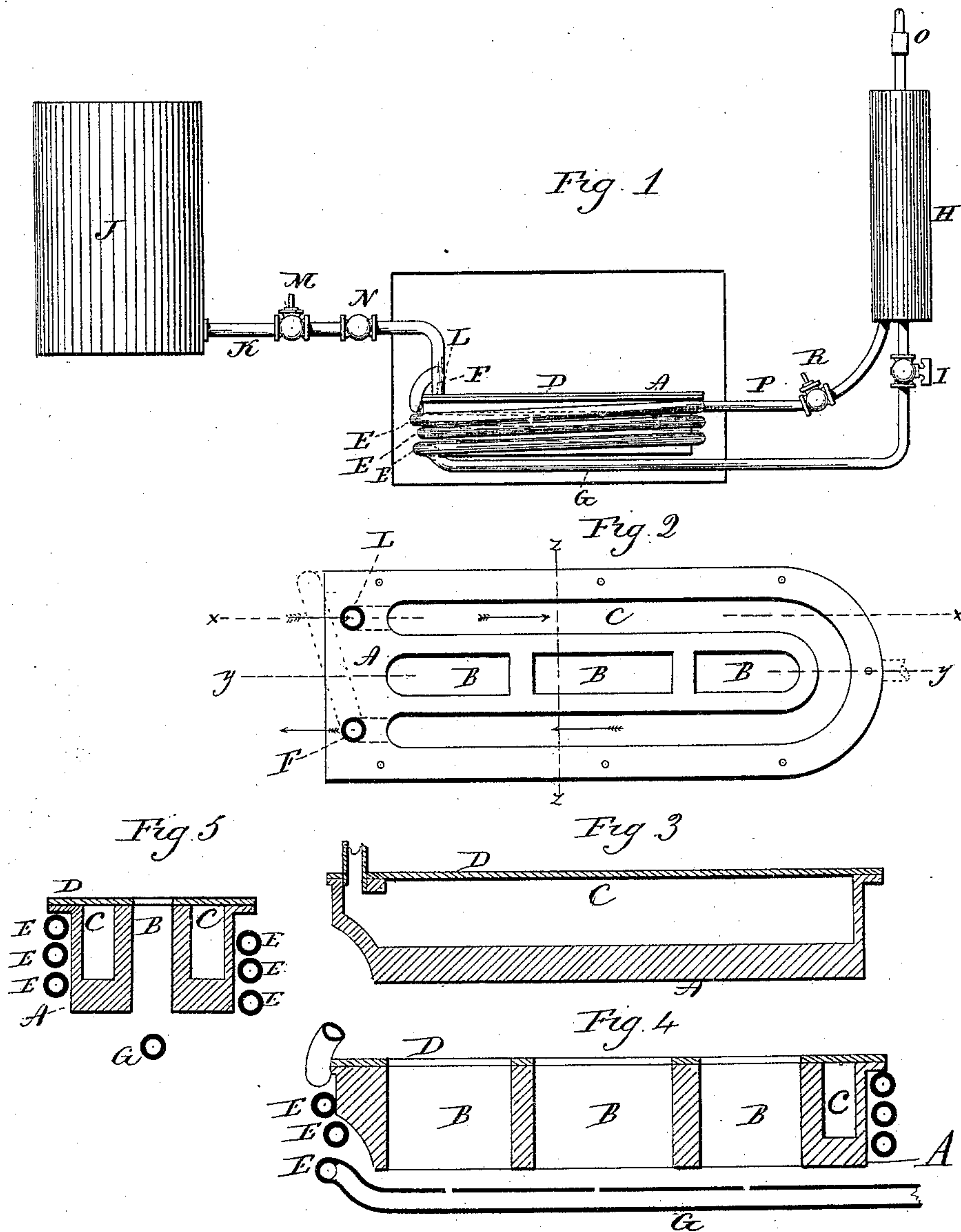


(No. Model.)

G. BOTSFORD.
HYDROCARBON OIL VAPORIZER AND BURNER.

No. 431,322.

Patented July 1, 1890.



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HYDROCARBON-OIL VAPORIZER AND BURNER.

SPECIFICATION forming part of Letters Patent No. 431,322, dated July 1, 1890.

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To all whom it may concern:

Be it known that I, GEORGE BOTSFORD, of New Haven, in the county of New Haven and State of Connecticut, have invented new Improvements in Hydrocarbon-Oil Vaporizer and Burner; and I do hereby declare the following, when taken in connection with accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of the burner as arranged in a furnace; Fig. 2, a top view of the generator enlarged, the cover removed; Fig. 3, a longitudinal section on line *x x* of Fig. 2; Fig. 4, a longitudinal section on line *y y* of Fig. 2, and Fig. 5 a transverse section on line *z z* of Fig. 2.

This invention relates to an improvement in hydrocarbon-oil vaporizer and burner, specially designed for heating, cooking, and other purposes, the burner employing crude petroleum or other suitable hydrocarbon. In the more general construction of this class of vapor-burners a coil of pipe is employed, the oil flowing into the upper run of the coil, the lower coil perforated, so that the oil flowing into the coil and heated is vaporized and escapes through the perforations in the coil and there being ignited produces a flame for heating purposes, and the flame is also utilized to heat the oil in the coil to vaporize it, it being understood that it is necessary to apply heat to the coil from an outside source in order to start vaporization; but when vaporization commences, so as to produce a flame, that flame serves as the means for heating and vaporizing the oil. A great difficulty is experienced in the use of this class of burners from the liability of the oil clogging the coil of pipe, so as to prevent the proper flow of oil. When so clogged, it is impossible to clear the tubing without separating the tubes from the apparatus, and in any case the cleaning of the tubes when once clogged can only be accomplished by the employment of a mechanic for the purpose. Vaporizing-chambers have also been employed with a pipe extending from said chamber below the vaporizer to conduct the vapor to be burned; but in such constructions the vapor

or gas is not sufficiently purified, and the flame is liable to smoke.

The object of my invention is the construction of a vapor-burner in which a generator is employed in the coil which will contain the oil to be vaporized and which may be readily cleaned without disturbance of the generator or coil; and the invention consists in a generator having vertical openings through it, with a chamber surrounding said openings, the said chamber being the reservoir for the oil to be vaporized and constructed with a removable cover, the supply of oil leading into such chamber, and the coil leading from the chamber above the natural level of the oil in the chamber, the coil being arranged around the generator as more fully hereinafter described.

A represents the generator, which is preferably made from cast-iron, but may be made from any suitable material, and is suitably supported where the heat is required, here represented as being in a fire-box, it may be as a furnace for a steam-boiler or for a house-warming furnace.

The generator is constructed with vertical openings B, more or less in number, centrally through it. In the top of the generator around said openings is the vaporizing-chamber C. As here represented this is of U shape, the openings B being between the two legs of the U. This chamber is closed by a removable cover D, secured in any suitable manner, or may simply lie upon the top of the generator, the joint being suitably packed or made tight to prevent the escape of gas.

E E represent convolutions of a continuous pipe around the sides of the generator. The upper end or end of the upper convolution opens into the chamber C, as at F. The lower rim of the pipe G passes below the generator and centrally below the openings B, as seen in Figs. 4 and 5. Thence the pipe runs to a receiver H, into which it opens; but in the pipe leading to the receiver I place a cock I, by which the flow in that direction may be cut off. The pipe G beneath the generator is perforated or provided with openings in the usual manner, as seen in Figs. 4 and 5, and through which vapor may escape.

The oil to be vaporized flows from any suit-

able reservoir (J represents such reservoir) through a pipe K into the chamber C, as at L. The pipe K is provided with a cock M, by which the flow of oil may be regulated or cut off, and it is also preferably provided with a check-valve N. This completes the construction.

The oil to be vaporized is permitted to flow into the chamber C, but not sufficient to fill that chamber. Heat is then applied by any suitable means which may be that usually applied for this purpose—that is, some material saturated with any suitable inflammable material placed beneath the generator. The heat from the flame passes up through the openings B in the generator, quickly heating it to sufficient extent to vaporize the oil. The vapor passes into the upper end of the coil, thence through the coil to the branch G, where it escapes through the perforations and ignites from the flame being employed for the initial generation of vapor. The flame from this vapor operates upon the generator to produce the required heat thereon to vaporize the oil, and when the vapor is thus ignited the initial heater may be removed, the generating-heat being thereafter derived from the flame. The flame from the burner will spread around the generator and surround the coil E, thereby superheating and purifying the vapor in the coil. The coil E is represented as run three times around the chamber, but good results may be obtained by two runs. The burning vapor also serves as the fire for the furnace or wherever the burner may be applied.

There may be several perforated branches through which the vapor will escape and be burned; but the illustration of one branch will be sufficient for a clear understanding of the invention.

If more vapor or gas is generated than is required for consumption in the furnace or at the generator, the surplus may pass into

the receiver H and thence led to any desired point like other gas and for heating or illuminating purposes.

In Fig. 1 I represent a gas-burner O as applied to the receiver simply to illustrate this use of the gas produced by the generator.

In some cases it is desirable to provide a conductor from the upper part of the coil to take away the surplus gas. P, Fig. 1, represents a pipe applied for this purpose, leading into the receiver H and provided with a stop-cock R. The check-valve N is a common check-valve arranged to open toward the chamber C, so as to permit the flow of oil, but so that the pressure of gas, should it flow toward the reservoir, may close the valve to prevent the gas passing to the reservoir.

The burner may be employed simply for the purpose of vaporizing the oil and the vapor led to any convenient point for combustion. In such case the perforations in the branch or branches beneath the generator will be only of sufficient capacity for vaporizing purposes.

I claim—

In a hydrocarbon-oil vaporizer and burner, a generator constructed with vertical openings through it, a chamber in its upper side surrounding said openings, combined with a removable cover by which said chamber may be opened or closed, a conductor leading to said chamber for the supply of oil, and a pipe leading from said chamber above the natural level of the oil therein and run two or more times around the outside of the chamber and beneath the generator, the run of pipe beneath the generator perforated, all substantially as and for the purpose described.

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