

A. O. BRADFORD.
HYDROCARBON BURNER.
APPLICATION FILED OCT. 18, 1907.

994,117.

Patented June 6, 1911.

2 SHEETS—SHEET 1.

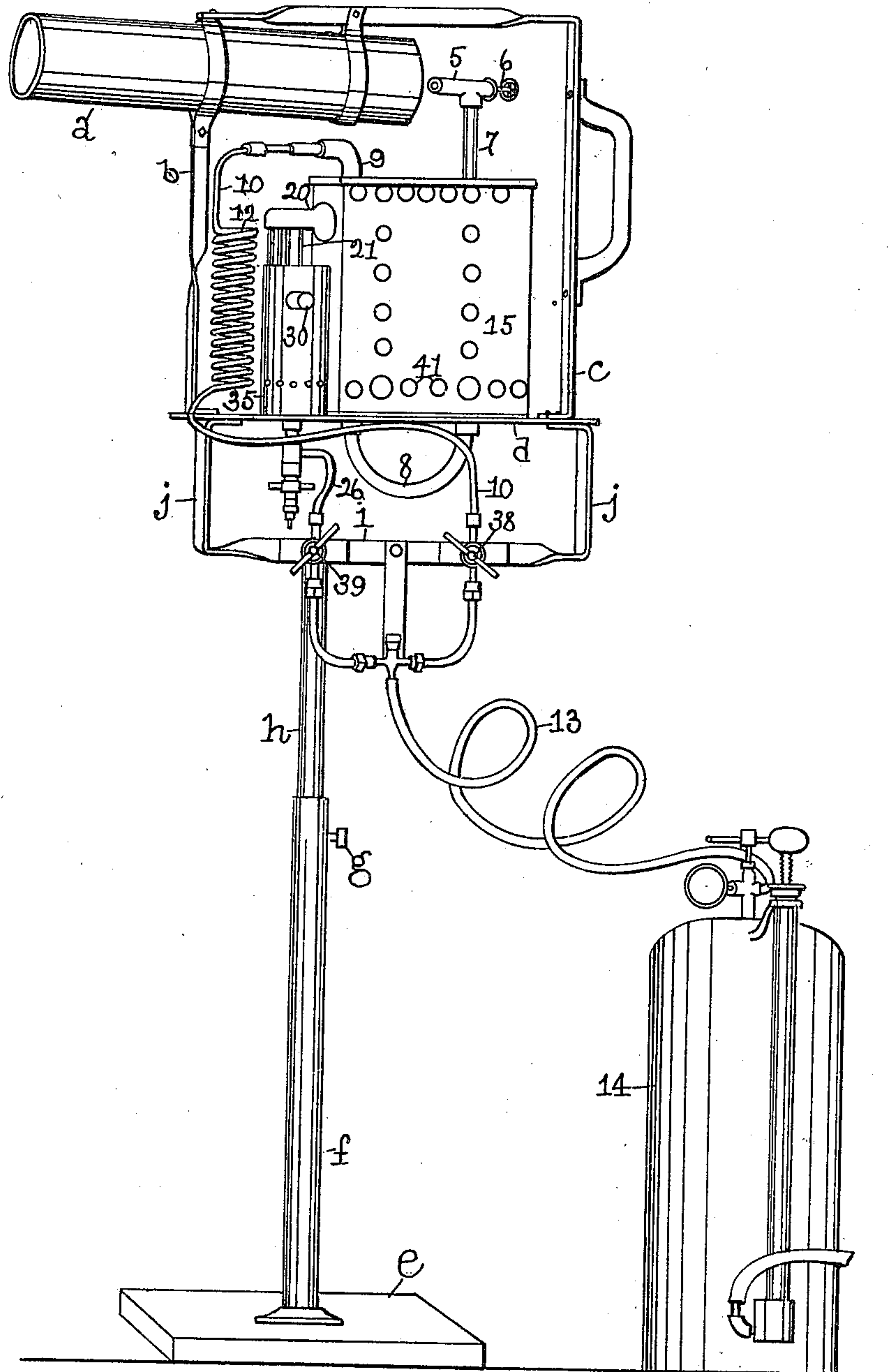


Fig. 1.

Witnesses.
C. H. Gammett
J. Murphy.

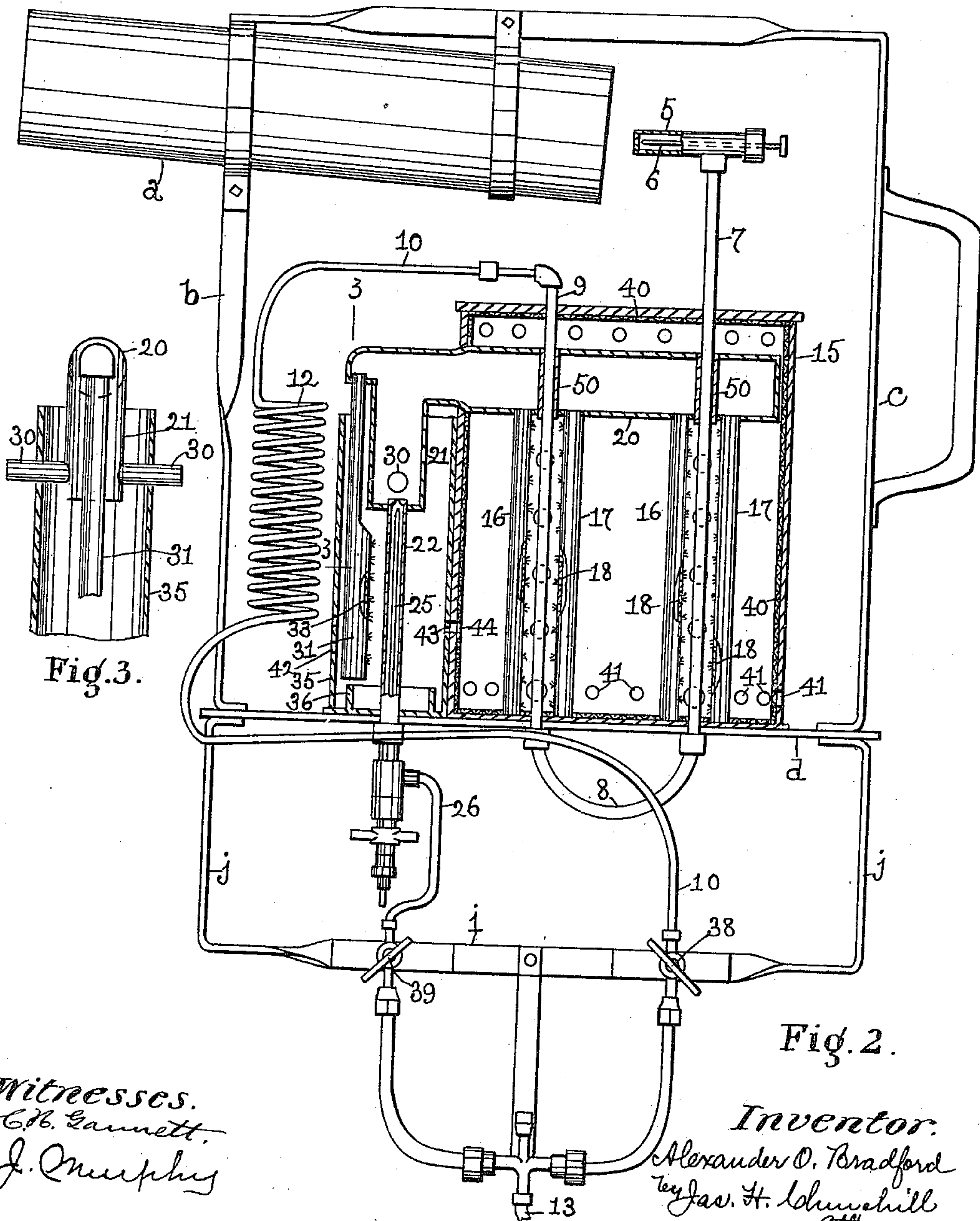
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Alexander O. Bradford
by Jas. H. Churchill,
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UNITED STATES PATENT OFFICE.

ALEXANDER O. BRADFORD, OF BOSTON, MASSACHUSETTS.

HYDROCARBON-BURNER.

994,117.

Specification of Letters Patent. Patented June 6, 1911.

Application filed October 18, 1907. Serial No. 398,016.

To all whom it may concern:

Be it known that I, ALEXANDER O. BRADFORD, a citizen of the United States, residing in Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Hydrocarbon-Burners, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a hydrocarbon vapor generator, especially designed and adapted for generating vapor in sufficient quantity to be used in a separate burner.

The invention among other uses, is adapted for generating hydrocarbon vapors for use in blast or blow torches of great heating power and especially for use in brazing cast iron or other metals. For this purpose, I employ a main generator, a burner for heating said main generator, an auxiliary generator for supplying vapor to said burner, and an auxiliary burner for heating said auxiliary generator. The main generator and the auxiliary generator may and preferably will be connected with a single source of oil supply, and provision is made for independently controlling the flow of oil to said generators. The main generator is arranged with relation to the burner which heats it, so that the generator may be highly heated when not in use, whereby it is maintained in condition for instant use as will be described. Provision is also made for arranging the generators and burners in a portable apparatus, which is provided with means for protecting the workman from the heat of the burners. These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is an elevation of a portable apparatus embodying this invention. Fig. 2, an enlarged vertical section of the apparatus shown in Fig. 1, and Fig. 3, a sectional detail to be referred to, taken on the line 3—3, Fig. 2.

In the present instance I have shown the invention as embodied in a portable blast or blow torch having the blast pipe or nozzle *a* supported by uprights *b*, *c* from a base plate or platform *d*, which is supported by a stand *e* having a hollow upright *f*, in which is adjustably secured as by the screw *g*, a

spindle or rod *h*, to which is fastened a cross bar *i* connecting arms *j* secured to the platform *d*. The blast nozzle or pipe *a* has co-operating with it a vapor nozzle 5 provided with a needle valve 6 and detachably secured to the end of one leg 7 of a U-shaped pipe 8, having its other leg 9 detachably connected to a pipe 10, preferably provided with a coil 12 and joined to a main supply 13 leading to a tank or reservoir 14 containing kerosene or like oil under pressure. The U-shaped pipe 8 constitutes the main vapor generator of the apparatus and its legs 7, 9, are extended up through the base or platform *d* and through the top of a casing 15 erected upon said base. Within the casing 15 the legs 7, 9 of the main generator have coöperating with them burners, which are herein shown as each composed of two pipes 16, 17 on opposite sides of each leg of the main generator and having perforations or vapor outlets 18 arranged opposite the leg with which the burner pipes coöperate. The pipes 16, 17 are closed at their lower ends and communicate at their upper ends with a pipe or chamber 20 located substantially at right angles to the burner pipes 16, 17, and extended through one side wall of the casing 15. The pipe or chamber 20 is closed at one end within the casing 15 and is provided outside of said casing with a depending section or branch 21, into which is extended the upper end of an auxiliary generator or vaporizer 22, which may be of any suitable construction and such as now commonly used on hydrocarbon lamps, said vaporizer having at its upper end a vapor outlet which is controlled by a needle valve 25, and having connected to its lower end an oil supply pipe 26, which is shown as connected with the oil supply pipe 13. The branch pipe 21 is also provided with suitable air inlets 30 (see Figs. 2 and 3).

The vaporizer 22 has coöperating with it a burner, herein shown as a pipe or tube 31 closed at its lower end and communicating at its upper end with the pipe or chamber 21, the pipe 31 having perforations 33 which are arranged opposite the said vaporizer. The vaporizer 22 and its burner 31 may be surrounded by a large pipe or casing 35 which rests upon the base plate or platform *d*. The vaporizer 22 may be extended up through a cup 36, which is designed to con-

tain alcohol by which the vaporizer is initially heated.

The oil pipes 10, 26 may and preferably will be provided with suitable valves 38, 39 by which the supply of oil to the main generator and to the auxiliary generator or vaporizer may be separately controlled.

The casing 15 may and preferably will be provided with a lining 40 of asbestos or like material, and the walls of said casing may be provided with air-inlet openings 41 and the pipe or casing 35 may also be provided with air-inlet openings 42 and with a flame outlet 43 which registers with a flame inlet opening 44 in a side wall of the casing 15. The casing 15 forms a combustion chamber for the main burner, and the pipe or casing 35 forms a combustion chamber for the auxiliary burner.

In operation with the apparatus herein shown, oil is supplied to the vaporizer 22 by opening the valve 39, and said oil is initially vaporized by igniting alcohol in the cup 36. The vapor thus generated passes into the branch pipe 21 and is admixed with air drawn into said pipe through the air inlets 30. The mixture thus formed fills the pipe 20 and some of the mixture flows back through the auxiliary burner 31 and issuing from the perforations thereof is ignited by the flame from the alcohol cup and serves to heat the auxiliary generator and vaporize the oil therein. Another portion of the mixture passes through the main burners 16, 17 into the chamber 15 where it is ignited by the flame in the combustion chamber 35, said flame passing through the ports 43, 44. The main burners 16, 17 highly heat the two legs 7, 9, of the main vaporizer or generator, and by opening the valve 38, oil is now permitted to flow through the pipe 10 and its coil 12 into the leg 9, wherein it descends and is highly heated and vaporized. The vapor passes from the leg 9 into the leg 7, up through which it ascends and issues from the nozzle 5 into the blast pipe or torch α , where it is mixed with air drawn into said pipe. The mixture thus formed is ignited by hand and the flame issues from the pipe or torch at a high heat sufficient for brazing heavy metals such as cast iron. The oil supplied to the main generator may be cut off, when the blast is not being used, by means of the valve 38, while the oil supply for the auxiliary generator or vaporizer may be maintained so as to furnish the main burners with fuel and thereby maintain the main generator highly heated and in condition to vaporize the oil when the valve 38 is again opened. It will also be seen that the vapor generated in the leg 9 is practically superheated in the leg 7 of the main generator, and that this vapor can be ignited in close proximity to the nozzle 5, or said vapor by reason of its highly heated condi-

tion can be carried to a point substantially remote from the generator.

With the apparatus herein shown, a flame having a temperature of 2500° F. has been obtained.

I have herein shown the invention as embodied in a portable apparatus, but I do not desire to limit my invention in this respect.

The legs 9, 7 of the main generator are detachably connected with the supply pipe 10 and nozzle 5, which enables the said generator to be readily removed from the apparatus for purposes of repair or renewal, without interfering with the operation of the main burner. The supply pipe 10 for the main generator or vaporizer, may and preferably will be provided with the coil 12, which is located in proximity to the casing 35 so as to be heated thereby, which arrangement serves to heat the oil supplied to the main generator before it reaches the said generator. The legs 7, 9 of the main generator pass as herein shown through tubes 50 extended transversely of the pipe 20.

I have herein shown one construction of apparatus embodying this invention, but I do not desire to limit my invention to the particular construction shown.

Claims:

1. In an apparatus of the character described, in combination, a hydrocarbon vapor generator comprising a substantially U-shaped pipe, a nozzle connected with one leg of said pipe, an oil supply pipe connected with the other leg of said pipe, and means to control the supply of oil to said generator, a burner coöperating with each leg of the said generator, a mixing chamber with which said burners are connected, an auxiliary generator communicating with said mixing chamber, an oil supply pipe connected with said auxiliary generator, means to control the supply of oil to said auxiliary generator, an auxiliary burner connected with said mixing chamber and coöperating with said auxiliary generator, substantially as described.

2. In an apparatus of the character described, in combination, a hydrocarbon vapor generator comprising a substantially U-shaped pipe, a nozzle connected with one leg of said pipe, an oil supply pipe connected with the other leg of said pipe, means to control the supply of oil to said generator, a burner coöperating with each leg of the said generator, a mixing chamber with which said burners are connected, an auxiliary generator communicating with said mixing chamber, an oil supply pipe connected with said auxiliary generator, means to control the supply of oil to said auxiliary generator, an auxiliary burner connected with said mixing chamber and coöperating with said auxiliary generator, a casing inclosing said main burners, and a casing in-

closing said auxiliary burner and communicating with the casing for said main burner, substantially as described.

3. In an apparatus of the character described, in combination, a vapor generator, an oil supply connected therewith, means to control said oil supply, a burner for heating said generator, a mixing chamber for air and vapor with which said burner is connected, an auxiliary generator communicating with said mixing chamber to supply vapor thereto, an auxiliary burner connected with said mixing chamber and cooperating with said auxiliary generator, an oil supply for said auxiliary generator, and means to control the supply of oil to said auxiliary generator independently of said main generator, substantially as described.

4. In an apparatus of the character described, in combination, a platform, a casing supported thereon, a main vapor generator having connected upright legs extended through said casing, burners located in said casing and cooperating with said legs, a pipe in said casing with which said burners are connected, a branch pipe located outside of said casing and connected with the pipe within said casing, an auxiliary vapor generator communicating with said

branch pipe, an auxiliary burner connected with said branch pipe and cooperating with said auxiliary generator, a casing for said auxiliary generator and its burner, oil supply pipes connected with said main and auxiliary vapor generators, valves controlling said oil supply pipes, and an air blast pipe supported by said platform and cooperating with said main generator, substantially as described.

5. In an apparatus of the character described, in combination, a main hydrocarbon vapor generator, a burner for heating said main generator, an auxiliary generator for supplying said burner with hydrocarbon vapor, oil supply pipes connected with said main and auxiliary generators and means for controlling the flow of oil through said pipes to said generators independently of each other, substantially as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

ALEXANDER O. BRADFORD.

Witnesses:

JAS. H. CHURCHILL,
J. MURPHY.