Nov. 13, 1923. 1,473,844

A. GARBARINI

GAS HEATING RADIATOR

Filed Nov. 17, 1922 2 Sheets-Sheet 1

Fig. 1.

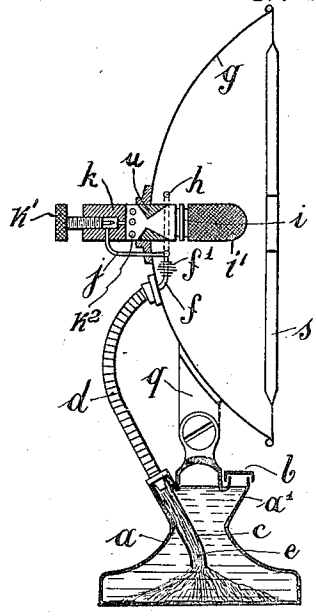


Fig. 2

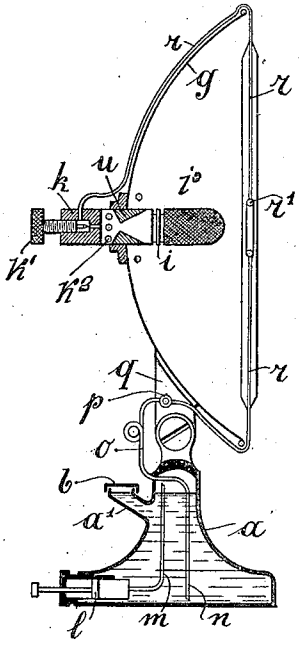
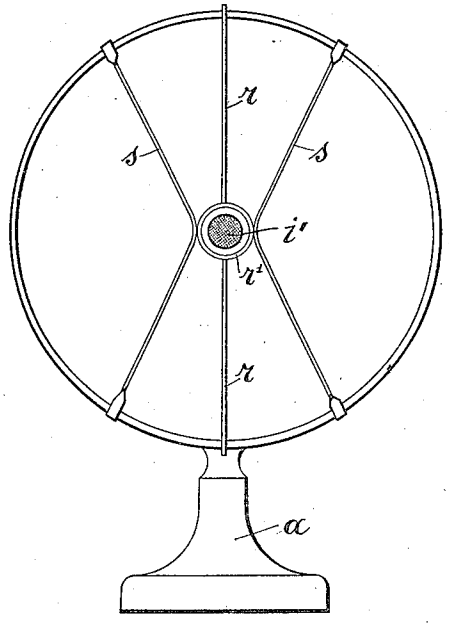


Fig. 3



Inventor
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Fig. 4

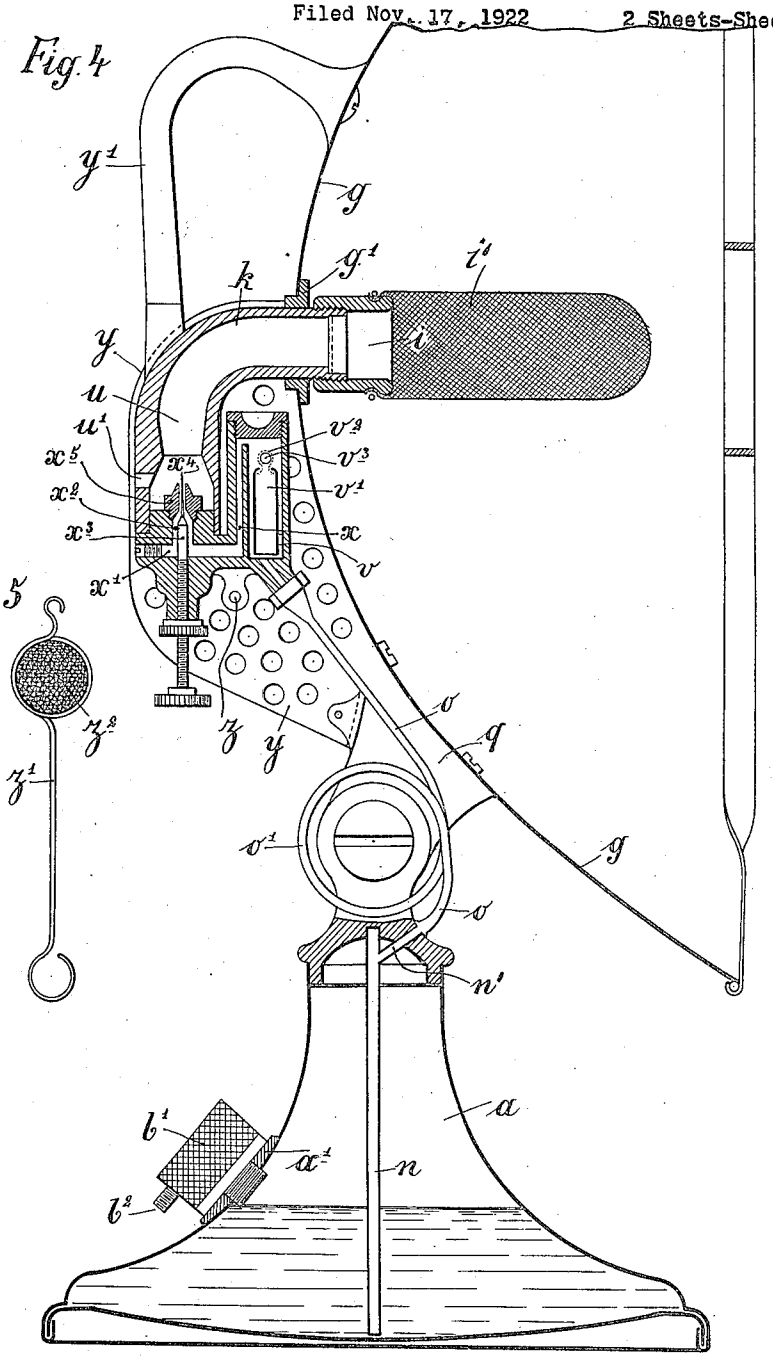

Fig. 5

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UNITED STATES PATENT OFFICE.

ANDRÉ GARBARINI, OF COURBEVOIE, FRANCE.

GAS-HEATING RADIATOR.

Application filed November 17, 1922. Serial No. 601,654.

To all whom it may concern:

Be it known that ANDRÉ GARBARINI, engineer, citizen of the Republic of France, residing in Courbevoie, Seine, France, and whose post-office address is 23 Rue de Colombes, has invented certain new and useful Improvements in and Relating to Gas-Heating Radiators; and he does hereby declare the following to be a full, clear, and exact description of the invention such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to a heating radiator employing hydrocarbon vapours such as alcohol, gasoline, petroleum and the like, in which the heating element acting by incandescence is situated approximately at the focus of a parabolic mirror.

According to the present invention the rise of the liquid fuel may be produced in two distinct manners, either by free surface tension by means of a wick, or by internal pressure by means of a pump, the vaporization of the fuel being produced in both cases by the heat evolved at the burner of the apparatus.

The characteristic feature of the arrangement resides particularly in the special disposition of its parts, which permits on the one hand of a perfect vaporization of the hydrocarbon and, on the other hand, of any required inclination of the reflector of the apparatus.

Referring to the accompanying drawings, which show diagrammatically as examples two arrangements of the radiator according to this invention:—

Fig. 1 is a diagrammatic vertical section of a construction in which the rise of the liquid fuel to the burner is produced by free surface tension by means of a wick;

Figs. 2 and 3 are respectively a diagrammatic vertical section and a front view of a construction in which the rise of the liquid is produced by internal pressure.

Fig. 4 is a vertical section on a larger scale of an improved construction of the radiator showing an arrangement in which the rising of the liquid fuel is also produced by internal pressure.

Fig. 5 is a separate view of the lighting wad used for starting the apparatus.

In the arrangement shown in Fig. 1 the stand a of the apparatus is hollow and constitutes the reservoir for the liquid fuel; it carries a neck a^1 for filling; closed by a stopper b. In this reservoir fits a metallic tube c which is continued externally of the reservoir-stand by a metallic flexible tube d of relatively large diameter; within the two tubes c and d is arranged a wick e the upper end of which terminates at the top of the tube d and the lower end issues from the tube c and dips freely in the liquid of the reservoir-stand a.

The flexible tube d is continued by a tube f of small diameter, but not capillary, which penetrates within the reflector g of the apparatus and which is preferably provided with ribs f^1 adapted to increase its heating surface. The tube f is continued by a curved portion h, constituting an element or vaporizing ring, which surrounds the burner i provided with an incandescent mantel i', said tube being continued by a tube j ending at the burner nozzle k. Instead of one single element or vaporizing ring, such as h, it is evident that one could use any required number of similar elements.

It will be understood that, with this arrangement, the liquid rises freely to the top of the wick, at the upper end of the tube d and that the heating of the tubular elements f, f^1 and h produces the complete vaporization of the fuel which in this manner arrives at the burner nozzle k in the gaseous state. The flexible tube d allows any required inclination of the reflector g.

In the construction shown in Figs. 2 and 3, an air-pump l is arranged in the reservoir-stand a, the force tube m of which ends at the top of the reservoir. In the latter dips a capillary tube n which is continued as it issues from the reservoir by a copper tube o bent upon itself, so as to form a loop, and ending in a regulating valve p, the body of which is secured on the lug of the hinge q of the reflector g and as close as possible to the axis of the said hinge.

From the regulating valve p proceeds a capillary tube r which follows externally the lower portion of the reflector g as far as the rim, then ascends in front of the open face of the latter, and forms a circular loop r^1 concentric with the burner i supporting an incandescent gas mantle i'; from this ring r^1 the tube r ascends vertically to the top of the reflector, then follows externally the upper

portion of the latter away from the rim and proceeds to the burner nozzle k.

The tube r and its ring r^1 are here utilized with advantage to constitute the vertical element of the protection grating s arranged in front of the open face of the reflector g.

The heating of the tube r and of its ring r^1 by the burner i produces, as in the manner of construction before described, the vaporization of the fuel, the rising of which is caused by the action of the internal pressure produced by the pump l. Owing to this pressure no risk of clogging of the capillary tubes is to be feared.

The arrangement of the tube o in the shape of a loop permits here also, any required inclination of the reflector to be obtained, the great proximity of the valve p with respect to the axis of the hinge of the reflector causing only a very slight deformation of the tube c. The valve p allows the regulation of the speed of ascent of the liquid fuel and consequently its degree of vaporization.

In the construction described above, the burner comprises, the usual valve k' for the gas and the usual apertures k^2 for the admission of air. It may also be provided advantageously with a constricted passage such as u.

The lighting of the burner will be obtained by means of an external flame, obtained by the combustion of some alcohol, for instance, which will start the vaporization necessary for the working.

In the alternative form shown in Fig. 4, the hollow stand of the apparatus a forms the liquid fuel reservoir, which can be admitted by a fuel inlet a^1 closed by a screw-threaded plug b^1 provided with a well known form of pressure gauge (not shown) and with a connection b^2 provided with a non-return valve (not shown) for screwing to the nipple of a small hand pump whereby the desired pressure can be obtained in the said reservoir.

Within the reservoir a is disposed the fuel elevating tube n; to the top of the latter is connected a small tube n^1 ending with the supply tube o which forms a loop at o^1 coaxial with the pivot of the mirror g. The tube o o^1 which is thus enabled to follow all the movements of the mirror, terminates in the vaporization chamber v containing a metal tube v^1 having the wire gauze cap v^2 which encloses a steel ball v^3 operating together with said cap v^2 to regulate the production of vapour.

The hydrocarbon vapour flows from the tube v^1 through a conduit x into a horizontal conduit x^1 upon which is branched the vertical conduit x^2 containing the needle valve x^3, the latter ending in a needle x^4 projecting into the orifice of the nozzle x^5 opening into the throttle tube of the mixing chamber k of the burner; the air for the mixture is caused to enter in said chamber through the orifice u^1.

The combination of the vaporizing chamber and mixing chamber which is formed of a good heat coiducting metal, is enclosed between the two apertured shield plates y only one of which is shown and which afford protection from accidental burning of the person while operating, and are preferably given a black surface coating in order to prevent radiation; for a like purpose, the apparatus is provided with a wooden handle y^1 secured at one end to the burner k and at the other to the parabolic reflector g, whereby the apparatus can be readily handled and carried about without danger of burning for the user.

A ring g^1 of quartz, asbestos or like insulating material separates the reflector g from the burner i so as to afford the maximum heat efficiency for the burner. At the lower part of the vaporizing chamber is a small lug z for hanging the wire-handled wad z^1 used for lighting purposes, Fig. 5, constituted by an iron wire wrapped around an asbestos wad z^2 which may be impregnated with alcohol.

I claim:—

1. A hydrocarbon vapor heating radiator comprising a stand forming a reservoir for liquid fuel, a parabolic mirror pivoted on said stand, a burner for the hydrocarbon vapor fixed to the center of the mirror, an incandescent device on said burner, an ascension tube for the liquid adapted to permit a variable inclination of the mirror, and means to secure ascension of the liquid fuel from the stand to the burner.

2. A hydrocarbon vapor heating radiator comprising a stand forming a reservoir for liquid fuel, a parabolic mirror pivoted on said stand, a burner for the hydrocarbon vapor fixed to the center of the mirror, an incandescent device on said burner, an ascension tube forming a loop adapted to permit a variable inclination of the mirror, and a pump for producing an internal pressure in the reservoir to secure ascension of the liquid fuel to the burner.

3. A hydrocarbon vapor heating radiator comprising a stand forming a reservoir for liquid fuel, a parabolic mirror pivoted on said stand, a burner nozzle for the hydrocarbon vapor fixed centrally of the mirror, an incandescent device on said burner nozzle, an ascension tube for the liquid adapted to permit a variable inclination of the mirror, a vaporization device for the liquid fuel in front of the burner nozzle, and a pump for producing an internal pressure in the reservoir to secure ascension of the liquid fuel to the vaporization device.

4. A hydrocarbon vapor heating radiator comprising a stand forming a reservoir for liquid fuel, a parabolic mirror pivoted on

said stand, a vaporization chamber, a mixing chamber having an air aperture, a connecting conduit between the vaporization chamber and the mixing chamber, a needle valve to control said conduit, a burner nozzle, an ascension tube for the liquid fuel adapted to permit a variable inclination of the mirror, and a pump for producing an internal pressure in the reservoir to secure ascension of the liquid fuel to the vaporization device.

5. A hydrocarbon vapor heating radiator comprising a stand forming a reservoir for liquid fuel, a plug for closing said reservoir and provided with a connecting nipple, a parabolic mirror pivoted on said stand, a vaporization chamber, a mixing chamber, a burner nozzle connected with the latter, a connecting conduit between the vaporization chamber and the mixing chamber, a screw-threaded needle valve to control the connecting conduit, an incandescent mantle on the burner nozzle, and an ascension tube for the liquid fuel adapted to permit a variable inclination of the mirror.

6. A hydrocarbon vapor heating radiator comprising a stand having a reservoir for liquid fuel, a parabolic mirror pivoted on said stand, a vaporization device, a mixing chamber, a burner nozzle connected with the latter, a conduit between the vaporization device and the mixing chamber, a valve in the conduit, an incandescent mantle on the burner nozzle, a perforated shield, and an ascension tube for the liquid fuel adapted to permit a variable inclination of the mirror.

7. A hydrocarbon vapor heating radiator comprising a stand having a reservoir for liquid fuel, a parabolic mirror pivoted on said stand, a burner constituted by a vaporization device and a mixing chamber having an aperture, a burner nozzle on the mixing chamber, a conduit between the vaporization device and the mixing chamber, a valve controlling the conduit, an incandescent mantle on the burner nozzle, a handle fixed to the mirror and burner, and an ascension tube for the liquid fuel adapted to permit a variable inclination of the mirror.

8. A hydrocarbon vapor heating radiator comprising a stand having a reservoir for the liquid fuel, a parabolic mirror pivoted on said stand, a burner constituted by a vaporization device and a mixing chamber, a burner nozzle on the latter, a conduit between the vaporization device and the mixing chamber, a valve for controlling the conduit, an incandescent mantle on the burner nozzle, and an ascension tube for the liquid fuel adapted to permit a variable inclination of the mirror.

In testimony that I claim the foregoing as my invention, I have signed my name.

ANDRÉ GARBARINI.