H. BROWN.

HEATING APPARATUS USING LIQUID FUEL.

APPLICATION FILED JULY 5, 1916.

1,217,698.

Patented Feb. 27, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

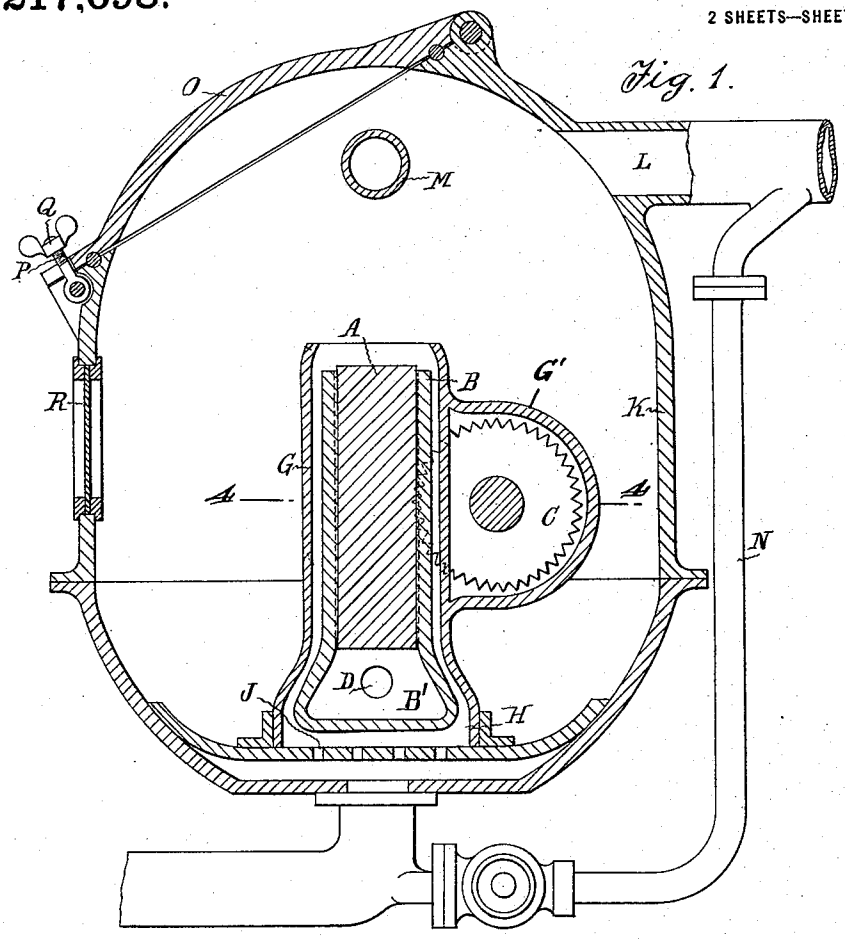


Fig. 2.

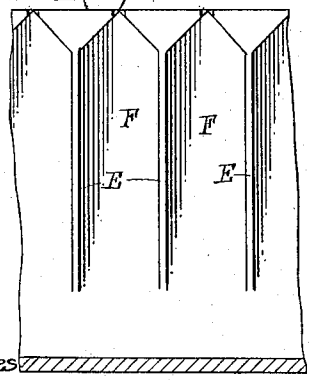
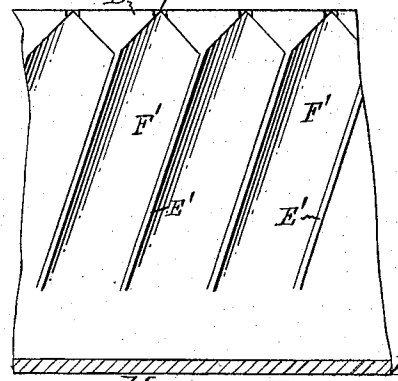


Fig. 3.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 4.

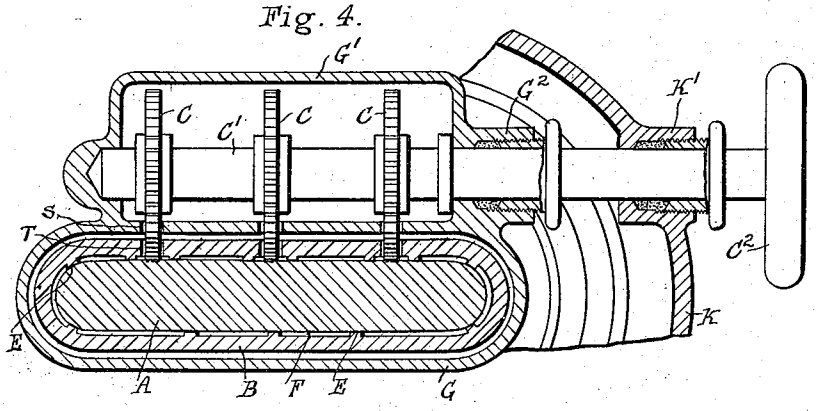
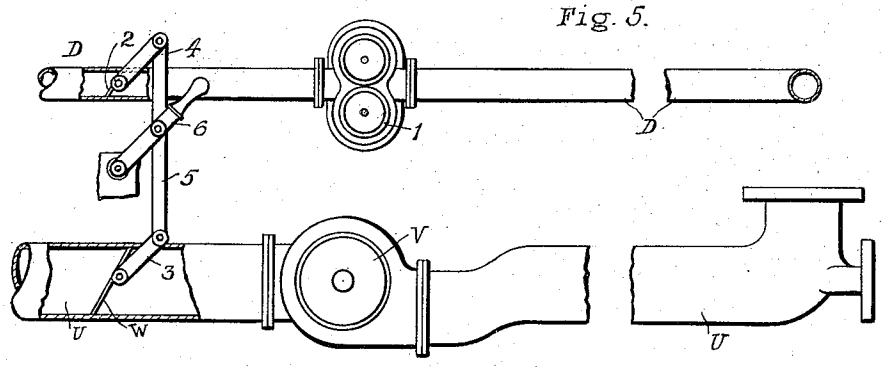


Fig. 5.



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UNITED STATES PATENT OFFICE.

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HEATING APPARATUS USING LIQUID FUEL.

1,217,698. Specification of Letters Patent. Patented Feb. 27, 1917.

Application filed July 5, 1916. Serial No. 107,642.

To all whom it may concern:

Be it known that I, HENRY BROWN, a subject of the King of Great Britain, residing at Putney Hill, in the county of London, England, have invented new and useful Improvements in or Relating to Heating Apparatus Using Liquid Fuel, of which the following is a specification.

This invention relates to a wick heating apparatus for liquid fuel, of the kind in which the air for supporting combustion is supplied under pressure and the liquid fuel is supplied to the wick under pressure.

According to my invention, the burner is arranged in a chamber or receptacle which, except for the necessary eduction pipe or conduit, is entirely closed to the atmosphere. The air under pressure is preferably supplied to the exposed or end surface of the wick through a passage surrounding the wick-tube, the casing that forms the outer wall of such passage extending beyond the exposed end of the wick and the outer end of such casing being slightly contracted in order to direct the air over such end surface of the wick.

In the accompanying drawing, I have shown how my said invention may be conveniently and advantageously carried into practice. In this drawing

Figure 1 is a transverse section of the burner, and

Figs. 2 and 3 are developments of the inner surface of the wick-tube, showing alternative forms.

Fig. 4 is a horizontal section on the line 4—4, Fig. 1.

Fig. 5 is a diagram showing the means for supplying air and fuel to the burner.

A is the wick, which is contained in a wick-tube B and is adjustable therein by means of toothed wheels C. This wick is made of asbestos or other suitable fireproof material. The wick-tube B is enlarged at the bottom to form a chamber B′ into which the liquid-fuel supply-pipe D opens.

As shown in Fig. 2, the inner surface of the wick-tube B is provided with inwardly extending ribs E, E for engaging with the outer surface of the wick so as to form channels F, F along which fuel can pass to the exposed end of the wick. The said ribs and channels can be of any desired relative width and may in some cases be arranged to extend spirally around the wick-tube, as shown at E′ and F′ in Fig. 3. The ribs E and E′ are provided at their upper ends with triangular extensions which only leave free at the top of the wick-tube B narrow apertures F^2, through which the liquid fuel can escape. The major part of the liquid fuel thus passes out by way of the wick.

Around the wick-tube, there is arranged a tubular casing G, so as to form an annular passage for the air. This casing extends a short distance above the exposed end of the wick and is slightly contracted at its outer end G′ in order to direct the air over such end surface of the wick. The tubular casing G is also enlarged at the lower end to form a chamber H, into which the air under pressure is supplied through a perforated diaphragm J, so as to render uniform the supply of air to said annular passage.

The burner is arranged in a closed chamber K having an eduction flue L and containing the object, *e. g.* a water tube or tubes M, which it is desired to heat. This chamber is entirely shut off from the atmosphere except for the eduction conduit L for the waste gases.

If desired, moreover, air may be supplied to the burning gases or vapors in the closed chamber K, or to the hot gases in the flue or conduit L, whereby they are conducted out of said chamber, for example by means of a conduit N, so as to complete the combustion of such gases or vapors. In some cases, the air from the conduit N may enter the conduit L in the form of a jet, so as to assist the flow of the gases in such conduit L. O is a hinged door adapted to be secured by a screw P and nut Q. R is a window of mica or other suitable material for enabling the operation of the burner to be controlled without opening the door O.

The toothed wheels C, C for adjusting the wick are arranged in a casing G′ mounted on the outside of the casing G, and are mounted on a spindle C′ which extends out of the casing G′ and K through stuffing boxes G^2, K′ and is provided with an external handle C^2. Inasmuch as the wick A bears only on the surface of the ribs E or E′, the frictional resistance to its motion in the tube B is small, so that the toothed wheels C, C acting on one side only of the wick are in most cases sufficient. The wheels C, C extend through slots S, T in the tubes G, B respectively, and any liquid fuel that may escape through said slots into the air-passage in the casing G is mixed with air in

said passage and carried up into the flame and consumed.

Suitable valves or other means are preferably provided for controlling the supplies of air and fuel. If desired, these valves may be connected to a common operating lever which moves them in such a manner as to maintain the supplies of air and fuel in proper proportions according to the amount of heat to be generated.

As shown in Fig. 5, the conduit U which delivers air into the chamber H through the perforated diaphragm J is supplied with air under pressure by means of an air-propeller or blower V and is controlled by a butterfly-valve W. The liquid-fuel pipe D is supplied with fuel under pressure by means of a pump 1 and is controlled by means of a butterfly-valve 2. The spindles of the valves W and 2 are provided with arms 3 and 4 respectively, which arms are pivotally connected by a link 5 which is actuated by means of a hand-lever 6, in such a manner that the supplies of air and fuel are maintained in the correct proportion to each other throughout the range of variation in the operation of the burner.

I claim:—

1. A liquid-fuel heating apparatus comprising a wick-tube, a wick in said tube, a casing arranged around said wick-tube and forming an air-passage, said casing extending beyond the exposed end of the wick and being slightly contracted at its outer end, means for supplying air under pressure through said air-passage to the exposed part of the wick, means for supplying liquid fuel under pressure to the interior of said wick-tube, a chamber inclosing the exposed part of said wick, and an eduction conduit to said chamber.

2. A liquid-fuel heating apparatus comprising a wick-tube having channels formed in its inner surface, a wick in said wick-tube, a chamber inclosing the exposed part of said wick, an eduction conduit to said chamber, means for supplying air under pressure to the exposed part of said wick and means for supplying fuel under pressure to the interior of said wick-tube.

3. A liquid-fuel heating apparatus comprising a wick-tube having channels formed in its inner surface, a wick in said tube, a casing arranged around said wick-tube and forming an air-passage, said casing extending beyond the exposed end of the wick and being slightly contracted at its outer end, means for supplying air under pressure through said air-passage to the exposed part of the wick, means for supplying liquid fuel under pressure to the interior of said wick-tube, a chamber inclosing the exposed part of said wick, and an eduction conduit to said chamber.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."