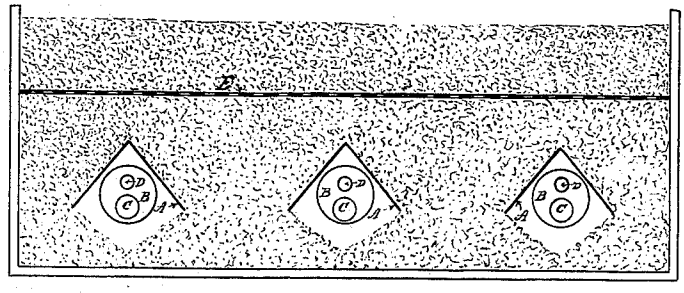
No. 734,710. PATENTED JULY 28, 1903.

C. HORNBOSTEL.

PROCESS OF TREATING MINERAL LIQUID HYDROCARBONS.

APPLICATION FILED MAR. 26, 1902.

NO MODEL.



Witnesses
Aspd. Thomas,
Walter Schenck.

Charles Hornbostel
Inventor

THE NORRIS PETERS CO. PHOTO-LITHO., WASHINGTON, D. C.

No. 734,710. Patented July 28, 1903.

UNITED STATES PATENT OFFICE.

CHARLES HORNBOSTEL, OF NEW YORK, N. Y.

PROCESS OF TREATING MINERAL LIQUID HYDROCARBONS.

SPECIFICATION forming part of Letters Patent No. 734,710, dated July 28, 1903.

Application filed March 26, 1902. Serial No. 100,126. (No specimens.)

To all whom it may concern:

Be it known that I, CHARLES HORNBOSTEL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Process of Treating Mineral Liquid Hydrocarbons, of which the following is a specification.

The object of my invention is to provide a simple and safe method of producing vapors from mineral oils, to purify said vapors, and to mix said vapors with gases and with air for the purpose of effecting the mixing of gas with air in correct proportions previous to ignition, and thereby accomplish a complete and economical combustion of mineral liquid hydrocarbons. Heretofore in burning mineral oils these have been atomized by air or steam pressure and the mixing of air with mineral oil has taken place in the combustion-chamber. I may practice my invention by suspending a tray in the upper part of an iron tank, which latter may serve as a still or retort in which mineral oils may be vaporized. Said tray is so arranged in said still and provided with perforations in its bottom that on filling said tray with porous materials, which act as hereinafter described, vapors, gases, and air arising from below before leaving said iron tank or still have to pass through said perforations and through the materials in said tray. I connect said tank or still near its bottom with a storage vessel containing a supply of mineral oils in a manner which enables me to admit from said vessel into said tank or still any desired quantity of oil at a time by the arrangement of valves in said connection. For said porous material, on the peculiar construction and general nature of which my invention is based, I use agents which heretofore have not been employed in vaporizing and purifying mineral liquid hydrocarbons and in mixing gases and air with vaporized mineral liquid hydrocarbons. Said agents consist in an earth which is known generally as "infusorial" earth and in geology also as "kiesel guhr" and in an earth known as "fullers'" earth. This latter earth has been used extensively for sundry purposes in the arts, while said infusorial earth is comparatively a late discovery and has found but limited application in the arts. Both kinds of earths are composed of infinitesimally-small dust-like particles, each of which contains cavities of great absorbing power, which enables these earths to hold a mass of mineral liquid hydrocarbons in absolute suspension in their pores. These pores constitute in said earths a system of capillary attraction of great perfection. I have found that in passing vaporized mineral liquid hydrocarbons through layers of said earths the less volatile and solid components of said mineral liquid hydrocarbons are absorbed by and retained in said layers of earth, while the gasifiable components pass through said layers in a purified and rarefied state, and that by passing gases and air, together with said vaporized mineral liquid hydrocarbons, through said layers of earth these elements become most thoroughly intermingled. I have further found that by forcing a current of air through layers of said earths saturated with mineral hydrocarbons in a pure and rarefied state these latter become evaporated and mixed with air. For vaporizing mineral liquid hydrocarbons and for facilitating the passage of said oils through said layers of earth I may arrange over the bottom of said still a series of steam-pipes connected with a steam-generator. I may superheat said steam from said generator before it enters said pipes for gasifying crude mineral oils, which may require an elevated temperature for separating the gasifiable components from the more refractory solid components. I may employ any other convenient source of heat for effecting the evaporation of mineral oils. The oil on being admitted into said still and on coming in contact with the heated surfaces of said steam-pipes becomes vaporized instantaneously, which causes an expansion of the gases and consequent pressure in the space between the bottom of said tray and the bottom of said tank or still. This pressure serves to force the vaporized oils through the porous layers of earth in said tray and to the surface outward. I may conduct the produced vapors from said surface to any desired locality or confine these in a holder, from where the said vapors may be applied. I may introduce atmospheric air and gases—for example, water-gas—into said tank or still and into the space above its bottom underneath said tray for

mixing said air and gases with the vaporized oil on their joint passage through said layers of earth. I utilize the action of heat for transforming mineral liquid hydrocarbons into a convenient condition for bringing the effect of said earth better to bear on said mineral liquid hydrocarbons. Said action of heat is a step in my invention without forming part thereof, except auxiliarly. I make use of the action of heat on mineral liquid hydrocarbons for creating in the space between the bottom and the said tray in said still a pressure by the expansion of gases, which forces said gases through said layers of earth, as hereinbefore described. It is immaterial in which manner said porous materials are arranged as long as said materials are so connected with and placed in an inclosed vessel or still that any vapors or gases generated inside of said vessel or still and any gases and air forced thereinto have to find an outlet from said vessel or still by penetrating said porous materials. I may effect the passage of said vapors, air, and gases through said layers of earth by other convenient means than the one of placing said earths on the perforated bottoms of trays, as hereinbefore described—for example, by distributing said earths into surfaces which are so exposed that vapors, air, and gases may pass through, as this is described in United States Patent No. 256,569, granted me April 18, 1882.

Referring to the annexed drawing, the figure is a vertical section of an apparatus by which my invention may be practiced.

In said drawing the reference-numeral 1 denotes the tank or vessel holding the porous earths, having suspended longitudinally over its bottom a series of triangular frames A, their apices extending upwardly. On filling said tank from above with the said porous earths these latter spread over the bottom of said tank and on filling up the space above leave open spaces between the lower edges of frames A. The portion of the earth lying underneath the roofs of these frames A is here subject to be permeated by said vapors, gases, and air. Said spaces are connected with tube B, leading outside, for admitting air, with tube C for receiving steam in steam-pipes distributed longitudinally over and near to the bottom of said tank 1, and with tube D for receiving mineral liquid hydrocarbons in perforated pipes distributed longitudinally over said tubes C. Letter E denotes a perforated tray on which the porous earths may be distributed for becoming permeated with said vapors, air, and gases arising from below and passing through said earths to the surface. After having exhausted the absorbing power of said earths the absorbed impurities, which are of a readily combustible nature, may be burned out and the said earths restored to activity and be used over again. Components of crude oils, which on their passage through said earths have been absorbed and retained therein, may be removed by well-known processes practiced in the arts and said earths restored to activity. The thickness of said layers of earths depends on the nature of the mineral liquid hydrocarbons to be passed through in vapor form. For facilitating said passage I may use more than one layer of said earth and reduce their thickness correspondingly. For the same purpose I may intermingle said layers of earths with pieces of porous substances of larger and of less regular size than the minute particles composing said earths. These substances form intervening spaces in said layers, which render these more permeable.

I do not claim, broadly, the evaporation of mineral liquid hydrocarbons nor the mixing of gases and air with vaporized mineral liquid hydrocarbons, as I am aware that this has been practiced in the arts.

My invention is distinguished from other devices of burning mineral oils in that it aims at effecting a thorough mixture of mineral oils with air for effectually and economically burning mineral oil and that for this purpose it converts the mineral oil into a highly purified and rarefied gaseous state in which the oil will enter into a true combination with air, and, furthermore, that for accomplishing its aim it selects auxiliary agencies which have not been employed in gasifying mineral oils and in mixing gases and air.

I am aware that porous earthy substances may be saturated with mineral oil and that this has been practiced, without, however, producing a controllable combustion on igniting the oil on the surface of the absorbents for want of air reaching the burning oil at the proper stage and under conditions which would make this combustion controllable and perfect.

What I do claim as my invention, and desire to secure by Letters Patent, is—

In the combustion of mineral liquid hydrocarbons the process for converting mineral liquid hydrocarbons into a gasified and purified state and for mixing said purified and gasified mineral liquid hydrocarbons with air, consisting in saturating with mineral liquid hydrocarbons and with vaporized mineral liquid hydrocarbons a mass of earthy substances known as fullers' earth and an earth known as infusorial earth and in geology as kiesel guhr, and in arranging a mass of said earths as a seal in a compartment and in forcing air into said compartment and out again through said saturated earthy substances sealing said compartment, substantially as described.

CHARLES HORNBOSTEL.

Witnesses:
F. D. CIPRICO,
W. J. DE MOTT.