

H. Taylor,

2 Sheets, Sheet 1.

Hydro-Carbon Furnace.

No. 102,619.

Patented May 3, 1870.

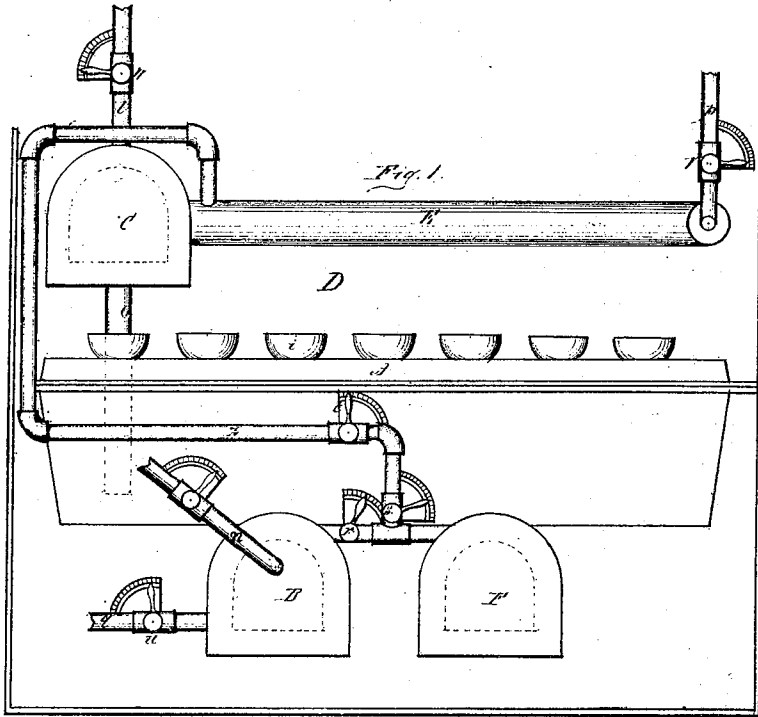


Fig. 1.

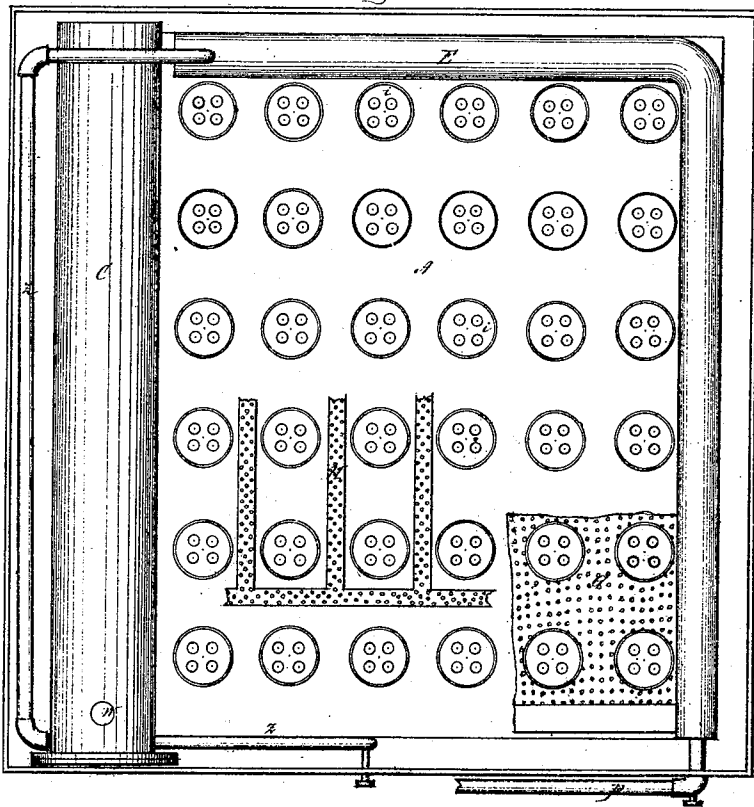


Fig. 3.

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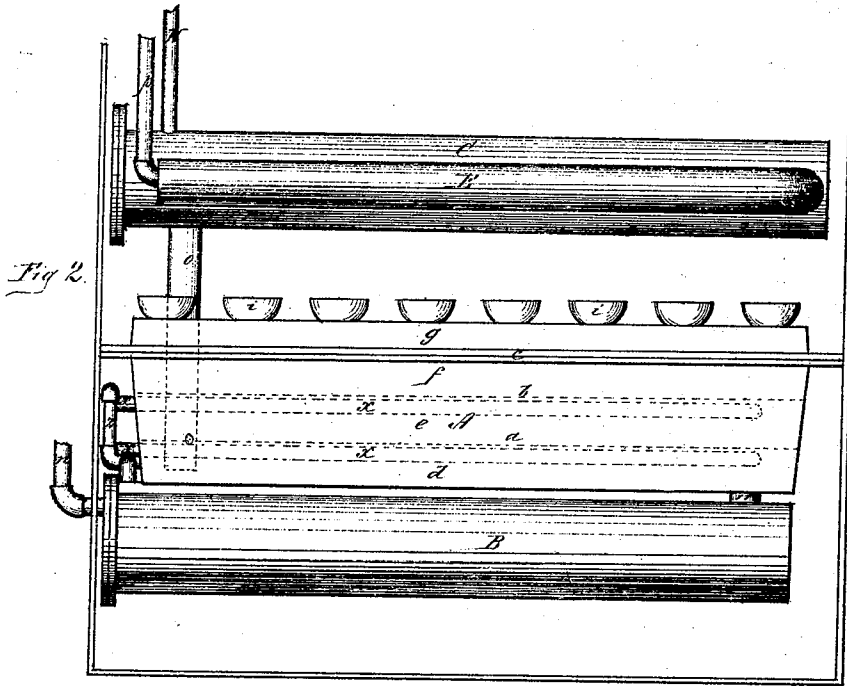


Fig. 2.

Fig. 4.

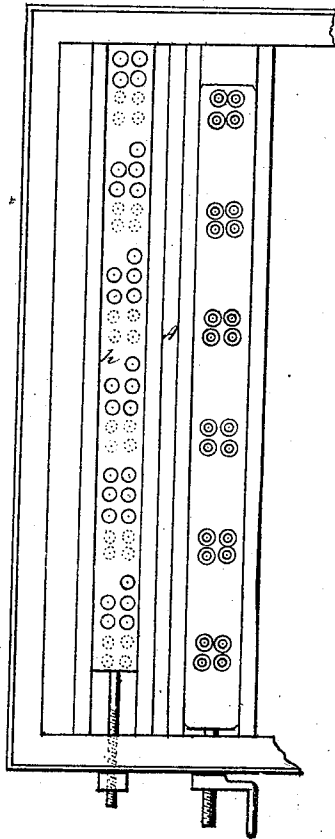


Fig. 5.

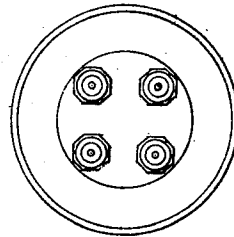
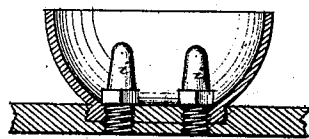


Fig. 7.



Fig. 6.



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United States Patent Office.

HOMER TAYLOR, OF MONTREAL, CANADA.

Letters Patent No. 102,619, dated May 3, 1870.

IMPROVEMENT IN APPARATUS FOR THE COMBUSTION OF PETROLEUM AND OTHER HYDROCARBON LIQUIDS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, HOMER TAYLOR, of the city of Dumfries, in that part of Great Britain called Scotland, at present a resident of Montreal, Canada, have invented a new and useful Apparatus for the Generation and Combustion of the Gases contained in Petroleum and other Hydrocarbon Substances, and utilizing them in furnaces for steam-boilers or for other analogous purposes. The following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a transverse elevation, with the front of the inclosing wall removed;

Figure 2, a longitudinal elevation, with the side of the inclosure removed;

Figure 3, a plan view of figs. 1 and 2;

Figure 4, a portion of the series of burners, to illustrate the means of regulating and controlling the flame therefrom;

Figure 5, a plan view of a group of burners, with their reverberators;

Figure 6, a vertical section of fig. 5; and

Figure 7, a vertical section of a single burner.

The letters of reference indicate the same parts in the different figures.

A is the gasometer, receiver, or mixing-chamber, which may be used also as a gas-generator, as hereinafter described. It may be of cast metal, boiler-plate, or other material, provided with a man-hole, and of a size to suit the furnace-space where it is to be used.

The gasometer A is divided into several compartments by horizontal partitions *a*, *b*, and *c*. In the present instance there are four compartments, *d e f g*. The lower partition *a* prevents any communication with the compartment above, except at its edges, where narrow slots are cut out, leaving only sufficient metal to serve the purpose of attaching it to the sides of the gasometer and holding it in position. The next partition *b* is united to the gasometer on all sides, and has an aperture of suitable size at or near its center. The next above, *c*, is imperforated in the center for a space of three or four times the area of the aperture in *b*, the remainder of its superficies being perforated with small holes, this arrangement causing the gases to be thoroughly mixed in their progress upward. Immediately beneath the partitions *a* and *b* coils of perforated pipe *x* are placed, which convey the mixed steam and gas from *c*, by means of the pipe O, and distribute it through their apertures, thereby thoroughly mixing it with the contents of A.

In the top of the gasometer A burners *i* are fixed, communicating directly with the interior of the same, without the agency of pipes of any kind, which, if used, would be liable to obstruction by carbonization.

These burners are, in the present instance, arranged in groups of four, each group surrounded by an annular reverberator, made of suitable metal, for the purpose of concentrating the heat about the burners to facilitate the combustion of the gas issuing therefrom.

Inside of the gasometer A, in contact with its top, and so placed as to coincide with the respective rows of burners, are the slides *n*. They move in guide-ways, and have holes corresponding with nicety to the apertures of the burners, each group of holes having an extra equidistant hole in a line with the others in the direction of the movement of the slide. The function of the slides is to regulate and control the amount of heat in the furnace. Of course, when all the apertures coincide, the greatest amount of gas will be consumed, and the maximum of heat evolved. When the slide is moved a proper distance two burners in each group are cut off, reducing the heat one-half; when moved so that only the extra hole coincides in each group with one of the burners, three-fourths are cut off; and when the extra hole and two others coincide, only one-fourth of the supply is cut off.

B is a gas-generator, which may be made of plate iron or cast metal, provided with a flange at one end, to which a removable head is bolted. A perforated pipe or coil of pipes, *k*, is placed inside for the purpose of conveying and distributing the oil or other fluid to be vaporized, which enters through the feed-pipe *n* (provided with a graduated stop-cock) from a suitable reservoir.

The pipe *m* conveys the gas to the gasometer A.

q is an outlet-pipe, through which any excess of oil which has entered the generator may be withdrawn.

A similar gas-generator, C, is placed in the fire-chamber D, the oil, &c., being supplied to it through the feed-pipe *l*. It communicates with the gasometer A by means of the pipe O, which extends nearly to the bottom of the gasometer.

E is a superheater, which consists of a tubular vessel extending from the front of the apparatus by one side and the back to the opposite angle, where it enters the gas-generator. From the forward end of A a pipe, O, extends down to the gasometer A, for the purpose of supplying superheated steam and gas thereto. The superheater is supplied with steam through the pipe *p* from the boiler, (not shown,) or from any other convenient source. A pipe, Z, leads from the superheater E to the coils of perforated tubes *x* in the gasometer A.

As a supply of oxygen by steam or air or both is necessary at the commencement of the process, a steam-generator, F, is provided for temporary use. It is formed like the gas-generator B, or in any other convenient form.

All the stop-cocks used are supplied with graduated

arcs or quadrants, which, in connection with the handles acting as indexes, indicate the extent of the supply through the respective pipes.

For the double purpose of giving an additional supply of oxygen to the flame, and promoting a current or draught without admitting cold air, I use a thin perforated cover of iron or cast metal, G, (a portion of which is shown in fig. 3,) over the whole surface of the top of the gasometer A, through which the reverberators protrude, leaving a space of an inch, more or less, for the admission of steam, heated air, or both mixed.

G is provided with a flange by which it is secured to A. The steam and air are supplied through pipes, which may be in the form of a coil, placed under or beside the gasometer, where they will become heated. Air may be forced into this coil by suitable means, and steam can be obtained from any convenient source.

Instead of the perforated cover G, a series of perforated pipes, as shown at H, can be used as a substitute therefor.

As heat is necessary at the commencement of the process, a temporary fire, of wood or coal, or other fuel, is made under the gas-generator B and steam-generator F, which heats the former to the vaporizing point, and raises a temporary supply of steam in the latter, and also heats the gasometer A sufficiently to prevent decomposition of the gases when admitted thereto. As soon as the steam is up in the generator F, and the gas-generator B sufficiently heated by opening the stop-cock *r*, steam is admitted from the steam to the gas-generator, and, by opening the cock *s*, it will enter the gasometer A, the cocks *r* and *t* being closed. Then, by opening the cock *u*, oil is admitted to B, and, passing through the perforations in the interior pipe, is instantly vaporized on the heated bottom, and the gas and steam together ascend into the gasometer through the pipe *m*, fig. 2. The gas, as it issues from the burners, may then be lighted, the preliminary process described being continued until steam can be had from the main boiler above, (not shown;) then, by opening the cock *v*, fig. 1, it will be admitted into the superheater E, and from thence to the gas-generator C; then, by opening the oil-cock *w*, the vaporization will commence in the upper generator C. The gases will then be conveyed by the pipe O to the lower compartment *d* of the gasometer, and the further mixing thereof will proceed as already described, and the permanent work of the furnace be in full operation.

Having thus fully described my invention, What I claim, and desire to secure by Letters Patent, is—

1. The within-described process, by means of which petroleum and other hydrocarbon substances are va-

porized by being passed through a perforated pipe *k*, whence they fall upon the heated surface of the gas-generator B, and pass thence into the gasometer or mixer A, substantially as shown and described.

2. The within-described process, by means of which steam is obtained in the steam-generator F, and, in conjunction with the gaseous products of petroleum or other hydrocarbon substances, passes into the gasometer or mixer A, substantially as shown and described.

3. The within-described process, by means of which steam and the gaseous products of petroleum are thoroughly intermixed by means of the partitions *a*, *b*, and *c*, and utilized by means of the burners *i*, substantially as shown and described.

4. The within-described process, by means of which superheated steam is obtained and supplied to the gas-generator C, where it comes in contact with the gaseous products of petroleum or other hydrocarbon substances, and such superheated steam and products in conjunction is supplied by means of the pipe O and perforated pipes *x*, to the gasometer or mixer A, wherein it is thoroughly intermixed by means of the partitions *a*, *b*, and *c*, and then utilized by means of the burners *i*, substantially as shown and described.

5. The auxiliary gas and steam-generators, in combination with the gasometer A, in the manner and for the purpose described.

6. The combination of the groups of burners with their respective reverberators, for the purpose set forth.

7. The combination of the perforated cover G, or its equivalent, with the gasometer A, for the purpose set forth.

8. The arrangement of the perforated partitions *a*, *b*, and *c*, in relation to each other, to the perforated pipes *x*, and to the gasometer A, as described, for the purpose set forth.

9. The combination of the burners *i* with their reverberator and with the perforated cover G, as shown and described.

10. The auxiliary gas-generator C, in combination with the gas-generator B and gasometer A, substantially as shown and described.

11. The perforated slide *h*, for regulating the supply of gas, arranged and operated substantially as shown and described.

In testimony that I claim the foregoing improvement in furnaces for the combustion of petroleum and other hydrocarbon substances, as above described, I have hereunto set my hand and seal this 5th day of January, 1870.

HOMER TAYLOR. [L. S.]

Witnesses:

THOMAS R. JOHNSON,
JOHN EMPSON.