hole r' , also with a transverse communicating passage r^2 . The said bore receives a needle-valve S , which wholly or partly closes at will the passage through the said jet-hole. The ends of the said transverse passage receive the lower end of the inner helix of the generator of which the jet-block thus becomes in effect a continuation, discharging solely through the said jet-hole. The downwardly-extending stem of the said jet-block is externally screw-threaded to receive an internally-screw-threaded stuffing-box T , which is provided in its lower part with packing material t , fitting into the concave lower end of the said jet-block stem. The said stuffing-box has a central perforation t' for the passage of the said needle-valve, also a tubular downward extension T^2 , which is open at its lower end and internally screw-threaded to receive a screw U , the stem of which is hollow, though contracted at the upper end, to allow the passage of the stem of a needle-valve, while retaining its globular head. A rod V fits removably from below into the hollow of this stem and is removably held there by a screw W , engaging threads in the lower end of the latter. The disk U' , which forms the head of the said screw U , is removable therefrom and fastened thereon by a clamping-screw z . When this screw is turned in one direction, it draws out the needle-valve, opening more or less the jet-hole aforesaid. When turned in the other direction, it forces in the said valve with the reverse thread. As the stem of the needle-valve is cylindrical and as the openings of the parts in contact therewith are cylindrical also, the valve's motion is longitudinal only. When it is to be removed for any reason, the screw W and rod V are first taken out, and it then easily falls through. This avoids all risk of friction in removal and allows the screw U to remain in place. The aforesaid stuffing-box passes through a cross bar or plate X , which is attached to or forms part of the frame aforesaid and braces said box, the hole in said bar being only large enough to conveniently admit the same.

The operation of the generator, burner, and connecting parts is substantially the same as in my application for patent on a vapor-burning lamp filed May 17, 1900, Serial No. 17,056.

I do not herein claim the details of construction of the filling plug and tank, the same being covered by my application, Serial No. 33,008, filed October 13, 1900.

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

1. In combination with a hydrocarbon-burner having radial perforated arms and a downwardly-extending cylindrical part, a coiled tubular generator of cylindrical form surrounding the said cylindrical part, a supplementary annular burner surrounding the said generator for heating the same, a tank or reservoir for liquid hydrocarbon provided with a space at the top for air and hydrocarbon vapor, a pipe from the said tank supplying said generator with liquid fuel, and a pipe from the said air and vapor space supplying the said supplementary burner substantially as set forth.

2. In combination with a hydrocarbon-burner having a downwardly-extending cylindrical part, a coiled tubular generator of cylindrical form surrounding the said cylindrical part, a supplemental annular burner surrounding the said generator for heating the same, a tank or reservoir for liquid hydrocarbon provided with a space at the top for air and hydrocarbon vapor, a pipe from the said tank supplying said generator with liquid fuel and a pipe from the said air and vapor space supplying the said supplementary burner substantially as set forth.

3. A hydrocarbon-burner consisting of a hollow cylindrical body and radial, perforated tubes, in combination with a generator sur-

rounding said body and consisting of a tube wound in concentric helices, pipes whereby the outer generating-helix is supplied with inflammable fluid at both ends, a jet-block through which the said fluid passes from the inner helix to the interior of the burner-body and a valve for regulating the flow through the said jet-block, substantially as set forth.

4. In combination with a hydrocarbon-burner and means for supplying the same, a valve for regulating the said supply, a tubular screw inclosing the head of said valve and adapted to adjust the said valve longitudinally without turning it, a removable pin bearing against the said head, to hold the said valve normally in place but allowing its removal at will and a screw for holding the said pin in place substantially as set forth.

5. In combination with a hydrocarbon-burner, a generator for supplying the same consisting of concentric continuous tubular helices supplied simultaneously at both ends of the outer helix, a filter, pipes connecting these ends to the said filter and a pipe connecting the said filter to the source of supply, substantially as set forth.

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

WILLIS MITCHELL.

Witnesses:

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