

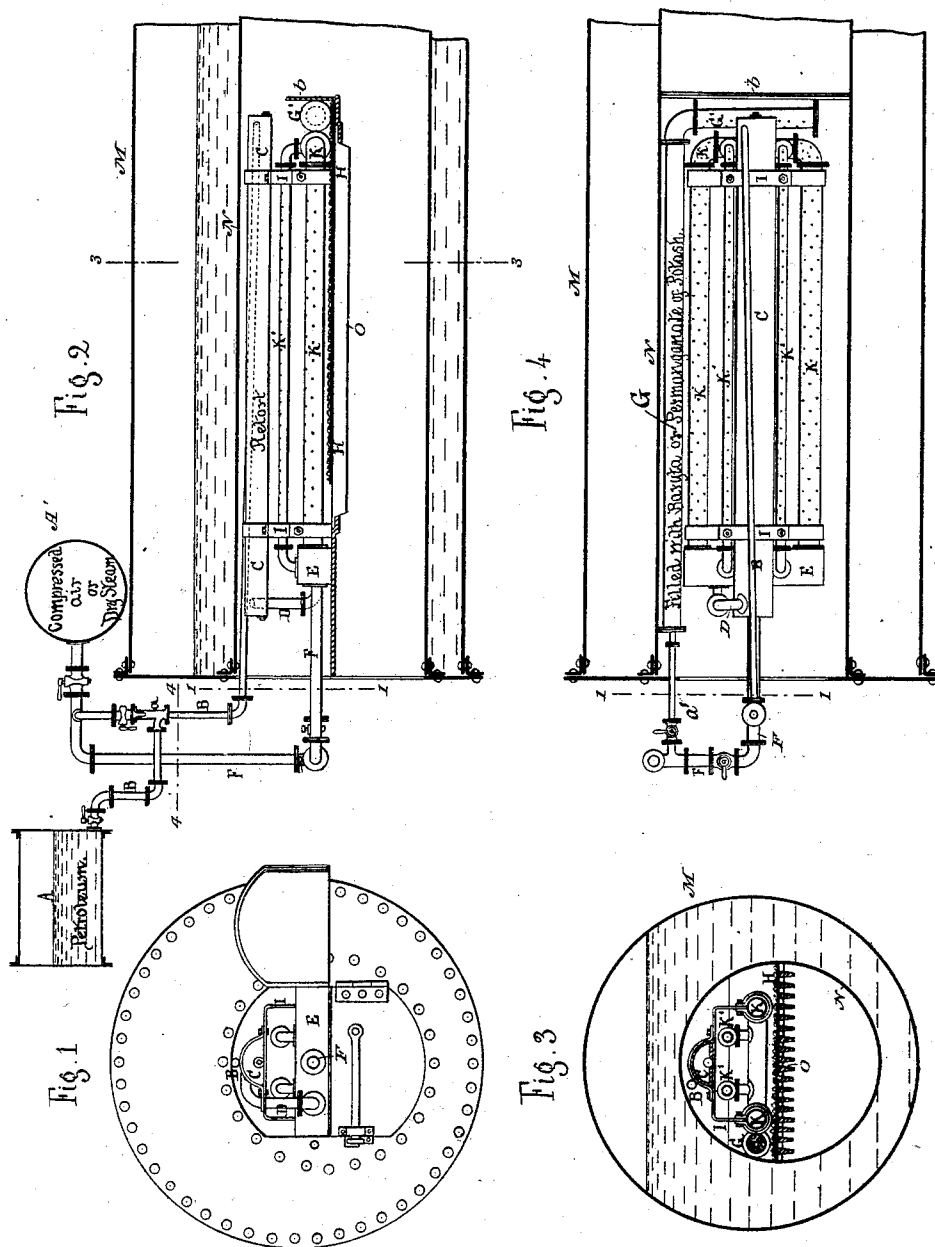
(No Model.)

H. DE BAY & C. DE ROSSETTI.

APPARATUS FOR BURNING VOLATILIZABLE HYDROCARBONS.

No. 317,444.

Patented May 5, 1885.



WITNESSES:-

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APPARATUS FOR BURNING VOLATILIZABLE HYDROCARBONS.

SPECIFICATION forming part of Letters Patent No. 317,444, dated May 5, 1885.

Application filed October 22, 1884. (No model.)

To all whom it may concern:

Be it known that we, HECTOR DE BAY and CHARLES DE ROSSETTI, the former a subject of the King of Belgium, and the latter a subject of the King of Italy, and both residents of Cairo, Egypt, have invented certain Improvements in Apparatus for Burning Volatilizable Hydrocarbons, of which the following is a specification.

Our invention relates to apparatus for burning such hydrocarbons, either solid or liquid, as are capable of being volatilized by heat, the object being to generate heat by the combustion of the vaporized hydrocarbon for use in generating steam and for heating purposes in general.

We contemplate using, in the main, liquid hydrocarbons, such as petroleum and its products, tars, and animal and vegetable oils; but our invention is not confined to these.

Our invention is characterized by the employment of a retort, in which the hydrocarbon is volatilized, which is arranged over perforated pipes, from which the vapors and gases escape in jets and are burned; in the employment of compressed air or a forced blast of air to inject or feed the hydrocarbon to the retort, and to supply the jet-pipes and retorts with the oxygen necessary for combustion, and in the employment in connection with the apparatus of a tube or chamber containing baryta, permanganate of potash, or other substance of a similar nature, capable of yielding up its oxygen to a current of hot air. A current of air heated, in its passage is forced through the tube and escapes through perforations in a tube arranged back of the apparatus, or on the side next to the smoke-flue.

Our apparatus is especially well adapted for use in connection with furnaces constructed for burning wood or coal, in which case it may be simply set on the grate of the furnace. In the annexed drawings we have shown our apparatus arranged within the furnace of a steam-boiler, the latter comprising a cylindrical shell, and an internal furnace-tube or cylinder provided with a grate and doors in a well-known way. This application of our furnace will be sufficient to illustrate its general application to all kinds of furnaces. We are aware that it has been proposed to arrange a volatilizing-retort over a perforated burner-

tube in order to volatilize and burn hydrocarbons, and that it has been proposed in such apparatuses to use superheated steam to supply hydrogen to the hydrocarbon as well as to inject the liquid hydrocarbon into the retort; and we are also aware that such apparatuses have been constructed of tubular form and been placed on the grates of ordinary boiler-furnaces. These features we do not claim.

In the drawings, Figure 1 is an end view or front elevation of the steam-boiler, showing one of the furnace-doors thrown open and the burner of our apparatus set on the furnace-grate inside. This view shows the burner in end elevation, but with those portions of the apparatus—namely, the hydrocarbon reservoir and the air-reservoir and pipes—exterior to the boiler-furnace broken away on line 1 1 in Figs. 2 and 4. Fig. 2 is a vertical longitudinal mid-section as to the boiler and a side elevation as to our apparatus. The hydrocarbon-reservoir, however, is shown in section. Fig 3 is a transverse vertical section on line 3 3 in Fig. 2. Fig 4 is a horizontal longitudinal mid-section as to the boiler and a plan as to the burner of our apparatus. In this view the exterior portions of the apparatus are removed, the section being on line 4 4 in Fig. 2.

Let M represent the exterior shell of the boiler, and N the inner cylinder, in which is arranged the ordinary furnace-grate O. On this grate is laid a plate or sheet, H, of iron, for example, to prevent the passage upward of cold air between the bars of the grate, and on this plate is or may be spread a layer or bed of sulphate of lime, sulphate of baryta, or other substance of a kindred nature to prevent the radiation of heat. On this bed is set the burner portion of our apparatus, which we will describe in connection with the exterior reservoirs for supplying the hydrocarbon and air. In this case we have supposed the hydrocarbon used to be a liquid, as petroleum, and the air to be compressed in a reservoir.

A is a reservoir of any kind for the petroleum. This reservoir may be arranged in any convenient place, but usually above the level of that portion of the apparatus in the furnace, so that the oil may flow to the latter by gravity through feed-pipe B.

A' is the compressed-air reservoir, the main

supply-pipe F of which leads to the apparatus in the furnace, while a branch, *a*, taps the feed-pipe B at an angle or bend therein, as seen in Fig. 2, in such a manner as to form an injector for forcing the oil to the retort of the apparatus in the furnace. The branch pipe *a* is in section in Fig. 2, the better to show the injector-nozzle.

C is the retort for vaporizing the hydrocarbon. The feed-pipe B extends to the rear end of this retort through the furnace and taps the retort at its rear end. The object of this is to enable the heat to act on the pipe B. The vaporized hydrocarbon escapes from the retort C at its front end by pipe D, whence it flows into a collecting-chamber, E. A U-shaped perforated pipe, K, has its two ends opening into the chamber E, and two smaller perforated pipes, K', are connected at their one end to the chamber E, and at their other end to the bottom of the U formed by the bent pipe K. The jets of volatilized hydrocarbon escaping from the numerous perforations in pipes K K' are ignited, and oxygen for combustion is supplied by compressed air, which enters the chamber E through pipe F from reservoir A'. The retort C is arranged over pipes K K', and it and said pipes are secured together by metal bands I I, or other equivalent means. The placing of the retort C over the pipes K K' is an important feature of our invention. The fierce heat from the burning jets issuing from the perforated tubes serves to rapidly and completely volatilize the hydrocarbon in the retort, as will be well understood. After the apparatus is once set going any of the heavier hydrocarbons may be used in the retort; but at starting it may be well to employ the lighter and more easily volatilized hydrocarbons—such as gasoline, for example.

G is a retort, pipe, or tube, which is arranged in the furnace alongside of the apparatus just described, and connected with the air-pipe F at its front end by a pipe, *a'*, as seen in Fig. 4. At the back of the apparatus and lying crosswise of the furnace is a perforated pipe, G', connected with the back or inner end of pipe G. The pipe G is loosely filled or partly filled, with baryta or permanganate of potash, or other substance of a similar character. Oxygen is disengaged by heat from the substance in G, and escapes through the perforations in G', which are preferably directed rather toward the front of the furnace than toward the smoke-outlet. Thus a supply of oxygen is provided which mixes with such unconsumed gases and hydrocarbon vapors as may have escaped burning, and insures more perfect combustion.

There may be one or more pipes G, and the perforated cross pipe or pipes G' may be ar-

ranged as shown in Figs. 2 and 4, or back nearer the smoke-outlet.

Any desired number and arrangement of the pipes K K' may be adopted. We do not limit ourselves in this respect.

When the hydrocarbon employed is solid at ordinary temperatures, as pitch, for example, the reservoir A may be heated to reduce it to a liquid form.

The use of sulphate of lime as a bed for the apparatus is not essential, as the apparatus might be set on the plates covering the grate H or on a bed of fire-bricks, for example.

We have shown a bridge-wall or deflector, *b*, back of the cross-pipe G'. This is designed to serve the usual purposes of a bridge-wall; but it is not an essential feature of our invention. Suitable cocks are provided to regulate the admission of air and hydrocarbon.

Having thus described our invention, we claim—

1. The combination of the elongated retort C, the perforated pipes K K', the collecting-chamber E, connected with said perforated pipes, the pipe D, connecting C and E, the pipe B, arranged to supply liquid hydrocarbon to the retort, the pipe F, arranged to supply forced or compressed air to the perforated burner pipes, and the branch air-pipe which connects the pipes B and F, whereby a portion of the air-blast is utilized for injecting the hydrocarbon, substantially as set forth.

2. The combination, with the air and hydrocarbon reservoirs, of the elongated retort C, the supply-pipe B, extending the length of said retort and connected with it at its inner end, the pipe D, which connects the outer end of the retort with the chamber E, the said chamber, the perforated pipes K and K', arranged under the retort and connected with said chamber E, and the air-pipe F, which connects the chamber E with the air-reservoir, whereby the blast of air is supplied directly to the perforated burner or jet tube, substantially as set forth.

3. The combination, with an apparatus for burning hydrocarbons, constructed substantially as described, of the tube or chamber G, containing permanganate of potash or its substantial equivalent, the perforated cross-pipe G', and means for forcing a blast of air through said pipes, substantially as and for the purposes set forth.

In witnesses whereof we have hereunto signed our names in the presence of two subscribing witnesses.

HECTOR DE BAY.

CHARLES DE ROSSETTI.

Witnesses:

EDWARD P. MACLEAN,
AMAND RITTER.