No. 631,792. Patented Aug. 29, 1899.

C. HOPPE.

VAPOR STOVE.

(Application filed Jan. 7, 1899.)

(No Model.) 2 Sheets—Sheet 1

Fig. 1.

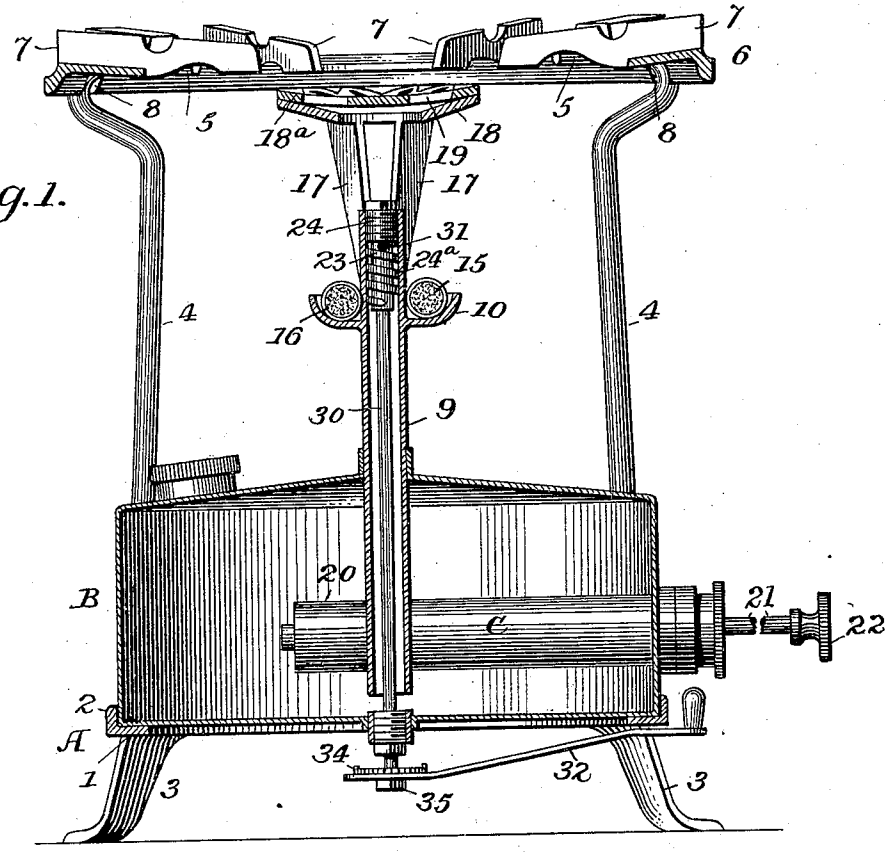

Fig. 2.

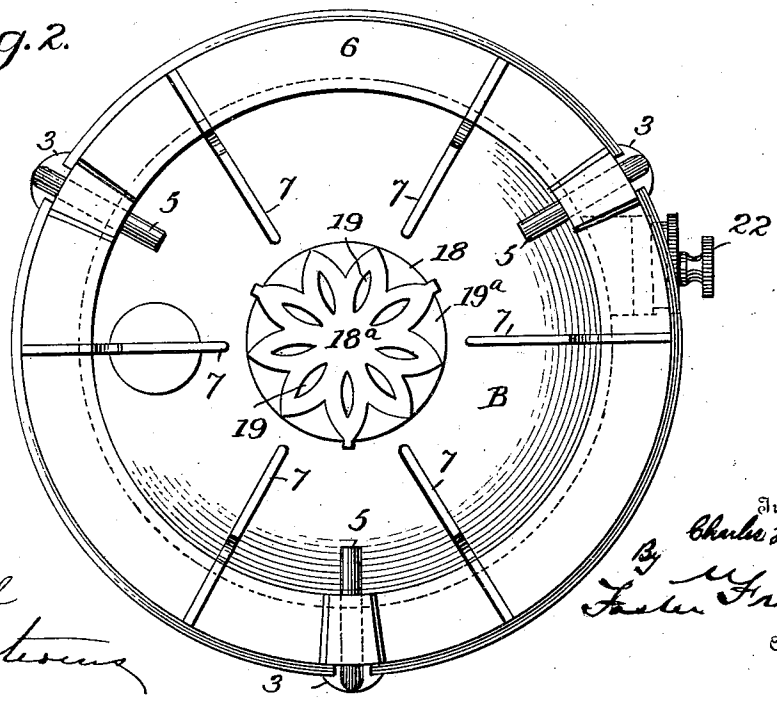

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Fig. 3.

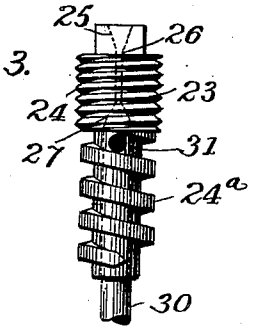


Fig. 4.

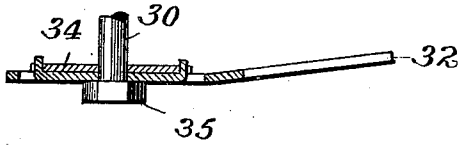


Fig. 5.

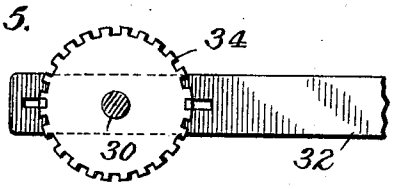
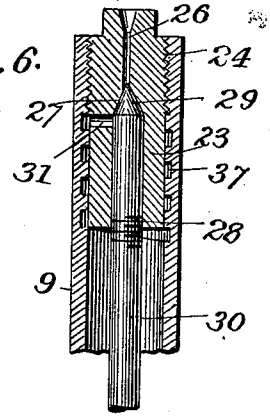


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES HOPPE, OF CINCINNATI, OHIO.

VAPOR-STOVE.

SPECIFICATION forming part of Letters Patent No. 631,792, dated August 29, 1899.

Application filed January 7, 1899. Serial No. 701,444. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HOPPE, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Vapor-Stoves, of which the following is a specification.

This invention relates to certain new and useful improvements in vapor burners and stoves, having for its object to provide a construction by means of which hydrocarbon oils may be quickly and thoroughly vaporized, resulting in the production of a flame of superior quality and a minimum expenditure of oil.

With this object in view the invention consists in the novel construction, combination, and arrangement of the parts hereinafter more particularly described.

In the accompanying drawings, forming a part of this specification and in which like letters and numerals of reference designate corresponding parts, Figure 1 is a vertical sectional view of a single-burner stove embodying the invention. Fig. 2 is a plan view thereof. Fig. 3 is an enlarged detail side view of the burner. Fig. 4 is a detail view of the burner-valve-operating means, parts being broken away. Fig. 5 is a detail plan view of the burner-valve-operating means. Fig. 6 is a detail sectional view of a modified form of burner.

In the one embodiment of the invention shown, A designates the base of the stove, comprising an annular ring formed with a horizontal flange 1 and a vertical flange 2, extending from the outer edge of the same, and the said ring is supported upon feet 3, formed integral therewith. Resting upon the horizontal flange 1 of the base and conforming to the inner surface of the vertical flange is a reservoir B, of any desired capacity and formed of any suitable material—as, for instance, copper or brass. Extending vertically from the base at separated points are three or more arms 4, having inwardly and horizontally extending portions 5 at their upper ends, which constitute bearings for a plate 6, adapted to support the vessel to be heated. As shown, the part 6 is in the form of a ring, from the inner edge of which converge short projections 7. In its under face the ring 6 is formed with recesses 8, into which the portions 5 of the supporting-arms 4 are received to prevent lateral displacement of the plate 6 from the arms or its turning thereon.

Extending vertically and, as shown, centrally through the reservoir B is a discharge or burner tube 9, open at its opposite ends and having its lower open end terminating near the bottom of the reservoir in order that liquid may enter said end and be forced upwardly through the tube. Surrounding the discharge-tube, near its upper end, and supported thereon is a cup or receptacle 10, into which is preferably placed some suitable non-combustible absorbent material—such, for instance, as asbestos. In the present instance a ring 15, of asbestos, is employed, which surrounds the discharge-tube 9 and is wrapped spirally with wire 16 to hold it in shape. By thus forming the absorbent material it is not easily displaced from the receptacle 10. Likewise extending from the upper end of the discharge-tube 9 are two or more vertically-projecting radial arms 17, at the upper ends of which is carried a flame-spreading plate-support 18 in the form of a ring having a concave upper surface, the opening through the ring being in the plane of the burner, so that the flame therefrom will project through said opening and into contact with the under central face of a flame spreading or distributing plate 18^a. This spreading-plate is detachable from the support 18 and normally rests thereon, and is formed of a general star-shaped configuration, and is provided with an annular series of elongated elliptical-shaped openings 19, which radiate from the center and extend between the peripheral notches 19^a, so that the plate has what may be termed a "solid central portion," a "series of elongated openings," and a "series of peripheral notches," so that the vapors from the burner impinge upon the solid central portion. Part of them pass up through the elongated openings 19 and part pass around the edges of the plate at the peripheral notches, where the vapors combine and produce the desired blue flame. Experience has shown that this form of spreading-plate, in this connection coöperating with the other devices, produces a most satisfactory heat-giving and non-illuminating flame.

Communicating with the reservoir B, near the bottom thereof and below the level of the liquid, is a suitable compression-pump C. This pump may be of any desired construction, and while it may be arranged upon the exterior of the reservoir it preferably has its cylinder 20 located within the reservoir and its piston-rod 21 extending to the exterior thereof and provided with a knob 22, by means of which the piston and its rod may be operated to exert a pressure upon the liquid, which tends to force it upwardly through the discharge or burner tube 9.

At its upper end the tube 9 is internally screw-threaded, and into said end fits the burner-tip 23, the projecting or extreme upper end of which is angular in cross-section for reception of a key or wrench, by means of which an externally-screw-threaded portion 24 of the burner-tip may be screwed into the threaded end of the burner-tube 9. The lower end of the burner-tip closely conforms to the inner smooth surface of the burner-tube and is provided on its exterior surface with a spiral groove 24^a, which extends from the lower end of the tip, at which point said groove opens into the passage of the burner-tube to the threaded portion 24 thereof. The said burner-tip 23 is provided with a central longitudinal passage 25, extending from end to end thereof, and this passage is contracted at or near its upper end to form a minute discharge-orifice 26, and it is also formed with a conical valve-seat 27 and with a threaded portion 28, the valve-seat being intermediate the threaded portion and discharge-orifice.

In the upper end of the groove 24^a is formed a port 31, which connects the groove with the passage 25 at a point slightly below the valve-seat 27. As thus constructed the oil flows from the burner-tube 9 in a spiral course through the groove in the burner-tip in contact with the wall of the burner-tube and then, passing through the port 31, enters the passage 25 and is finally discharged through the discharge-orifice 26.

Projecting into the passage 25 is a conical valve 29, adapted to the seat 27, the valve being carried upon a stem 30, formed with external screw-threads, which engage those of the passage. The valve-stem extends centrally through the reservoir and projects from the exterior of its bottom. Any suitable means may be employed for rotating the valve-stem to carry the valve to and from its seat, and thereby open communication between the reservoir and discharge-orifice; but it is preferred to effect this result by means of a lever 32, fixed at one end to the valve-stem and extending horizontally beneath the reservoir to a point beyond the periphery in convenient position to be grasped and manipulated by the operator. As a convenient means of securing the lever 32 to the valve-stem, said stem has a toothed or notched wheel 34, rigidly attached thereto near its lower end, and at a point beneath this wheel the stem is threaded for reception of a nut. Upon the end of the lever is formed a tooth, which is adapted to engage any one of the teeth of the wheel 34, the said end of the operating-lever being received upon the threaded portion of the stem and clamped into firm contact with the face of the wheel by means of a nut 35.

In operation when it is desired to light the stove the oil is subjected to pressure in the reservoir by means of the pump, the discharge-orifice of the burner being closed by its valve. A small quantity of alcohol is poured upon the absorbent material in the receptacle 10, or oil might be used, if desired. The alcohol or oil is then ignited and the flame produced thereby rises into contact with the upper end of the burner and with the flame-spreading plate and its support, causing the same to become heated to such a degree as will vaporize oil passing through the discharge-orifice of the burner and impinging against the spreading-plate. The valve is then opened, and the vaporized oil is ignited by the surrounding flame, producing a brilliant blue-white flame, which coming into contact with the plate 18 is spread thereby in order that it may be directed over an extensive surface.

By forming a burner with a spiral groove or channel at its upper end obviously the oil is brought into contact with an extended heating-surface and is in consequence more easily and thoroughly vaporized. It will be obvious also that the burner-tip may be quickly and easily removed from the burner-tube and valve-stem and after being freed of sediment which often collects and clogs most oil-burners it can be reapplied to the tube with equal facility.

While it is preferred to employ the construction of burners shown in Figs. 1 to 4, such construction might be modified, as shown in Fig. 6, by forming the burner-tube with a spiral 37 and the burner-tip with a plain outer face at its lower end. Moreover, it will be obvious that several burners might be arranged to lead from a single reservoir. These and various other changes in the construction and arrangement of the parts might be made without departing from the spirit or scope of the invention and some of the features thereof used without others, since

What I claim is—

1. A vapor-burner tip formed with a discharge-orifice, and a spiral groove communicating with said orifice, a valve for opening and closing the orifice, and means for operating the valve, substantially as described.

2. A vapor-burner comprising a burner-tube and a burner-tip fitted thereto formed with a discharge-orifice, an external groove communicating therewith and with the passage of the tube, and a valve and its operating means for controlling the discharge-orifice, substantially as described.

3. A vapor-burner comprising a burner-

tube, a burner-tip detachably connected to the end of the tube and formed with a discharge and with a groove communicating therewith and with the passage of the tube, and a valve and its operating means for controlling the discharge-orifice, substantially as described.

4. A vapor-burner comprising a burner-tube, threaded at its upper end, a threaded burner-tip adapted to fit within the tube and formed with an external spiral groove communicating with the passage of the tube, with a discharge-orifice and with a lateral port connecting the upper end of the groove with the orifice, and a valve and its operating means for controlling the discharge-orifice, substantially as described.

5. A vapor-stove comprising a reservoir, means for putting the oil therein under pressure, a burner-tube extending from a point near the bottom of the reservoir to a point above the same, a burner-tip at the upper end of the tube having a discharge-orifice and having a spiral groove communicating with the orifice, a valve therefor, and a valve-stem extending through the bottom of the reservoir with means for operating it, substantially as described.

6. A vapor-stove comprising a reservoir, means for putting the oil therein under pressure, a burner-tube extending from a point near the bottom of the reservoir to a point above the same, a burner-tip at the upper end of the tube having a discharge-orifice and having a spiral groove communicating with the orifice, a valve, a valve-stem extending through the bottom of the reservoir with means for operating it therefrom, a flame-spreading plate above the burner-tip, and a support therefor connected with the burner-tip, substantially as described.

7. A vapor-stove comprising a reservoir, a burner, a support above the burner and a flame-spreading plate upon the support formed with radial openings and peripheral notches, substantially as described.

8. A vapor-stove comprising a reservoir, a burner, and a substantially star-shaped plate supported above and in line with the burner, said plate being formed with radial openings and with peripheral notches, substantially as described.

9. A vapor-stove comprising a reservoir, a burner, a support above the burner formed with a central opening and a flame-spreading plate upon and detachable from the support, said plate being formed with a series of radial openings and with peripheral notches, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES HOPPE.

Witnesses:
C. BECKER,
PH. GAUKEL.