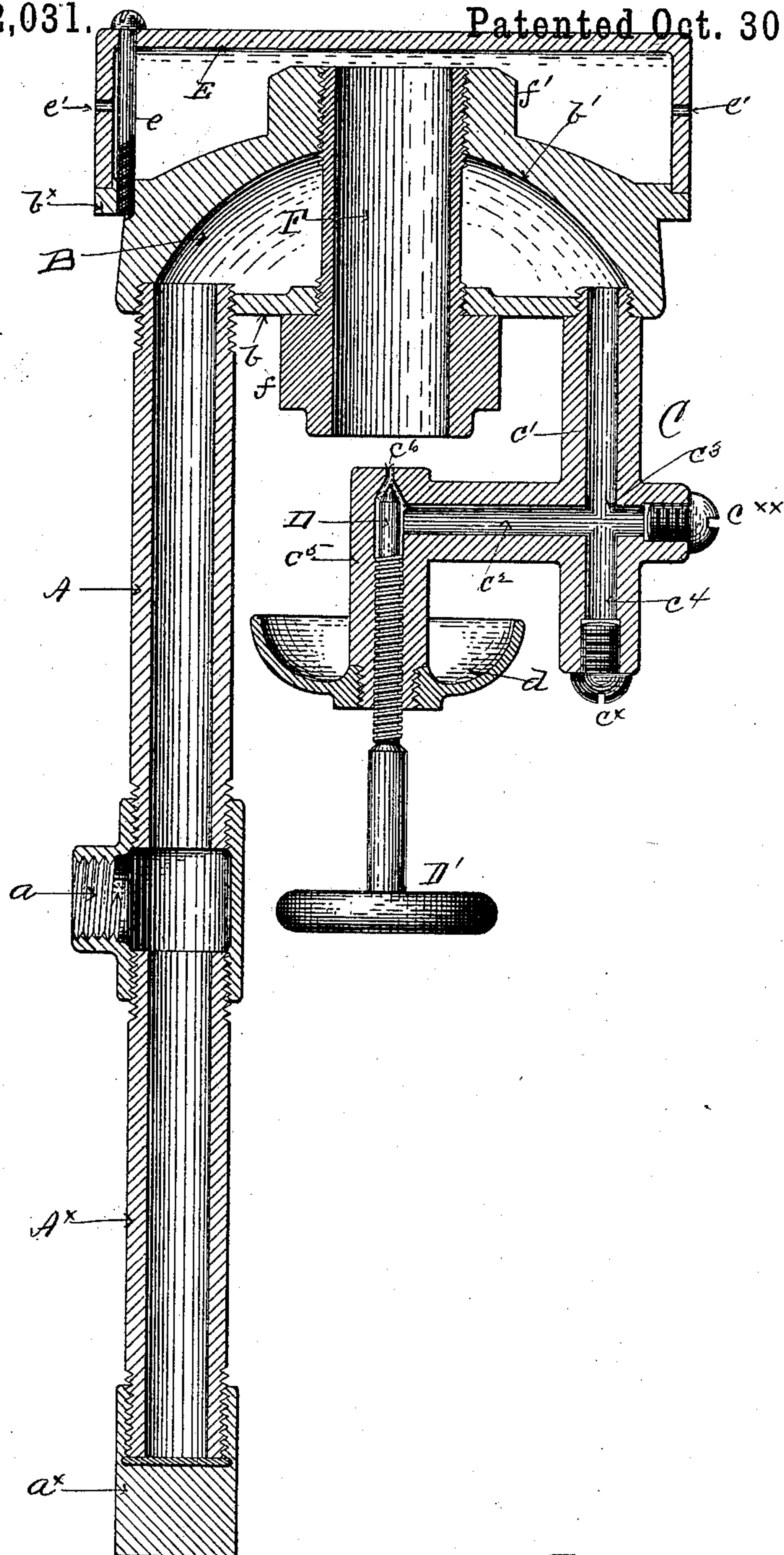


(No Model.)

W. H. HOLMES.  
DEVICE FOR VAPORIZING AND BURNING VAPORIZED LIQUID  
HYDROCARBONS.

No. 392,031.

Patented Oct. 30, 1888.



Witnesses:-  
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# UNITED STATES PATENT OFFICE.

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DEVICE FOR VAPORIZING AND BURNING VAPORIZED LIQUID HYDROCARBONS.

SPECIFICATION forming part of Letters Patent No. 392,031, dated October 30, 1888.

Application filed October 3, 1887. Serial No. 251,270. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY HOLMES, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Devices for Vaporizing and Burning Vaporized Liquid Hydrocarbons; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to devices for vaporizing and burning vaporized liquid hydrocarbons, and has for its object the provision of a device of this character which shall possess qualities of cleanliness and constancy in use of a very marked type. The device is intended more particularly for use with a coil of water-pipe or other water-reservoir for keeping the water in boilers constantly warm—as, for instance, in steam fire-engines and similar situations; but the use of the invention is not limited to such service alone, as it can with equally good results be employed in any of the various situations in which vapor or gas burners are now so extensively used.

One of the main objects sought in the invention is the prevention of the accumulations of tar, which have heretofore been a great obstacle and impediment to the employment of these burners in steam fire-engines, where steadiness and continuity of flame are absolutely essential to the utility and function of the device, as a burner which will clog and stop burning is not at all adapted, nor is it fit for use in situations where the reliability and constancy of the heat are the prime objects sought.

A further object attained by my invention is the ready removal of any sediment, either from the gasoline previous to the generation of gas or in the gas subsequent thereto. The object is attained by the peculiar construction of the device, which enables me to separate the parts and cleanse the structure from all

accumulations of tar or other sediment in a very short space of time and in the most convenient manner.

The manner in which I attain these objects in an organized burner will be more readily and fully understood from the following detailed description.

The accompanying drawing illustrates what I consider the best means for carrying my invention into practice, and the figure illustrates a vertical section taken centrally through the apparatus.

As already stated, the device is particularly intended for use in heating water for steam-boilers, and will generally be placed in a coil of water-pipe or in some other similar situation; but as I do not desire to be confined to any particular use of the invention I have not deemed it best to illustrate it in position relative to any device to be heated, as it is obvious that the points of advantage and superiority which render it especially useful in one situation will remain with it and add to its value in any other where analogous qualities are demanded.

In the said drawing, A represents the supply-pipe, which is connected with the oil-reservoir through the T-coupling *a*. This supply-pipe leads upward to the generator-chamber B, and also extends down below the T-coupling, as shown at A<sup>x</sup>, and is provided with a screw-cap, *a*<sup>x</sup>, on its lower end, the purpose of which extension and cap will presently appear.

The generator-chamber B is preferably flat-bottomed, as shown at *b*, and the top is dome-shaped, as shown at *b'*. The casting of the generator-chamber is as thin as is consistent with strength, in order to prevent the undue absorption of heat. The supply-pipe A is screwed into the bottom *b* on one side. Through the bottom on the opposite side of the apparatus the discharge-pipe C is screwed, as shown. This discharge-pipe is made in the general form of a cross, and both the upright and horizontal limbs are tubular, as shown at C<sup>1</sup> and C<sup>2</sup>, respectively, and the bores extend from the point of intersection C<sup>3</sup> in both directions in each pipe, and are fitted with screw-plugs C<sup>x</sup>



and C<sup>x</sup>, which can be removed for cleansing the apparatus. The extension of the upright pipe C' beneath the intersection, as shown at C<sup>4</sup>, gives a sediment-chamber, whose purpose will presently be explained. The inner end of the horizontal portion of the discharge-pipe is fitted with a valve, as shown at D, whose stem is provided at the lower end with a hand-wheel, D', and is threaded into the head C<sup>5</sup> of the discharge-pipe to regulate the flow of gas through the orifice. The discharge-orifice is contracted in the usual way, and the top of the valve is conical, as seen, so as to direct the discharge of gas in a well-concentrated stream. A bowl or receiver, d, is screwed upon the lower end of the head and serves a purpose which will be understood when the operation of the device is explained.

Above the generator-chamber B is mounted the cap or box E, surrounding the gas-receiving chamber. To secure this cap or box E upon the dome of the chamber B, I provide an annular horizontal flange, b<sup>x</sup>, on the said chamber B with a recess around it, as shown, and set the cap or box E upon it and secure it by bolts e, passing through the top of the cap E and screwed into the metal of the dome B or flange b<sup>x</sup>. The top of the cap E is flat, and exit-ports e' are provided in the perpendicular side walls, as shown, through which the gas to be burned passes.

A tube, F, of considerably larger diameter than the burner, is screwed through the bottom and dome of the generator-chamber immediately over the discharge-orifice and in sufficiently close relation thereto to insure the passage of all the gas emitted from said orifice through it, and at the same time at sufficient distance therefrom to permit the intermingling with the gas of a sufficient amount of atmospheric air to properly load the gas and make it possess the greatest degree of heat-producing power. The lower end of the tube F projects beneath the bottom of the generator-chamber, and is enlarged into or provided with a head or nut, f, which can be taken hold of with a wrench and turned, and where the said tube passes through the dome of the generator-chamber an extension is also provided upon the dome, as shown at f', which also serves as a nut or head to be taken hold of with a wrench to hold the device after the cap E is removed and while the tube F and pipes A and C are being removed. The extension brings the discharge end of tube in close proximity to the flat top of cap.

When it is desired to start the burner, the oil is turned on from the reservoir (not shown) and flows through coupling a, pipe A, chamber B, pipes c' c<sup>2</sup>, through orifice c<sup>6</sup>, the valve having been previously opened, and into bowl d. It is there lighted, and the flame rising from it flows up through tube F, and as soon as the parts become sufficiently heated the generation of gas is begun in the chamber B, and a sufficient amount will soon accumu-

late to flow down through gas pipe C and out the orifice c<sup>6</sup> into tube F, thence into the gas-receiver above the generator-chamber and out through the openings e'. In the passage of the gas from the orifice to the tube an amount of air as great as can be properly commingled with the gas for burning flows up with it and is burned, thus increasing the effectiveness of the burner very materially. Any sediment from the oil will lodge first on the pipe A and drop down into the extension A<sup>x</sup>, whence it can be removed by removing the cap a<sup>x</sup>, and this may be done without disturbing the other parts of the apparatus. The sediment from the gas will settle into the generator-chamber and into the discharge-pipe extension C<sup>4</sup>. It can be removed from the generator-chamber by taking off cap E and unscrewing tube F and pipes A and C, when the chamber can be readily cleansed and the parts restored. The pipe C is cleaned by unscrewing plugs c<sup>x</sup> and c<sup>x</sup> and running in a wire or swab. This cleansing of the gas-pipes can be accomplished without disturbing the other parts of the apparatus. The orifice c<sup>6</sup> and space below it can be readily reached both from the horizontal pipe and up through the threaded hole in the head when the valve-rod is removed.

I prefer to form the device of cast-iron instead of brass or composition, as is usually done in burners, for the reason that I have found that the tar does not adhere as tenaciously to cast-iron as to the brass or composition, and the cast-iron is much cheaper.

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

1. The generator-chamber B, having a flat bottom and a dome-shaped top, a tube, F, screwed through both bottom and top and affording a passage through the generator-chamber, which is closed on the sides and open at bottom and top, and the cap E, set over the generator-chamber, having a closed top and perforated sides, in combination with the supply-tube A and the discharge-tube C, having a jet-tube attached to it and located immediately beneath the bottom of tube F, as set forth.

2. The combination, with a generator-chamber having the open-ended tube F screwed through it, and provided with a cap having an imperforate top and perforate sides, of a supply-tube, A, leading into the bottom of the generator-chamber, having a connection, a, to the supply-pipe and a closed drip-extension, A<sup>x</sup>, and a discharge-tube, C, having an upright and a horizontal duct, both of which extend beyond the point of intersection, and are provided with removable plugs, as described, and a jet-tube located at the inner end of the horizontal duct of the discharge-tube and lying immediately beneath the open tube F, as set forth.

3. In a hydrocarbon-burner, the combina-



tion of a generator-chamber having a flat  
bottom and a dome-shaped top provided with  
the nut or head  $f'$ , a mingling-tube screwed  
through the bottom and into and through the  
5 head of the dome, and having the head or nut  
 $f$  on its lower end below the bottom of the gen-  
erator-chamber, a cap, E, above the genera-  
tor-chamber inclosing the gas-space, and the

oil-supply and gas-discharge tubes screwed  
into the bottom of the generator-chamber. 10

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

WILLIAM HENRY HOLMES.

Witnesses:

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J. E. SMITH.