No. 735,683.

PATENTED AUG. 4, 1903.

E. THOMSON.

VAPOR BURNER.

APPLICATION FILED JULY 31, 1901.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

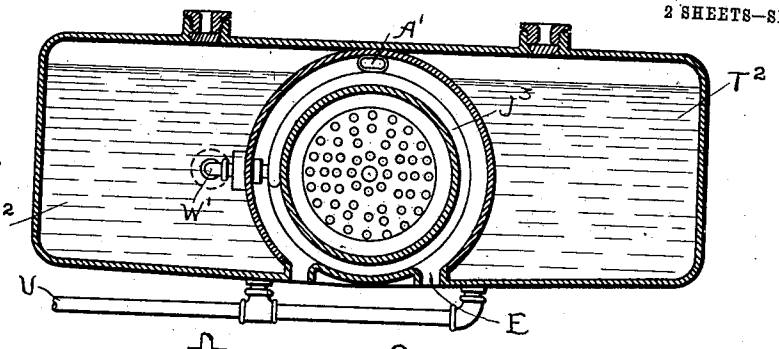


Fig. 2.

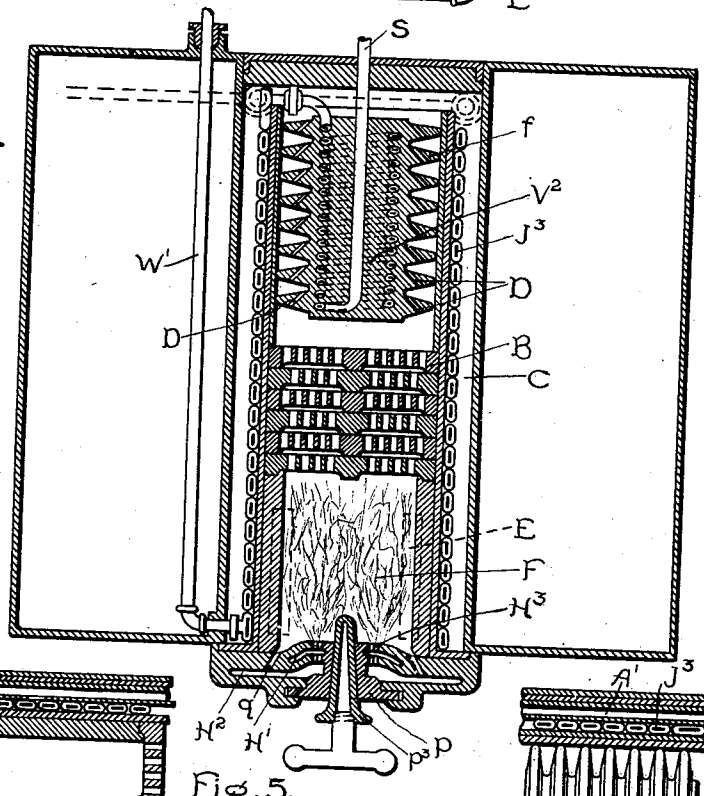


Fig. 3.

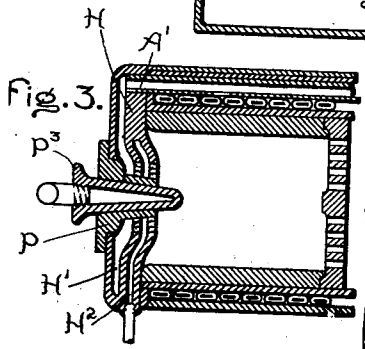


Fig. 5.

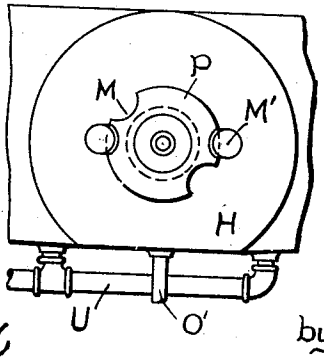
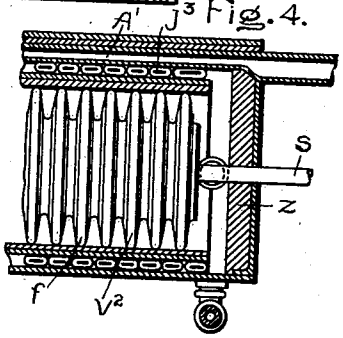


Fig. 4.



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Alex F. Macdonald.

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Att'y

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

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2 SHEETS—SHEET 2.

Fig. 6.

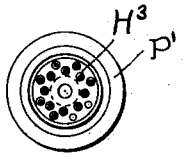


Fig. 9.

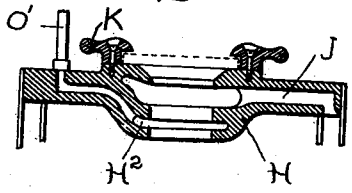


Fig. 7.

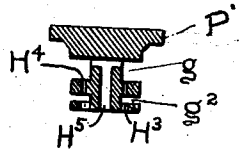


Fig. 10

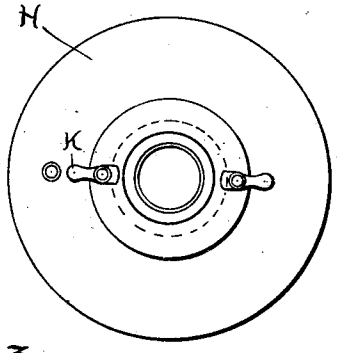


Fig. 8.

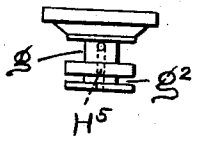


Fig. 13.

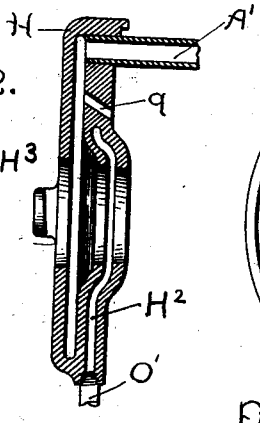


Fig. 14.

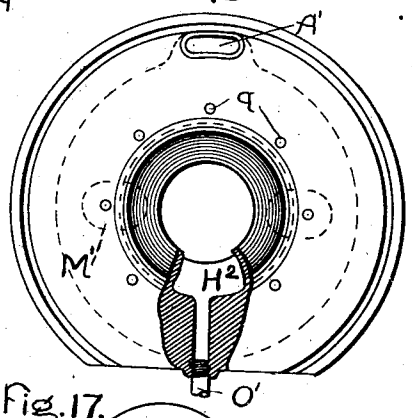


Fig. 11

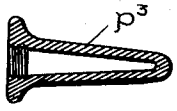


Fig. 12.

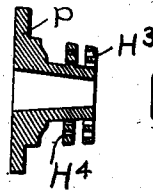


Fig. 15

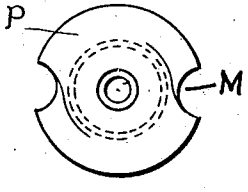


Fig. 16

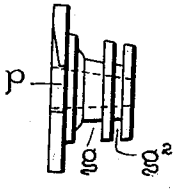
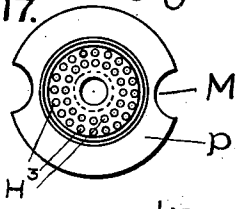


Fig. 17.



Witnesses:

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Alex. F. Macdonald.

Inventor:
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by Albert G. Davis
Att'y

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

No. 735,683. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS.

VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 735,683, dated August 4, 1903.

Original application filed June 9, 1898, Serial No. 683,000. Divided and this application filed July 31, 1901. Serial No. 70,352. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Vapor-Burners, of which the following is a specification.

The present invention is a division of my pending application, Serial No. 683,000, filed June 9, 1898, on steam-generating apparatus, which division is made at the requirement of the Patent Office under the provisions of rules 41 and 42.

The present invention has for its object to provide a burner which is capable of burning a hydrocarbon vapor, such as that obtained from kerosene, without objectionable odor and this in an efficient manner.

A further object of the invention is to provide a burner which is capable of being shut down for a more or less protracted period and restarted without the use of a separate relighting device.

For a consideration of what I consider to be novel and my invention attention is called to the accompanying description and the claims appended thereto.

In the accompanying drawings, which illustrate an embodiment of my invention, Figure 1 is a transverse section of the vaporizer. Fig. 2 is a longitudinal section thereof. Figs. 3 and 4 are sectional details. Fig. 5 is a front elevation of the vaporizer-head. Figs. 6, 7, and 8 are detail views of a modified form of removable burner-plug. Figs. 9 and 10 are detail views of a modified form of burner-head. Figs. 11, 12, and 13 are sectional views illustrating my improved burner. Fig. 14 is an elevation, partially in section, of the head of the vaporizer. Figs. 15, 16, and 17 are details of the burner-plug.

A tank T^2 of considerable capacity is provided for containing the water which is to be vaporized by the apparatus. It is made, as shown, to surround and inclose the vaporizer and also the heat-producing apparatus itself for the purpose of still further economizing heat. The fire-plug P or burner-jet proper is in this instance provided with a central plug P^3, having a handle whereby it can be removed to permit the inspection of the interior of the fire-space or to enable the fire to be lighted at the start. The detachable plug P is provided with diametrically-opposed notches M, which when the plug is inserted in place are adapted to register with the projections or lugs M′, formed on the head H. By slightly rotating the plug its flange will pass under the overhanging ends of the projections or lugs and be secured in place. The central plug P^3 may be made hot by any suitable means and used on insertion to produce the first ignition of the oil and air charges. The head H is provided with hollow spaces H′ and H^2 for the entrance of air and also for oil, which oil is vaporized by the heat of the apparatus. Passages H^3 are also provided, through which mixed air and oil are delivered to the fire-chamber, while other passages *q* are made for the delivery of air alone, it being inferred that the oil and air mixture shall be somewhat richer in oil than is necessary for complete combustion and that the deficiency in air shall be made up or even increased to a slight excess by the free air-passages. When air is admitted in this general manner in addition to that mixed with the fuel, there will be a certain portion which will be exactly the chemical mixture desired, and therefore highly inflammable. This burns very rapidly, holds the total flame well back against the head, and insures combustion under the best conditions. The air which reaches the head H is heated by being passed through the space C between the tank-casing and the tube J^3 by means of the oval flattened pipe A′, Fig. 1, also shown as entering the head H in Fig. 3, while Fig. 4 shows this pipe entering the casing from the back. The figure also shows the outward passage with the steam-delivery pipe and shows a heat-insulating slab Z placed at the back of the vaporizer V^2, where the gases turn after passing the vaporizer, returning over the outside of the pipes J^3.

Fig. 5 shows a front view of the head H with the plugs in place, the oil-supply pipe O′ being shown entering the proper passage; also, the water-pipe U.

Fig. 6 is a face view from the interior of the fire-chamber F of a modified form of plug P′, heretofore described, while Fig. 7 is a sec-

tion of the same, and Fig. 8 is a side elevation. The plug is made to fit in the opening in the head H, which opening is slightly tapered to fit the tapered portion of the plug, and the air-passage J in the head H registers with a deep groove g in the plug, while the oil-passage H^2, communicating with the pipe O′ in the head, opens into the groove g^2 in the plug when the latter is inserted. Holes H^3 are drilled from the lower face of the plug through to the oil-groove g^2, and smaller holes H^4 continue onward to the air-groove g. A slight air-pressure is maintained in the passage J and groove g when the apparatus is in operative condition. The air passes down through the openings in the plug P′ and meeting oil-vapor from the groove g^2 carries the same forward into the fire-space F of Fig. 2. Suitable means, such as projections or clamps K, are provided to hold the plug P′ in position during action and to cause it to fit tightly with the surfaces of the head, so as to prevent the gases from leaking outwardly. I have also shown in the plug a central opening H^5, communicating with the fire-chamber from the air-groove without passing through the oil-groove. This gives a little excess of air to the mixture and assists in completing the combustion and preventing extinguishment, inasmuch as a richer mixture may be run from the jets of oil and air than otherwise would be permitted, and therefore there will be sufficient oxygen fed into the fire-space to be, if anything, slightly in excess of what is required for complete combustion.

Fig. 10 shows a face view of the head H, with the clamps K holding the plug in place, and a central opening for receiving the plug P′.

Figs. 11 to 17, inclusive, are views illustrating the details of construction of the burner and head used in connection with the apparatus shown in Fig. 2. Fig. 11 shows the detachable firing-plug P^3 in longitudinal section, while Fig. 12 represents a cross-section of the plug P, which is adapted to be fitted into the head H. Fig. 13 is a section of the head H, wherein A′ is the entering air-pipe, and O′ the entering oil-pipe. The plug P (shown in section) enters into the tapered space in the head H and can be turned slightly and be locked therein by the lugs M′. (Shown in dotted lines, Fig. 14.) The engaging surfaces of the plug M and lugs M′ are slightly beveled, so that by rotating the plug with respect to the lugs the former will be firmly seated in place and prevent the escape of vapor. The plug P is constructed as described in connection with Figs. 6 to 8, except that it has a central opening for the passage or insertion of plug P^3. It also permits the interior of the fire-chamber to be inspected. The openings which permit air alone to enter the fire-chamber from the head H are indicated by g. H^2 represents the space or chamber which receives oil and discharges it through the groove g^2 and openings H^3 in the plug. Fig. 14 is an elevation of the head as viewed from the fire box or chamber and is partly in section. Here the openings g are seen directed toward the observer. The pipe A′ for air is also seen. The oil-pipe O′ enters the oil-space H^2 at the central portion of the head H. Fig. 15 shows a face view of the plug P separated from the remainder of the apparatus, and the notches M, which register with the retaining-lugs, are situated at diametrically opposite points. Fig. 16 is a side view of the same plug, showing the air-groove g and the oil-carrying groove g^2. Fig. 17 is a view in elevation looking at the end of the plug next the fire-chamber. The last-mentioned figure shows the innumerable openings H^3 through which mixed oil and air vapor enters the fire-chamber.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a burner, the combination with a fire-box, of a head therefor having chambers, one in front of the other, means for supplying oil to the front chamber, means for supplying air to the rear chamber, and a plug passing through both chambers and removable therefrom, said plug containing grooves registering with said chambers and holes connecting said grooves and also connecting the front groove with the fire-box.

2. In a burner, the combination with a fire-box, of a head therefor having two chambers, one in front of the other, an oil-pipe entering the inner chamber, an air-pipe entering the outer chamber, and a removable plug passing through both chambers, said plug containing grooves registering with said chambers and holes in line with each other for connecting the grooves and also the inner groove with the fire-box.

3. In a burner, the combination with a fire-box, of a head therefor having an oil-chamber and an air-chamber, the former in front of the latter, a removable plug passing through both chambers, said plug containing grooves registering with said chambers and holes connecting said chambers with each other and with the fire-box, and free air-passages from the air-chamber directly to the fire-box.

4. In a burner, the combination with a fire-box, of a head therefor having an inner oil-chamber and an outer air-chamber, an air-supply pipe for said air-chamber arranged to be heated by the products of combustion, a removable tubular plug passing through both chambers and having grooves registering with said chambers and holes connecting said grooves with each other and with the fire-box, and a detachable firing-plug adapted to fit in the tubular plug.

In witness whereof I have hereunto set my hand this 29th day of July, 1901.

ELIHU THOMSON.

Witnesses:

DUGALD MCK. MCKILLOP,

JOHN J. WALKER.