No. 851,002. PATENTED APR. 23, 1907.

H. S. DURAND.

HEATER.

APPLICATION FILED APR. 8, 1903.

Fig. 1.

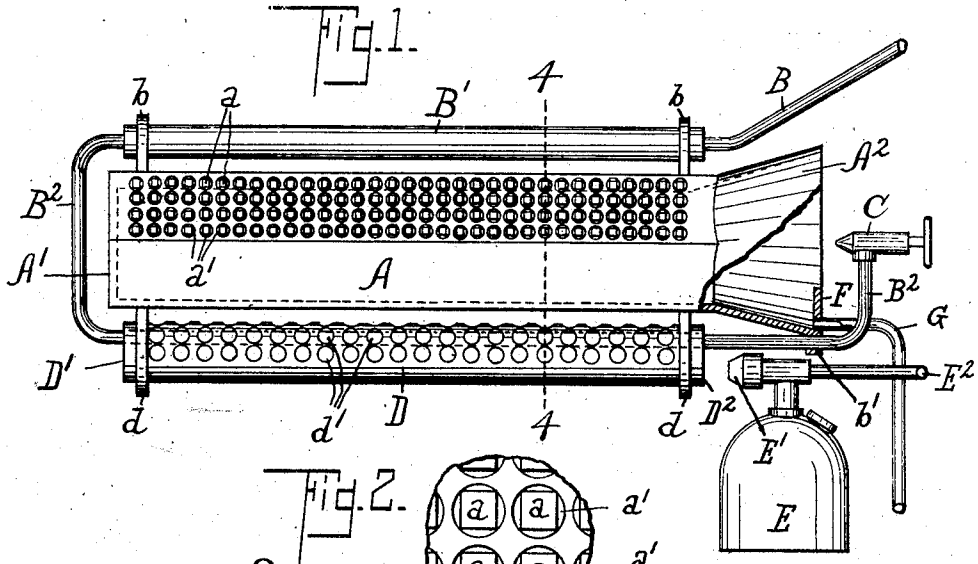


Fig. 2.

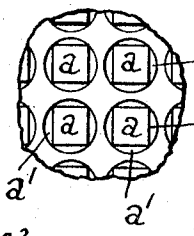


Fig. 3.

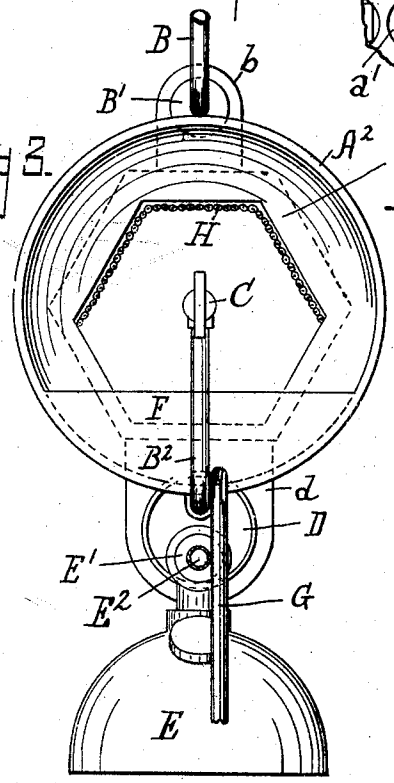
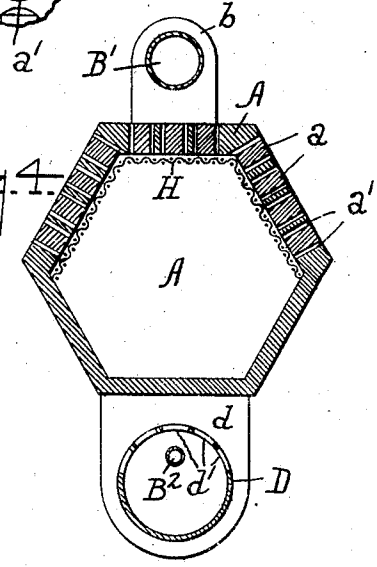


Fig. 4.



WITNESSES=
F. Birrell.
D. Gurnee.

INVENTOR=
Henry S. Durand
by Osborn & Davis
his Attys

UNITED STATES PATENT OFFICE.

HENRY S. DURAND, OF ROCHESTER, NEW YORK.

HEATER.

No. 851,002. Specification of Letters Patent. Patented April 23, 1907.

Application filed April 8, 1903. Serial No. 151,611.

To all whom it may concern:

Be it known that I, HENRY S. DURAND, a citizen of the United States, and a resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Heaters, of which the following is a specification.

This invention relates to heaters, and has for its object to provide a burner, adapted to the consumption of kerosene-oil, that is simple in construction and economical in operation.

In the drawings, Figure 1 is a side elevation of the burner and its attachments. Fig. 2 is an enlarged view of a portion of a section on the line 4 4 of Fig. 1. Fig. 3 is an end view of the burner and attachments represented in Fig. 1, and Fig. 4 is a section on the line 4 4 of Fig. 1.

A represents a tube closed at one end A'. The tube is represented as hexagonal, although it is not essential that it should have that form, and its other end A^2 is preferably flared. The three uppermost surfaces of the tube A are perforated throughout their length and breadth, as represented in Fig. 1. These perforations are circular in cross-section, and within each is driven a square plug *a*, that partly fills the perforation. These plugs close, respectively, the perforations except for the four narrow slits *a'* around each plug, which are the burner-orifices through which the gas is discharged to the flame. The shape of these plugs is essential only so far as it reduces the perforations to slits of such size and shape that they will have the advantages of the slits *a*, and are easy to manufacture.

The oil is introduced through the pipe B, which leads to a reservoir (not shown in the drawings) wherein the supply of oil is kept under sufficient pressure to force it through the pin-valve C, to which the reservoir is connected by a system of pipes. Such connection is represented by the pipe B', into which the pipe B is screwed, and the pipe B^2, which is screwed into the other end of the pipe B'. The pipe B' is represented as somewhat larger than the pipes B and B^2 and is intended to be filled with steel shavings or other material for equalizing the pressure of the oil. Other suitable means to this end may be employed, if desired; but this equalizing means is not essential to the operation of the burner. Brackets *b b*, which may be cast upon the pipe B', or other means adapted to be connected with the tube A hold the pipe B above that part of said tube that is perforated, as described above.

The pipe B^2 passes around the tube A and is turned upwardly, so that the valve C upon its end is brought in front of the flaring end A^2 of the tube A at about its central point. A bracket *b'* upon the end A^2 of the tube A supports the end of the pipe B^2.

Beneath the tube A the tube B^2 passes through the upper part of a heater D, which is attached to the under side of the tube A, as by brackets *d d*, cast upon the tube D or otherwise secured to it. The outer end D' of the heater D is closed; but its front end D^2 is open. The upper part of the tube D is perforated, as at *d'*.

An oil-tank E with an atomizing attachment E' of the well-known construction and a pipe E^2, from which air is forced through the atomizer, are shown in Figs. 1 and 3 located in front of the heater.

The burner is operated and lighted in the following manner: Compressed air is admitted to the atomizer through the pipe E^2, which operates to draw oil from the tank E and to spray it from the atomizer E' in the usual way. The spray is ignited, and the flame under pressure of the air from the pipe E^2 enters the end D^2 of the heater. The flame heats that part of the pipe B^2 that is within said pipe D and passing through the perforations *d'* heats also the tube A. When the pipe B^2 has been heated to such a degree that the oil contained in it will vaporize, the pin-valve C is opened. The pressure on the oil in the supply-tank, (not shown,) with which the pipe B connects, will force the vapor that is discharged from the valve C into the tube A. A supply of air will be carried into the end A^2 of the pipe with the vapor that will insure complete combustion. The vapor thus mixed with air is ignited as it escapes through the slits *a'* in the tube A and will heat surrounding surfaces. This burner will also heat the pipe B', which lies above it, thereby vaporizing the oil contained therein. When the pipe B' has been heated sufficiently for that to take place, it is no longer necessary to use the atomizer E and the heater D, for the burner itself is adequate for vaporizing the oil-supply. Thus the atomizer and the heater are only used to start the burner in operation, and when that has been done the burner is adapted to reduce the oil to proper form for consumption and is ac-

cordingly complete in itself. It is also obvious that in place of the atomizer and heater herein shown and described other such devices may be employed for the purposes of these without affecting the operation of the burner proper.

With the vapor that is discharged from the valve C a certain amount of oil may also be discharged into the tube A and a part of the vapor may condense within the tube A. To prevent such oil from dripping out from said tube A, a dam F is placed across the lower part of the opening of the end A^2 of the tube A, and such oil is conducted from said tube A to a receptacle by some suitable means, as by the pipe G. It has been shown that while the heater D is vaporizing the oil in the pipe B^2 it is also heating the burner-tube A. In this way the temperature of the said tube A is raised till it is sufficient to maintain the gas injected into it from the valve C at lighting temperature. The peculiar arrangement of the burner-tube and supply-pipe with reference to each other make it possible to heat both parts at the same time. The arched form of the tube A and the use of series of burner-holes at different horizontal levels serve to maintain the heat of the burner-body, and being without air-spaces between the burner-holes improve the quality of the flame and give high efficiency.

A wire-gauze H is inserted within the tube A beneath those of its surfaces that are perforated (see Fig. 3) and acts to prevent the flames from entering said tube through the perforations a' and reaching the pin-valve C, as they otherwise might.

What I claim is—

1. The combination of a horizontal burner-tube closed at one end and perforated throughout its upper part, an oil-supply pipe extending along the upper perforated portion of the burner-tube and having a lower portion, a valved discharge-jet for the supply-pipe at the open end of the burner-tube, and a foraminated heater-tube extending along the under side of the non-perforated portion of the burner-tube and also along said lower portion of the oil-supply pipe to heat the pipe and tube simultaneously, and separate means for discharging oil into said heater.

2. The combination of a burner-tube, having one end closed, and perforated throughout its upper part; a valve adapted to control the discharge of vapor into the open end of said burner-tube; an oil-supply for said valve, a part of said pipe being located above the perforations in said burner-tube, and a part thereof beneath said tube; means for supporting said supply-pipe above and beneath said burner-tube; and a heater adapted to vaporize oil contained in said supply-pipe and at the same time to heat said burner-tube; substantially as shown and described.

3. The combination of the burner-tube A, having one end closed, the flared end A^2 and perforations a throughout its upper part; the valve C adapted to discharge vapor into said burner-tube; the pipe B′ connected to an oil-supply, and the pipe B^2 connecting said pipe B′ with said valve C, said pipe B′ being supported above said burner-tube, and the pipe B^2 beneath it; the tube D attached to said burner-tube having the perforations d', one end closed, and the other open and inclosing the pipe B^2; and the atomizer E arranged to spray vapor into the perforated tube D; substantially as shown and described.

4. The combination with a burner-tube perforated along its upper portion and closed at one end and a supply-pipe extending along the burner-tube and provided with a valved discharge at the open end of the tube, of a heater-tube surrounding the supply-tube and perforated along its upper side to heat the burner-tube and an atomizer discharging into the heater-tube.

5. The combination with a burner-tube closed at one end and having perforations along its upper portion, plugs within said perforations; the plugs and apertures being shaped to form slits between them, wire-gauze along the inner side of the perforated portion of the tube, an oil-supply having a valved discharge at the open end of the tube, a tubular heater perforated along one side to heat both the burner-tube and oil-supply pipe and an atomizer discharging into the open end of the said heater.

6. A burner comprising a burner-tube closed at one end and perforated along its upper portion, an oil-supply pipe having an enlarged member extending along the upper perforated portion of the tube and a lower smaller member extending along the lower side of the tube and provided at the front open end thereof with a valved jet to discharge into the tube, a heater-tube inclosing said lower pipe member and perforated along its upper portion and an atomizer discharging into the heater-tube.

HENRY S. DURAND.

Witnesses:
I. B. BUTLER,
A. R. SELDEN.