L. LUMIERE & J. HERCK.

CATALYTIC HEATING APPARATUS.

APPLICATION FILED JUNE 16, 1915.

1,202,199.

Patented Oct. 24, 1916.

2 SHEETS—SHEET 1.

FIG. 2

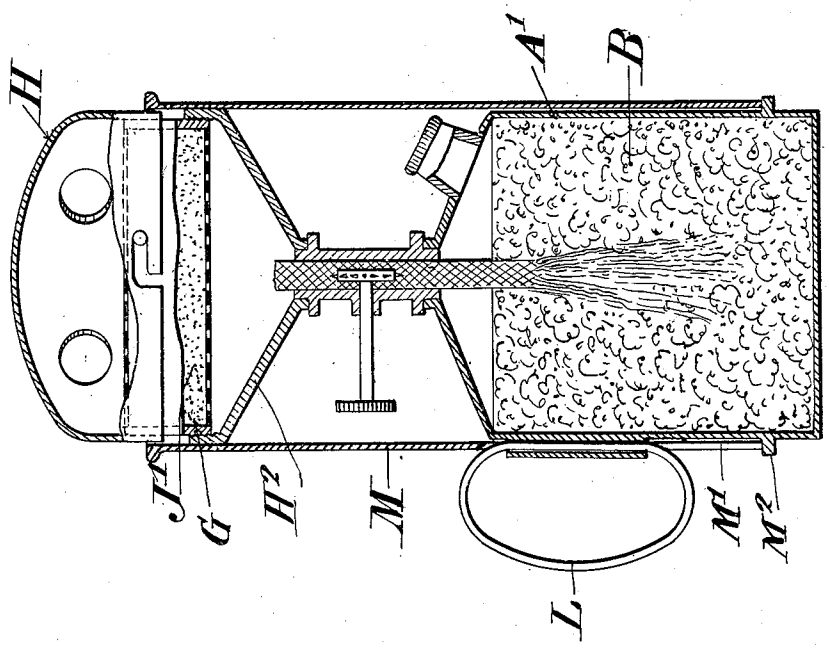
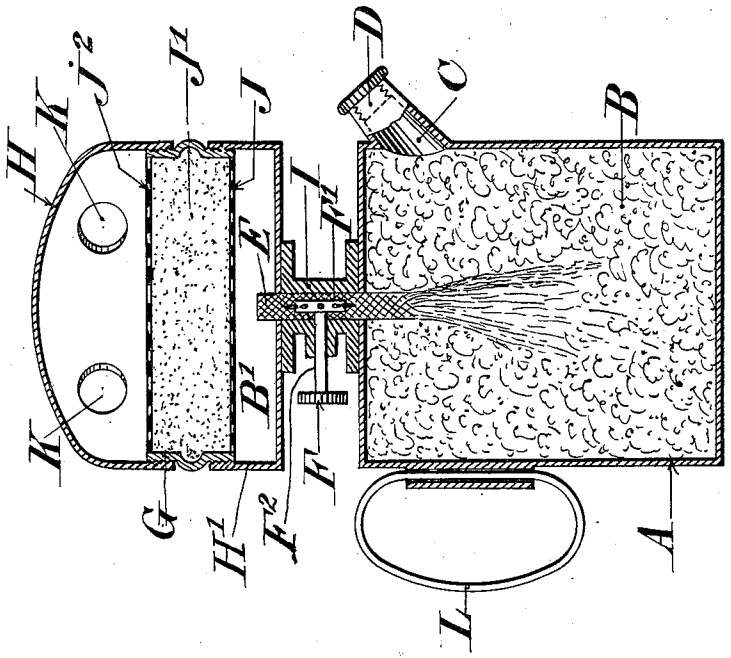


FIG. 1



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FIG. 4

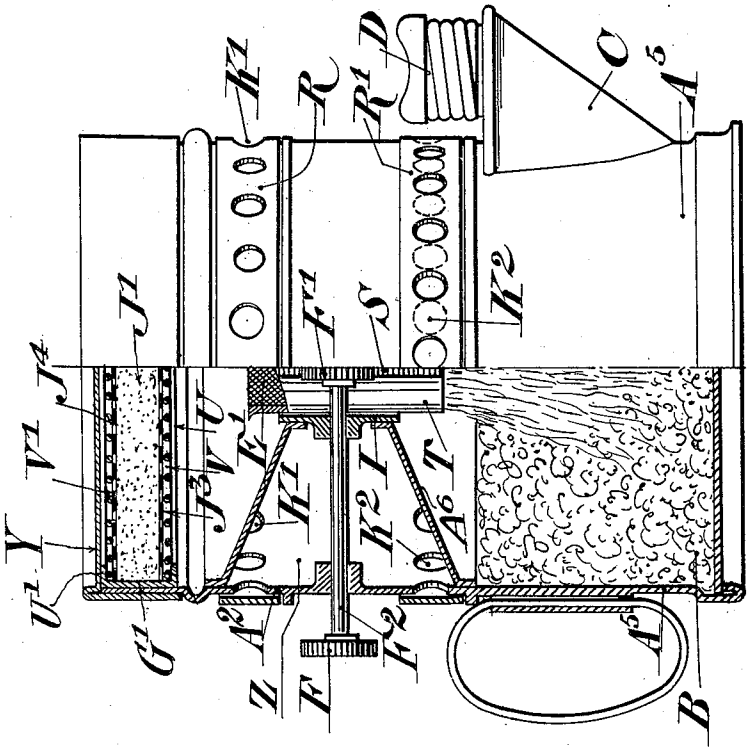
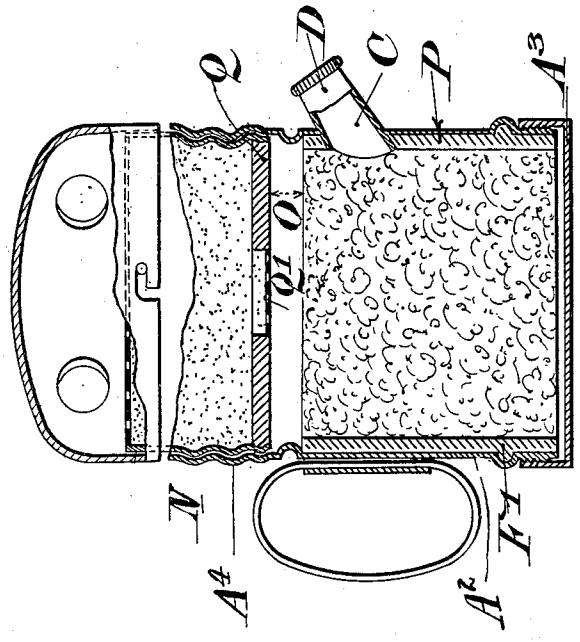


FIG. 3



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UNITED STATES PATENT OFFICE.

LOUIS LUMIÈRE, OF LYON, AND JEAN HERCK, OF PARIS, FRANCE.

CATALYTIC HEATING APPARATUS.

1,202,199. Specification of Letters Patent. Patented Oct. 24, 1916.

Application filed June 16, 1915. Serial No. 34,361.

To all whom it may concern:

Be it known that we, LOUIS LUMIÈRE and JEAN HERCK, both citizens of the French Republic, residing at, respectively, Lyon and Paris, in France, have invented a certain new and useful Improvement in Catalytic Heating Apparatus, of which the following is a specification.

The object of the invention is to provide a heat generator wherein gaseous or vaporous fuel is caused to generate heat by combining with atmospheric air or other oxidizing gas, without producing a flame, the action being due to the presence of a catalytic agent such as platinized asbestos or an equivalent porous substance. The use of such substances is well known in connection with ordinary gas burners, and has also been proposed in connection with igniters for cigars and the like, and with antiseptic appliances and small pocket appliances for warming the hands and body. Our invention, on the other hand, provides a compact, portable device, which is adapted to heat the surrounding atmosphere, or to impart heat to vessels and the like, examples of its use being the heating of rooms, motor cars and other vehicles, and the heating of tanks and other apparatus in motor cars, air-craft and the like where excessive cooling has to be avoided. The fuel used may be a carbureted gas, or a volatile liquid such as petrol or alcohol.

The invention is illustrated in the accompanying drawings, which show four embodiments thereof in Figures 1, 2, 3 and 4 respectively.

Figs. 1, 2 and 3 are vertical sections, and Fig. 4 shows the apparatus half in vertical section and half in elevation.

Like references denote like or equivalent parts throughout the drawings.

Referring in the first instance to the construction shown in Fig. 1, A designates a container for an absorbent substance B, such as cotton wool, impregnated with volatile liquid fuel, the container having a tubular inlet C closed by a stopper D. From a hole in the top of the container rises a wick E, which can be raised and lowered by means of a device of the usual kind, comprising a milled button F, a toothed wheel F^1 engaging the wick, and a spindle F^2 connecting the wheel to the button. The wick E passes through a short tube or neck I standing upon the container A and supporting a cup H^1, into the interior B^1 of which the wick extends. Into the upper part of the cup is screwed a ring G forming the wall of a chamber having a perforated floor J, preferably of metal gauze, supporting a mass of platinized asbestos J^1, under a perforated cover J^2 of metal gauze. The floor J and the cover J^2 form diaphragms through which vapor rising from the wick must pass. Upon the ring G is screwed a cap H having air holes K. When the apparatus is not in use a suitable cover is placed upon the cap, closing the air holes K. The container A has a handle L for carrying the apparatus.

For starting the combustion the cap H is removed, and a small quantity of spirit is poured upon the cover J^2 and ignited, the cap being then replaced without the air hole cover referred to.

The heat generated by the burning of the spirit is communicated to the cup H^1 and volatilizes the fuel conveyed to the chamber B^1 by the wick E. The vapor ascends through the perforated floor J and the platinized asbestos J^1, the catalytic action of which raises the temperature of the vapor, so that when it comes into contact with the air, it combines with the oxygen and generates heat, without producing a flame.

The rate of combustion can be regulated by turning the wick up or down, as this operation varies the length of wick exposed in the chamber B^1, and the distance between the wick and the hottest part of the apparatus.

In the modification shown in Fig. 2 the top of the container A^1 is conical, and the cup H^2 is in the form of an inverted truncated cone with a short cylindrical upward extension, into which the ring G is screwed. The cap H is connected to the ring G by means of a bayonet joint. A sleeve or casing M having a slot for the handle L stands upon a flange M^2 near the bottom of the container A^1, and surrounds the greater part of the said container and the chamber containing the catalytic agent J^1. The purpose of this casing is to protect the cup connecting the tube and container from drafts which would be liable to cool the same below the temperature required for efficient vaporization of the fuel.

In the construction shown in Fig. 3 the fuel container consists of an outer cylinder A^2, screwed into a base A^3, and an inner cylinder or lining P of heat-insulating ma-

terial, which reduces to the required degree, the conduction of heat to the fuel by the outer metal wall of the container. No wick is used, the substance impregnated with the fuel being freely exposed at the top to the space below the receptacle of the catalytic agent. The cylinder A^2 has an upward extension A^4, which is helically corrugated to form a kind of screw thread. The ring N is similarly corrugated and is screwed into the part A^4, so that by turning the ring the distance O between the fuel and the catalyzing agent can be varied. This affords a means for regulating the rate of evaporation and combustion, inasmuch as by raising the ring N the distance between the fuel and the zone of combustion is increased, and the temperature of the fuel container is reduced. In this instance the bottom of the container for the catalytic substance consists of a disk of incombustible substance Q, provided centrally with an opening Q^1, thus limiting the active catalyzing surface.

In the construction shown in Fig. 4 the cover A^6 of the container A^5 and the bottom of the vaporizing chamber are conical, as in Fig. 2, the space Z between these two parts being inclosed by an upward extension of the container wall. This upward extension of the wall has two circular series of holes K^1 and K^2, outside which the wall is embraced by two rotatable rings R, R^1 resting upon ribs formed on the container. The said rings also have holes arranged so that by turning the rings the holes K^1, K^2 can either be fully exposed or partly or wholly covered. This enables the access of cold air to the space Z to be regulated, for the purpose of regulating the rate of vaporization of the fuel. The vaporization can also be regulated by raising and lowering the wick E^1, preferably an asbestos wick, which is held in a vertically movable tube T having a rack S engaged with the wheel F^1 on a shaft F^2. The ring G^1, forming the wall of the receptacle for the catalytic agent, is soldered to the cylindrical wall at the top, under the cover Y, and has two flanges U, U^1. The floor of the said receptacle is formed by a coarse meshed net or grid V and a fine meshed net or grid J^3 resting upon the same, both supported by the flange U. The catalytic agent J^1 is covered at the top by a fine meshed net or grid J^4, with a coarse meshed net V^1 lying upon the same, both held down by the flange U^1.

Although primarily intended for producing a heating effect, which is very powerful in proportion to the size of the device, the device may also be used for disinfecting the room which it heats, methylic alcohol or other suitable fuel being used for that purpose.

What we claim as our invention and desire to secure by Letters Patent of the United States is:—

1. A heating device comprising in combination a fuel container, a chamber above said container, a neck connecting said fuel container to said chamber, a vertically adjustable wick holder in said neck, and a catalytic body in said chamber above said wick holder.

2. A heating device comprising in combination a fuel container, having a top in the form of a truncated cone, a chamber above said container having a bottom in the form of an inverted truncated cone, a neck connecting the top of said container to the bottom of said chamber, a vertically adjustable wick holder in said neck, a catalytic body in said chamber above said wick holder, a cylindrical casing having air holes, surrounding said conical parts of said fuel container and said chamber, and means for regulating the aperture of said air holes.

3. A heating device comprising in combination a fuel container having a top in the form of a truncated cone, a chamber above said container having a bottom in the form of an inverted truncated cone, a neck connecting the top of said container to the bottom of said chamber, a vertically adjustable wick holder in said neck, a holder having a perforated bottom and a perforated top in said chamber, a catalytic body in said holder, a cylindrical casing having air holes, surrounding said conical parts of said fuel container and said chamber, and means for regulating the aperture of said air holes.

4. A heating device comprising in combination a fuel container having a top in the form of a truncated cone, a chamber above said container having a bottom in the form of an inverted truncated cone, a neck connecting the top of said container to the bottom of said chamber, a vertically adjustable wick holder in said neck, a holder having a perforated bottom and a perforated top forming horizontal diaphragms in said chamber above said wick holder, a catalytic body filling the space between said diaphragms, a cylindrical casing having air holes, surrounding said conical parts of said fuel container and said chamber, and means for regulating the aperture of said air holes.

In witness whereof we have signed this specification in the presence of two witnesses.

LOUIS LUMIÈRE.
JEAN HERCK.

Witnesses:
JEAN GERMAIN,
MARIN VACHON.