No. 708,258. Patented Sept. 2, 1902.

W. H. & G. E. RUSSELL.

APPARATUS FOR BURNING LIQUID HYDROCARBONS.

(Application filed Oct. 11, 1900.)

(No Model.)

Fig. 1.

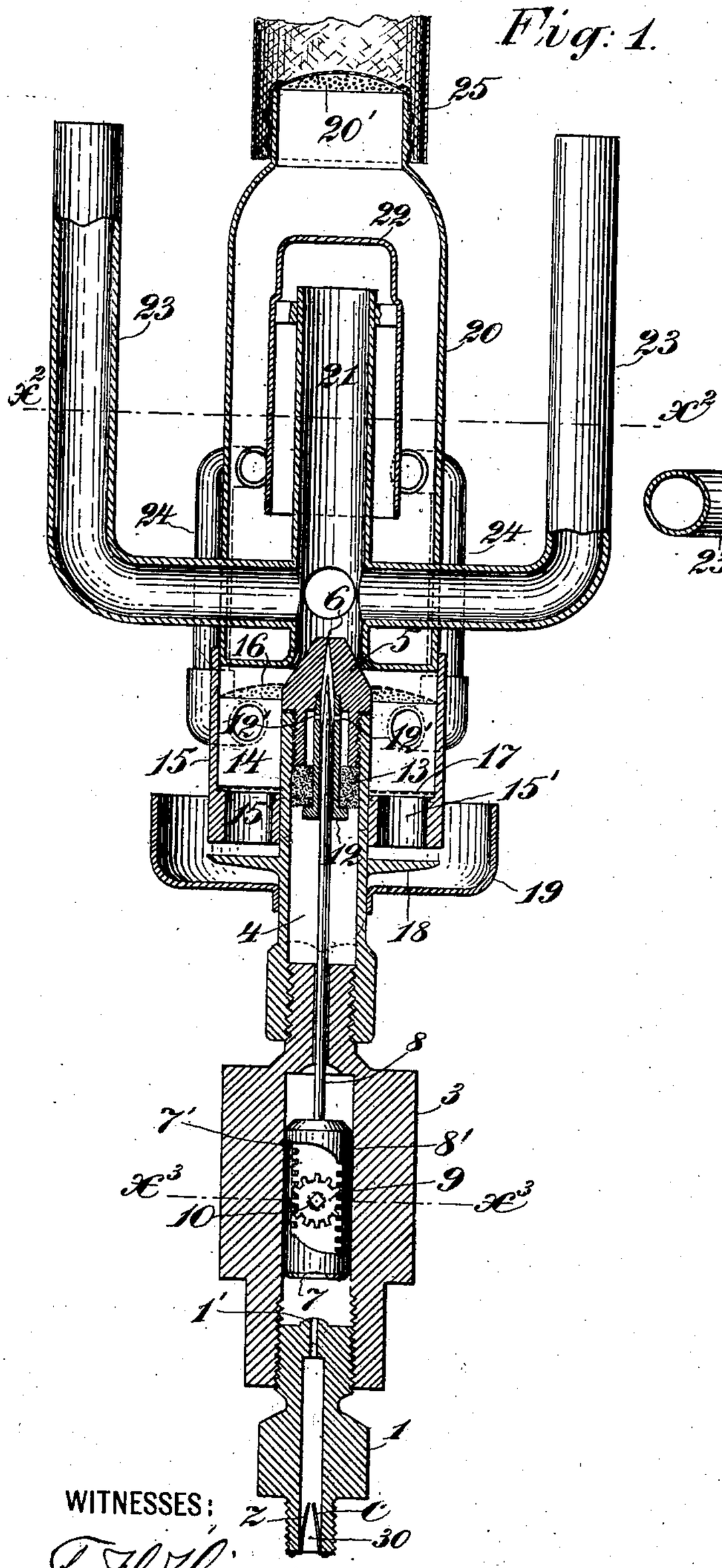


Fig. 2.

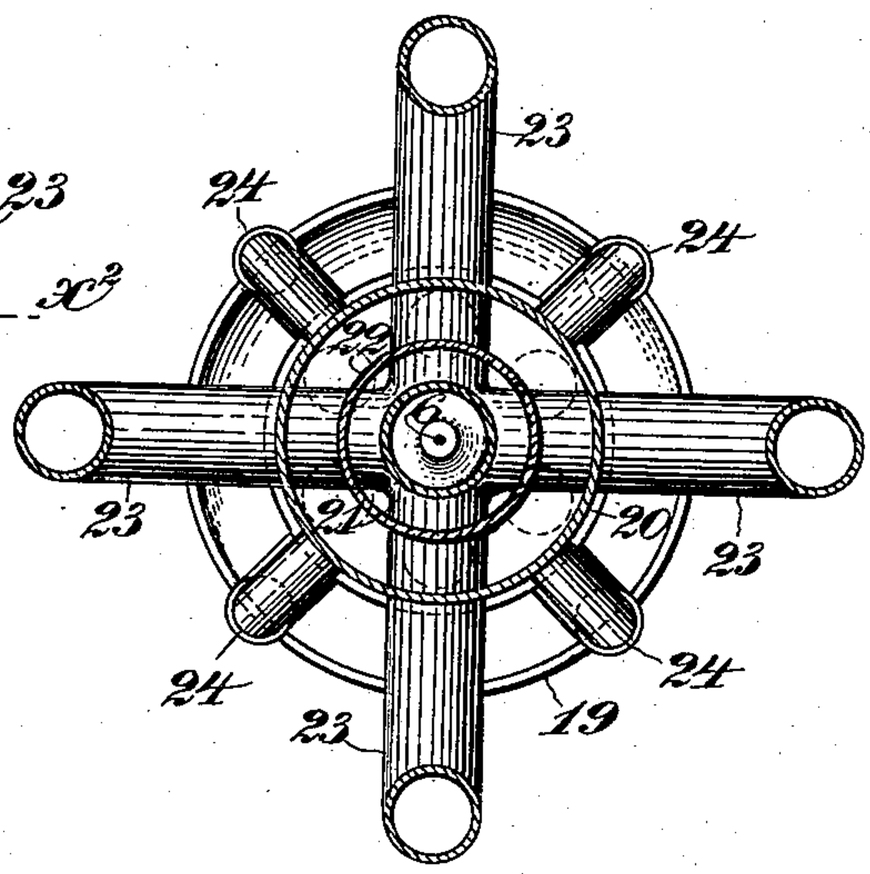
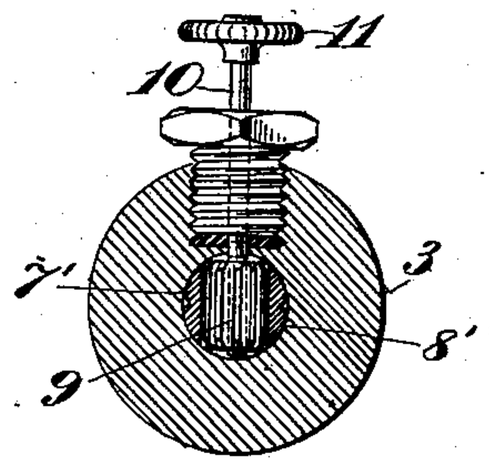


Fig. 3.



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APPARATUS FOR BURNING LIQUID HYDROCARBONS.

SPECIFICATION forming part of Letters Patent No. 708,258, dated September 2, 1902.

Application filed October 11, 1900. Serial No. 32,703. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. RUSSELL and GEORGE E. RUSSELL, citizens of the United States, and residents of Jersey City, Hudson county, New Jersey, have invented certain Improvements in Apparatus for Burning Liquid Hydrocarbons, of which the following is a specification.

This invention relates to an apparatus for gasifying and burning a hydrocarbon with the aid of air induced by the draft. The apparatus is designed mainly for producing a Bunsen flame and is herein shown as operating in connection with what is commonly called a "Welsbach" mantle for illuminating purposes, though it may be employed for heating purposes without such mantle.

In the drawings, which serve to illustrate one embodiment of our invention, Figure 1 is a longitudinal axial section of the generator and burner; and Figs. 2 and 3 are respectively cross-sections of the same, taken in the planes indicated by lines x^2 and x^3.

As shown in the drawings, 1 is the nipple where the oil-supply pipe is attached. This nipple screws into a casing 3 and has at its upper end a valve-seat 1′. The casing 3 is secured at its upper end to a tubular generator 4, which has at its upper end a nozzle 5, in which is a very small outlet 6 for the gas. Within the casing 3 are a valve 7 to close the inlet for oil and mechanism for actuating this valve and a needle or needle-valve 8, which extends up to the outlet 6, which it serves to close. Within the casing 3 the needle-valve 8 is provided with a rack 8′, and the valve 7 is provided with a rack 7′. A pinion 9 gears at its respective opposite sides with these racks and is provided with a rotatively-mounted shaft 10, which passes out through a stuffing-box in the wall of the casing 3 and may be provided exterior to the casing with a thumb-wheel 11 for rotating said shaft and operating both the valve 7 and needle 8 simultaneously. When the valve 7 is open, the oil under pressure or head enters the chamber 3 and finds its way into the generating-chamber through the guides of the racks, which are grooved or apertured to permit it to flow. The needle 8 is sufficiently loose in its guides to allow the liquid, vapor, or gas, as the case may be, to flow around it. The needle 8 is guided near its upper end in a flanged tubular guide 12, in which it fits snugly, and the oil or vapor filters through a mass of refractory filtering material 13 up to lateral apertures 12′ in the guide 12, which lead it into the outlet-passage. The needle 8 is not new in this general class of burners and is not intended as a valve, but for cleaning the outlet 6. It serves, incidentally, as a valve; but the valve 7 accomplishes that function.

About the upper part of the generator 4 is a heating-chamber 14 in a casing 15, which has apertures 15′ in its bottom and two diaphragms 16 and 17, of fine gauze, one near the bottom and the other near the top of the chamber 14. Below the casing 15 is a baffle-plate 18, mounted on the generator, and below said plate, on the generator, is secured a cup 19 for alcohol.

Mounted on and closing the top of the casing 15 is an outer casing 20, having a burner-tube in its top, covered with wire-gauze 20′, and extending up into this casing 20 is a mixing-tube 21, into which the outlet 6 discharges. Intermediate the mixing-tube and the casing 20 is a tube 22, which is open at the bottom and closed by a diaphragm or plate at its upper end above and over the open upper end of the mixing-tube. Air is induced and supplied to the mixing-tube through one or more air-tubes 23, which penetrate the casing 20 and enter the mixing-tube just above the gas-outlet 6. Supply-tubes 24 for a mixture of gas and air extend from the casing 20 down to the heating-chamber 14, where they admit a combustible charge between the diaphragms 16 and 17.

In Fig. 1, 25 designates a part of a Welsbach mantle for illumination. This view also shows the air-tubes 23 as turned upward, so as to be inclosed within the encompassing globe. (Not shown in this view.) The object of this arrangement is to heat the air admitted to promote combustion, and when this induced supply of air is thus heated we do not find it necessary ordinarily to employ air-shutters to regulate the quantity of air admitted; but these may be employed, if desired.

The operation of the burner is as follows:

Oil being admitted to the generator by opening the valve 7, alcohol is poured into the cup 19 and ignited. The gaseous product from the generator flows up through the tube 21, inducing an influx of air through the tubes 23, and the two gases are mixed within the tube 22, flowing thence down and out from under the lower edge of same into the chamber of the casing 20. A portion of this combustible mixture of gas and air rises to the point of ignition at the top of the burner-tube, and the remainder backs down through the tube or tubes 24 to the heating-chamber 14, where it is ignited and heats the generator. This ignition is maintained at the outlets in the bottom of the chamber 14 so long as the supply of oil to the burner is kept up. The alcohol is employed only for a temporary purpose.

It may be well to explain that the lower gauze or foraminous diaphragm 17 in the chamber 14 interposes between the body of said chamber and the outlets 15′, and the gas passes out through the diaphragm 17 and burns at the said outlets exterior to said diaphragm.

Preferably asbestos will be employed as the filtering material 13, and preferably, also, the oil-passage will be provided at some point in the burner with copper and zinc electrodes to provide, with the heat and the flowing oil, a galvanic current, which is believed to aid materially in gasifying the oil. In Fig. 1 these electrodes are shown at 30 and designated by the letters *c* and *z*.

Having thus described our invention, we claim—

1. In an apparatus for the purpose specified, the combination with a generator and means for admitting oil in regulated quantity thereto, of a mixing-tube above the outlet of the generator, an intermediate tube closed above and over the upper end of the mixing-tube, an air-induction pipe which admits air to said mixing-tube, an outer casing inclosing the mixing-tube and intermediate tube, a casing about the generator to form a heating-chamber, a tube connecting the chamber in the outer casing with the heating-chamber, the receiving end of said tube being situated above the lower, open end of the intermediate tube, and a receptacle below the heating-chamber to contain a combustible for igniting the gaseous mixture in the heating-chamber, substantially as set forth.

2. In an apparatus for the purpose specified, the combination with a generator and means for admitting oil thereto, of a casing about said generator and having apertures in its bottom, a baffle-plate below said casing, a cup for combustible liquid below said plate, gauze diaphragms within said casing, an outer casing, which carries the burner-tube and is mounted on the casing surrounding the generator, tubes connecting said casings, a mixing-tube within the outer casing, air-tubes connected with and supplying said mixing-tube, an intermediate tube within the outer casing and inclosing the mixing-tube, and means for regulating the outflow of gas from the generator, substantially as set forth.

In witness whereof we have hereunto signed our names, this 8th day of October, 1900, in the presence of two subscribing witnesses.

WILLIAM H. RUSSELL.
GEORGE E. RUSSELL.

Witnesses:
HENRY CONNETT,
PETER A. ROSS.