

(No Model.)

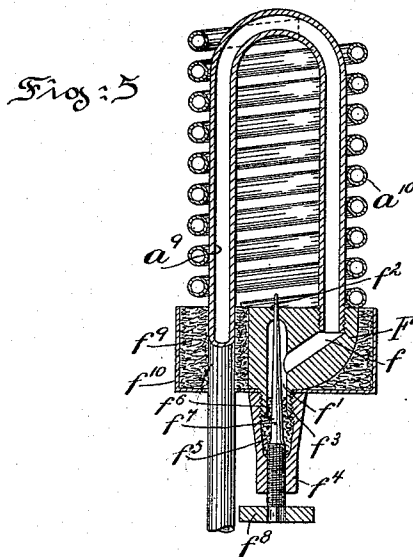
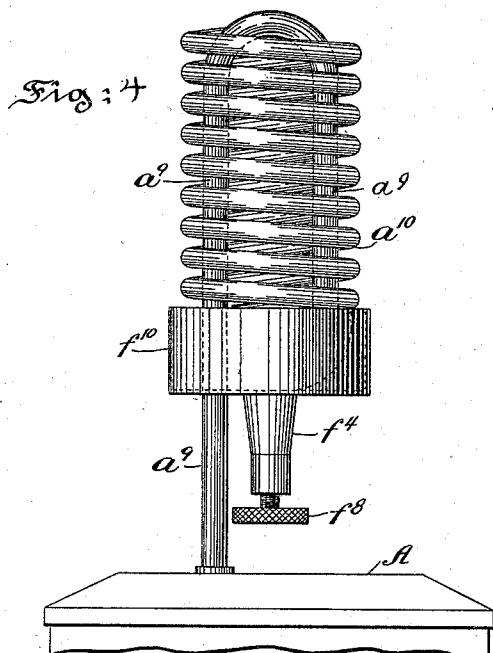
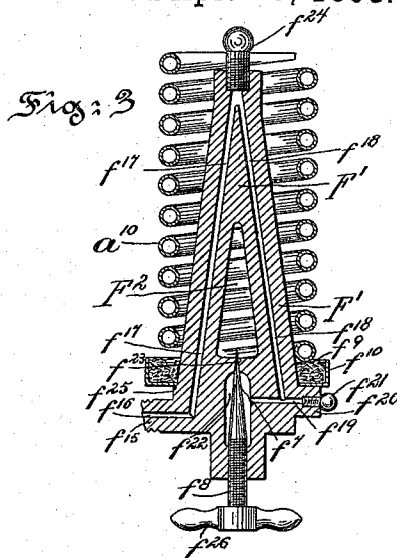
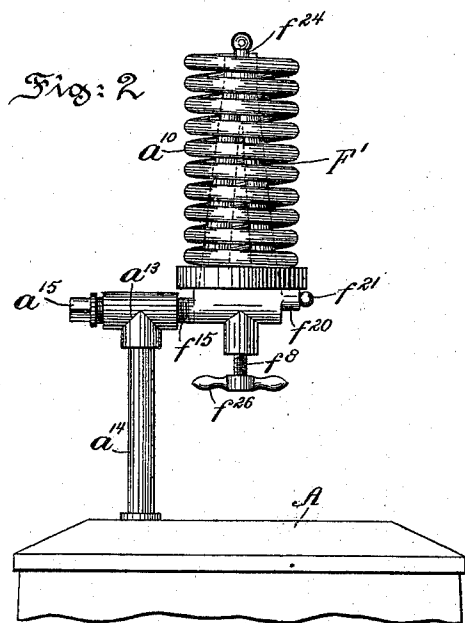
2 Sheets—Sheet 2.

J. P. HAYES.

APPARATUS FOR VAPORIZING HIGH GRADE OR FIRE TEST OILS FOR
HEATING PURPOSES.

No. 537,572.

Patented Apr. 16, 1895.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR VAPORIZING HIGH-GRADE OR FIRE-TEST OILS FOR HEATING PURPOSES.

SPECIFICATION forming part of Letters Patent No. 537,572, dated April 16, 1895.

Application filed March 28, 1894. Serial No. 505,374. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. HAYES, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Vaporizing High-Grade or Fire-Test Oils for Heating Purposes, of which the following is a specification.

My invention relates to a portable apparatus or furnace for effecting the thorough vaporization of high grade or fire test oils for obtaining a fuel gas of high calorific power for heating or analogous purposes.

Hitherto high grade or fire test oils have not with any degree of success been used in such type of furnaces for constituting the gaseous fuel therefor, but on the contrary gasoline or the like has been almost universally used with its attended danger of explosion, unless due care was exercised in the employment of the same, for said purposes.

The principal object of my invention is to provide a portable blast furnace having a burner provided with a retort and a heat-absorbing and air and vapor coiled mixing body contiguous to said retort and to the normal position of the burner flame, the arrangement being such that fire test or high grade oil in transit through the retort is thoroughly vaporized in advance of the combustion thereof, to obtain a gaseous product having superior heat imparting properties and also a gaseous fuel that can be economically and thoroughly generated from the oil with the greatest heat units obtained therefrom, for reducing matter to a molten or liquid state for plumbers' and other somewhat similar purposes.

My invention stated in general terms, consists of apparatus for vaporizing and utilizing a gaseous fuel for heating purposes, constructed and arranged substantially as hereinafter described and claimed.

The nature and general scope of my invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, in which—

Figure 1 is a side elevational view of a plumber's blast furnace, embodying features of my invention for vaporizing high grade or

fire test oil and burning the same as a gaseous fuel for heating and other analogous purposes. Fig. 2 is a similar view of a needle operating valve and its surrounding heat and air and vapor mixing coiled body for effecting in the one instance vaporization of the oil and in the other, complete and continuous vaporization and combustion thereof. Fig. 3 is a vertical central section through the needle controlled valve of Fig. 2, showing the surrounding heating coil thereof and the bed of non-consumable absorbent material located adjacent to said valve. Fig. 4 is a side elevational view of a modified form of valve to that of Fig. 2, but like that shown in Fig. 1; and Fig. 5 is a vertical central section of the valve of Fig. 4, showing the detail construction of the needle operating valve thereof and the location of the bed of non-consumable absorbent material adjacent to the valve.

Referring to the drawings with reference to Fig. 1, A, is a reservoir provided with rods or posts a , a' and a'' , having both ends threaded and adapted to detachably engage complementary threaded openings provided in the top of the reservoir and lugs b , b' and b'' , of an apertured holder B, having preferably integral ears b^3 , with tapering end studs b^5 , engaging complementary looped bearings c , on each side of a bail C, with a handle C' . The end studs b^5 , are arranged so that the bearings c , of the bail C, may be readily caused to engage the contracted portions of these bearings when the bail has assumed a vertical position with respect to the furnace, whereby the bail in such position will support the furnace so that it can be safely carried from place to place in an upright condition. The support B, is provided with integral recessed clamps extending outwardly from a central aperture, not shown, toward the periphery so as to permit of the engagement therewith of the base of an inversely tapering flame concentrator pot D. The base of this pot has inwardly flanged recesses and a series of lugs projecting also inwardly and on each side of the series of recesses of the base, not shown, but illustrated and fully described in my application for a patent, Serial No. 505,375, filed of even date herewith; the construction and arrangement being such that

by a slight rotary movement of the pot D, by hand or otherwise, the same may be brought into engagement with the series of clamps of the holder B, for supporting the pot D, to required position.

The construction of the pot D, is such that the flame rising from the combustion of the vaporized oil through the perforated air and gas mixing chamber E, suitably supported from the holder B, will take the freest line of travel along the inner wall of the pot D, so as to impart its heat to the solder or other matter to be melted.

a^4 , is a threaded opening in the top of the reservoir A, and provided with a screw plug a^5 , having an eye a^6 , adapted for a rod or the like in order to readily release the screw plug a^5 , from its seat in the opening a^4 , to permit of the introduction of the high grade or fire test oil into the reservoir A.

a^7 , is a curved tube screwed into the top of the reservoir A, and provided with a stop-cock a^8 . This tube is provided with a contracted exit or nozzle for the application of a flexible or rubber tube a^{11} , thereto with a bulb a^{12} , or the like, for forcing air into the reservoir so as to lift the oil through the inverted U-shaped pipe or retort a^9 , Figs. 1, 4 and 5, screwed into the top of the reservoir at one end and engaging at the opposite end in a bowl-shaped valve body or casting F, having an inclined or tapering channel f , communicating with a channel f' , with a contracted exit f^2 . The body of this valve coupling device F, is provided with a threaded nipple f^3 , engaged by a bonnet or casing f^4 , with an enlarged internal channel f^5 , for the reception of a suitable indestructible packing f^6 , such as asbestos or the like.

f^7 , is a needle cock extending vertically through the bonnet f^4 , detachably connected with the device F, and through the latter and the contracted aperture f^2 , thereof. This needle cock f^7 , is partially threaded and provided with a knob or handle f^8 , for manipulating the same, seated to the internal threaded surface of the bonnet f^4 .

E, is a perforated air and gas mixing chamber.

f^9 , is a bed of non-consumable material such as asbestos or the like, adapted for the reception of a firing substance, as oil; and which bed is mounted in a cup or casing f^{10} , surrounding the device F, and which is supported to required position against the nipple f^3 , of the device by means of the bonnet or casing f^4 .

It may be here remarked that the construction of the valve is such that by the application of a match or lighted taper to the oil saturated bed f^9 , of non-consumable material mounted in the cup or casing located adjacent to the needle valve f^7 , an intense flame can be readily derived therefrom for creating a vaporization of the oil in its transit through the inverted U-shaped pipe or retort a^9 , and at the same time heating up the surrounding

hollow coiled body a^{10} , which by radiation imparts its heat to the oil in transit through the pipe or retort a^9 , to completely and expeditiously effect a thorough vaporization of the oil through this pipe or retort a^9 , to the device F, continuously and successively during the operation of the furnace, due to the uniform spreading of the flame so as to envelop the exposed surface of the retort or pipe a^9 , and as well the air and vapor mixing coiled body a^{10} , which imparts its heat to the said retort to increase vaporization and combustion and thus to give a gaseous fuel as a resultant product of high calorific power for heating and other somewhat analogous purposes.

The coil a^{10} , consists of separable tubing, as shown, in order to afford a perfect circulation of air in and about the same to expedite and greatly enhance the vaporization of the oil in its transit by radiated heat and a direct flame action, and hence to insure a far more perfect and complete combustion of the vaporizable product in the mixing and combustion chamber, and as practice has demonstrated, to give most beneficial results in the production of a gaseous fuel therefrom for utilization in the furnace.

The operation of the apparatus hereinbefore described, is as follows: The reservoir A, is filled with oil through the opening a^4 , by the removal of the plug a^5 , and when replaced the stop-cock a^8 , of the pipe a^7 , is opened and the rubber tubing a^{11} , provided with its pump or bulb a^{12} , is applied to the nozzle end of said pipe a^7 , and manipulated so as to force air into the interior to lift thereby the oil, (after the needle cock f^7 , has been properly adjusted,) through the retort or pipe a^9 , and channels f and f' , of the bowl-shaped coupling device F, onto the bed of non-consumable absorbent material f^9 . A match may then be applied to this bed, which will at once produce a flame of considerable intensity for starting the furnace so as to vaporize the oil in its transit and by means of the apertures in the air and gas mixing chamber E, the flame for the combustion of the oil gas will be directed toward the surface of the retort or pipe a^9 , and the heat radiating coil a^{10} , to enhance the vaporization of the oil in transit and when the oil saturated bed f^9 , has been consumed by the burning off of the oil, the flame will have produced a sufficient vaporization of the oil in transit through the said retort or pipe a^9 , to ignite the gas issuing at the exposed upper end of the needle cock f^7 , which volume of flame derived therefrom will be concentrated at and about the retort or pipe a^9 , and its air and vapor coiled mixing body a^{10} and along the wall of the pot D, licking as it were, against and over the body of the matter to be melted in a solder pot held on the holder B, thereby quickly and thoroughly reducing the same to a liquid or molten state for use. It may be here remarked that in such type of blast furnace it is essentially requisite that the flame directed there-

from should quickly and thoroughly reduce matter to a molten condition for use, and the conditions are present in the form of furnace illustrated, with a valve and its accessories 5 as hereinbefore described, to effect such a result in the shortest possible time, with the greatest economy in the quantity of gaseous fuel consumed and with the waste of oil in the production of the gaseous fuel for such 10 purpose reduced to a minimum.

The valve of Figs. 2 and 3, differs from that of Figs. 1, 4 and 5 in the following particulars: It comprises a triangular-shaped casting F', with a similar shaped opening F², between 15 the sides thereof. The interior as illustrated in Fig. 3, is provided with an integral nipple f¹⁵, with a narrow channel f¹⁶, which merges into an inclined vertical channel f¹⁷, which at the apex of the casting merges into a complementary inclined channel f¹⁸, and at the base 20 into a longitudinal channel f¹⁹, provided at the flanged end f²⁰, thereof with a plug f²¹, removable in order to permit of the ready cleaning of the channel f¹⁹, whenever the same becomes clogged with extraneous matter 25 carried with the oil in its transit through the said valve casting F'. The narrow channel f¹⁹, merges into an enlarged tubular gas storage chamber f²², with a contracted opening f²³, in the top through which a needle cock f⁷, with a threaded stem f⁸, engages the wall of the casting F', and at the free end is 30 provided with a handle f²⁶, for manipulating said valve cock to thereby control the flow of the gaseous fuel through the casting F'. The apex of the casting F', is provided with a screw plug f²⁴, which is preferably screwed and ground to place therein and is adapted to permit by removal of the same of the cleaning 40 out of the internal tapering meeting channels f¹⁷ and f¹⁸, of the casting F'. f²⁵, is an annular rim formed integral with said casting F', and supporting a casing f¹⁰, for containing a bed of non-consumable oil absorbent material constituting a firing bed for the furnace in the starting of the same in order to 45 vaporize the oil in its passage through the internal channels or retort of the appliance and also to heat up the surrounding coiled air and vapor mixing body a¹⁰, supported to position in contact with the casting F', on the surface of the bed f⁹. The nipple f¹⁵, of the casting is connected with a T-union a¹³, engaging a fluid supply pipe a¹⁴, screwed into the reservoir A. The T-union a¹³, is provided 55 with a removable grooved plug a¹⁵, for presenting a retarding influence, as it were, to the flow of the oil under pressure from the reservoir A, in the manner, for example, as clearly illustrated in Fig. 1, to the vaporizing or gasifying device F', and prior to the combustion of the same for producing a gaseous fuel of high calorific power for heating purposes.

65 The operation of the valve with its accessories of Figs. 2 and 3, is substantially the same in all essential respects as the valve of

Figs. 1, 4 and 5. It may, however, be here remarked that the construction and arrangement of the valve is such as that complete 70 vaporization is insured, high calorific power from the gaseous product is obtained and waste is reduced to a minimum. Moreover, the hollow or solid heating coil surrounding the valve F', is such as to concentrate the heat 75 and flame so that most beneficial results in the successive, as well as continuous vaporization by direct flame action and heat radiation are insured by the jet flame and flame arising from the non-consumable oil absorbent material 80 bed and the combustion of the gaseous vapor thus produced is most complete due to the particular disposition of the device F', and its accessories, within the chamber of the perforated cylinder E, as will be seen and understood by reference especially to Fig. 1, of the 85 drawings.

It will be manifestly obvious to those skilled in the art to which my invention appertains that as to details of the apparatus shown and described for producing a gaseous fuel from 90 high test oil for heating purposes, modifications may be made without departing from the spirit of my invention; and hence I do not wish to be understood as limiting myself to the precise construction and arrangement 95 of the parts of said appliance as hereinbefore explained; and

Having thus described the nature and objects of my invention, what I claim as new, 100 and desire to secure by Letters Patent, is—

1. An apparatus for making gaseous fuel from high grade or fire test oils, comprising a reservoir provided with a burner having an 105 interposed retort and a heat absorbing and air and vapor mixing coiled body contiguous to said retort and to the normal position of the burner flame, substantially as and for the purposes described.

2. In an apparatus for making gaseous fuel 110 from oils, the combination with a burner provided with a retort, of a heat absorbing and air and vapor mixing coiled body contiguous to said retort and to the normal position of the burner flame, and a needle-cock, substantially 115 as and for the purposes described.

3. An apparatus for making gaseous fuel from oils, comprising a reservoir having a fluid supply pipe leading therefrom, a retort 120 connected with said pipe and with a casting having internal channels, a needle cock provided with an operating handle and a hollow detachable air and vapor mixing coiled body arranged contiguous to said retort and to the normal position of the burner flame, substantially 125 as and for the purposes described.

In witness whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOHN P. HAYES.

Witnesses:

THOMAS M. SMITH,
RICHARD C. MAXWELL.