2 Sheets—Sheet 1.

C. HOLLAND.

HYDROCARBON-BURNER AND GAS-GENERATOR.

No. 191,144. Patented May 22, 1877.

Fig. 1.

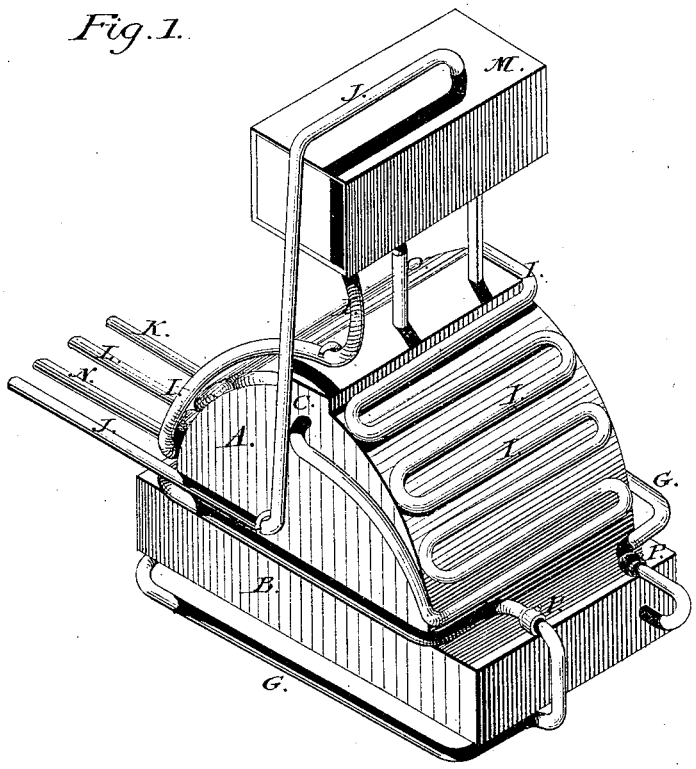
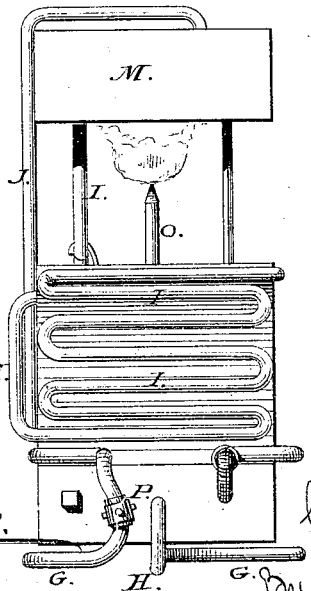


Fig. 2.



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2 Sheets—Sheet 2.

C. HOLLAND.

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Fig. 3.

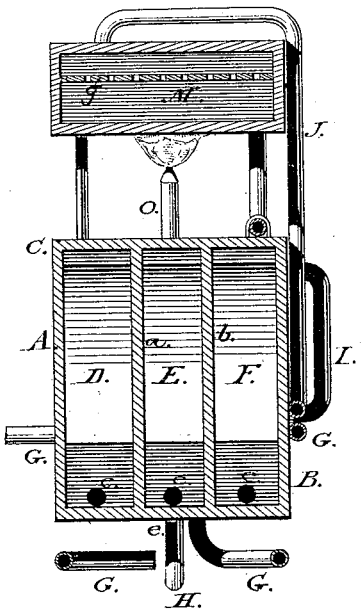


Fig. 4.

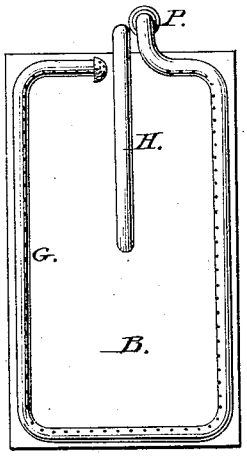
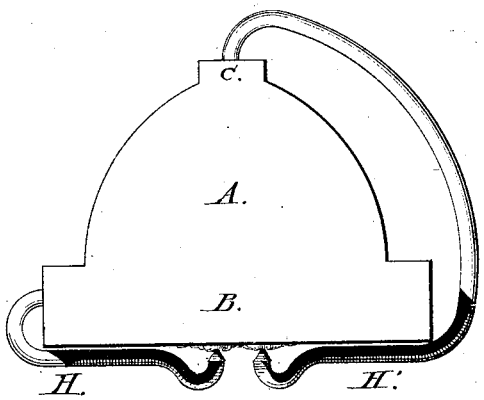


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES HOLLAND, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN HYDROCARBON-BURNER AND GAS-GENERATOR.

Specification forming part of Letters Patent No. **191,144**, dated May 22, 1877; applicatio filed April 3, 1877.

To all whom it may concern:

Be it known that I, CHARLES HOLLAND, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hydrocarbon-Burners and Gas-Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, which 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 of reference marked thereon, which form a part of this specification, and in which—

Figure 1 is a perspective view of my improved invention. Fig. 2 is a rear view of the same. Fig. 3 is a vertical longitudinal section taken on the line *x x* of Fig. 1. Fig. 4 is a bottom view of the retort, showing the arrangement of the perforated steam-pipe; and Fig. 5 is a modification.

Similar letters of reference occurring on the several figures indicate like parts.

My invention relates to certain new and useful improvements in hydrocarbon-burners and gas-generators; and it consists of a dome-shaped retort provided with the usual oil and water chambers, and having coiled or bent pipes arranged on the outer sloping top and sides of the retort so as to be fully exposed to the blaze and heat of the burner, for readily heating and vaporizing the petroleum or fluid to be converted into gas.

It also consists in providing the steam-pipes on the outside of the retort with union joints or couplings for readily removing burnt-out pipes and replacing them with new ones.

It further consists in providing an auxiliary gas-receiver, for more perfectly securing the conversion of the fluid into gas without waste of material, or the clogging of the pipes with refuse matter, said gas-receiver being arranged directly over the retort, and heated by a burner leading directly from the top of the central oil-chamber, all as will be hereinafter more fully described, and pointed out in the claims.

Referring to the drawings, A represents the dome-shaped retort, having a rectangular base, B, and a hollow cap or bar, C, at the top, said retort being divided lengthwise, by two partitions, *a b*, into three chambers, D E F, each being provided with an opening, *c*, in the rectangular base, and an opening at the top in the cap or bar C for the introduction of the induction and eduction pipes, hereinafter more fully described. A pipe, G, leading out of the water-chamber D at the base B, and provided at that point with union joints or couplings P, extends entirely around the flange of the base outside of the retort, and, passing downward and under the retort, is arranged around the edges of the same and closed at the end, said pipe being perforated with small holes for steam to be discharged from it to mingle with the blaze of the carbon from the burner under the retort, for securing a perfect combustion, and producing an intense heat. The pipe H leads from the central oil-chamber E at the base, and, passing under and to the center of the retort, terminates in a jet, *e*, for heating the retort and its arrangement of pipes. A wire-gauze ball is arranged in the bend of the pipe H, directly under the orifice or jet, for preventing the clogging or accumulation of waste matter in the bend of the pipe, as also for regulating and controlling the supply of carbon or fuel to the burner.

I represents the pipe which leads the gas from the chamber F to the gas-receiver M above the retort. This pipe I projects from the side of the chamber F, as shown in Fig. 1, and, passing downward to the base B, is arranged in coils on the outer sloping walls of the retort on both ends, and then, passing upward, enters the bottom of the gas-receiver M to one side.

The gas-receiver is placed directly above the retort, and consists of a strong iron box, rectangular in shape, and having a horizontally-arranged perforated partition, *g*, at the upper part, provided with iron shavings or its equivalent. A pipe, J, leads from an opening in the top of the receiver, over the perforated partition *g*, down to the side of the retort, and from thence to the gas strainer and holder.

When the apparatus is in operation water enters the chamber D by the induct-pipe K, and in passing through such chamber becomes highly heated and converted into steam, which flows through the pipe G, and, becoming su-

perheated in such, will be discharged, through the perforations in the same beneath the retort, into the flame of the burner or gas-jet. Petroleum is also conducted into the chamber E by the pipe L, and, being heated and vaporized, escapes from the chamber through the pipe H and its jet, upon which it is enflamed. The chamber F receives the hydrocarbon fluid, intended to be resolved into gas, from the induct-pipe N.

In passing through the said chamber F and through the coiled pipe I the conversion of the fluid into gas is very thoroughly accomplished, particularly by its passage through the coils of pipes I on each end of the retort, which are heated by exposure to the flame of the burner, which spreads laterally in all directions under the retort, and this effect is further perfected by the arrangement of the gas-receiver M above the retort, into which the gas flows from the pipe I, and is broken up and volatilized by the heat from the burner O under the gas-receiver, leading from the central oil-chamber E at the top of the retort, thereby producing a superior quality of gas with little or no waste of the material.

It may be observed that in the construction of the retorts now in use the space inside the chambers is insufficient to allow of the proper expansion of the gas-vapor, which is forced out at a rapid rate before the fluids are well broken up, and as a consequence a less degree of heat is obtained, and the oil burns down to a cake before it can be volatilized, which clogs or fills the chambers and pipes, causing much annoyance, trouble, and expense.

By means of my dome shaped retort with the coils of pipe arranged on the ends and top, ample space is secured for the thorough breaking up of the fluids to be vaporized, inasmuch as every portion of the same is subjected to an intense heat, and sufficient room secured for the perfect expansion of the gas-vapor.

It will also be observed that when it is desired to use my retort for domestic purposes, the gas-receiver *m* over the retort can be dispensed with, and the gas produced led direct to the usual gas strainer and holder, and the pipe having the gas-jet O led from the top of the retort down under the same, so as to increase the heat, as shown at H′, Fig. 5; but when desired to be used on a larger scale, such as for hotels, public buildings, &c., I prefer to use the gas-receiver *m*, arranged over the retort, for rapidly and thoroughly producing a large and superior quality of gas.

By the employment of the union joints or couplings in connection with the water-pipe at the base of the retort, ready means are provided for removing burnt-out pipes and replacing them with new ones without necessitating the removal of the retort, or the substitution of a new one, as is usually the case.

Having thus described my invention, what I claim as new and useful is—

1. The dome-shaped retort A, constructed as described, and provided with the coiled pipe I, arranged on the top and ends of the retort, and communicating with the gas-receiver M, substantially as and for the purpose specified.

2. The dome-shaped retort A, in combination with the induct-pipes K L N, steam-pipe G, coiled pipe I, gas-receiver M, having outlet-pipe J, pipe H, having burner *e*, and the upper burner O, the several parts being constructed, arranged, and operating, substantially as and for the purpose specified.

3. The steam-pipe G, arranged as shown, and perforated on its upper surface, and provided with the union joints or couplings P, substantially as and for the purpose described.

In testimony that I claim the foregoing as my own invention I affix my signature in presence of two witnesses.

CHARLES HOLLAND.

Witnesses:

PARK HOLLAND,

ELIJAH W. BONTECON.