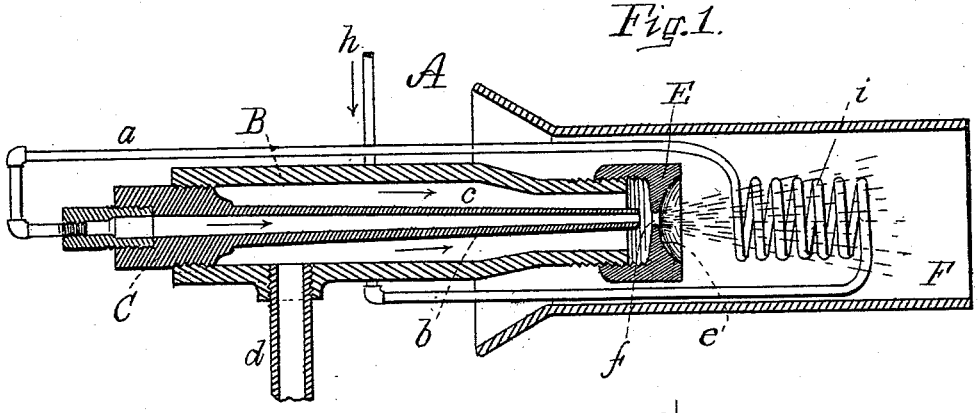
(No Model.)

T. L. & T. J. STURTEVANT.

VAPOR BURNER.

No. 457,801. Patented Aug. 18, 1891.

Fig. 1.



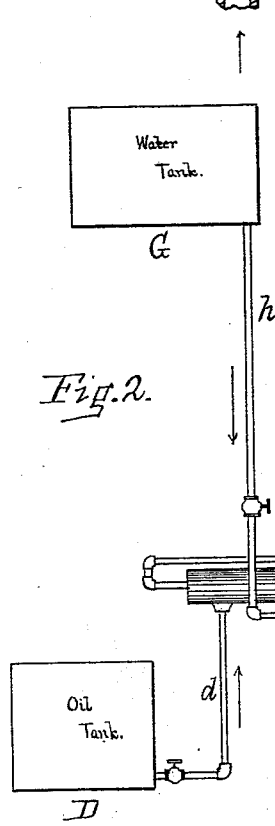


Fig. 2.

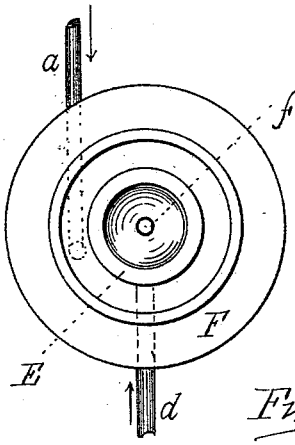
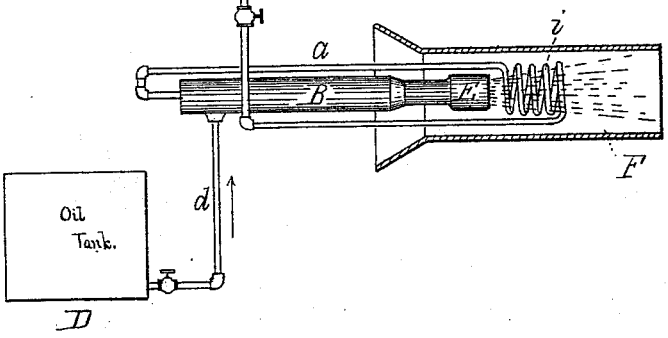


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS L. STURTEVANT AND THOMAS J. STURTEVANT, OF FRAMINGHAM, MASSACHUSETTS.

VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 457,801, dated August 18, 1891.

Application filed March 10, 1890. Serial No. 343,293. (No model.)

To all whom it may concern:

Be it known that we, THOMAS L. STURTEVANT and THOMAS J. STURTEVANT, citizens of the United States, residing at Framingham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Vapor-Burners; and we do 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 of reference marked thereon, which form a part of this specification.

This invention relates to improvements in "vapor-burners," so called, such as employ liquid fuel either alone in the form of spray or as vapor commingled with a forced supply of superheated air or steam.

The said invention consists in the construction and combination of parts hereinafter set forth and claimed.

The drawings represent in Figure 1 a sectional elevation of a burner containing our invention. Fig. 2 shows the same connected with a water and fuel supply. Fig. 3 is an end view of the burner.

In connection with our improved arrangement, as above premised, for rendering the supply of oil dependent upon the existence of a flame fed thereby we have adopted a vapor-burner of the following construction, and shown as an entirety at A. This burner is made up of the following parts: The member B is a hollow casting or tube, preferably cylindrical in cross-section, closed at one end by a hollow plug C, connecting with the steam-supply pipe *a*. Said plug terminates in a nozzle *b*, reduced or tapered as shown. Since this nozzle extends centrally of the tube B, an annular chamber *c* is formed, which connects with the oil-supply by the pipe *d*. The oil contained within the tank or reservoir D is set below the burner. Hence none can flow except it is lifted by suction. When it does flow, this chamber serves to act as a temporary storage-place, where the liquid fuel is heated by the nozzle prior to its escape from the burner when commingled with steam or air, or, with both steam and air, it is fed to the flame. The open end of the tubular casting B is equipped with an adjustable cap E, termed the "regulating-cap." The latter is formed with an inwardly-projecting annular flange or lip *e*, by means of which a central discharge-orifice *f* is produced. The inside face of this flange is preferably at right angles or transversely disposed with relation to the longitudinal bore of the spray-nozzle, while the orifice *f* is in alignment with said nozzle. As a consequence, when the steam is discharged from the nozzle a suction is created and the oil so supplied fills the chamber *c* and seeks an outlet in the direction of the escaping steam. The cap E, however, by means of the flange *e* directs said oil across the path of the steam with such effect as to thoroughly commingle the steam and oil and direct them, together with a small amount of air, into the flame. The intensity of the flame is controlled by the position of the regulating-cap, which is united in the present instance by screw-threads with the end of the tube B, and can thus be moved to cause the flange *e* to approach or recede from the extremity of the spray-nozzle. The more closely it approaches the latter the smaller the amount of oil permitted to escape. One advantage in the construction of this kind of vapor-burner is that oil passages or apertures are large, and hence not liable to become obstructed, and crude petroleum or any other kind of oil can be used with equal facility.

In connection with this burner we employ an exterior or inclosing cylinder or casing F. The latter serves not only as a protection to the burner proper, but stimulates a current of air to flow in the direction of the flame, and combustion is more complete. In some instances this burner can be used without the casing F.

With our improvements is combined the arrangement by which the supply of oil is rendered automatic—in other words, ceases with the extinction of the flame, and, vice versa, commences with the lighting of the flame. This we effect as follows: Communicating with the spray-nozzle by a feed-pipe *h*, sup-

plied with a valve, is a water system under pressure. Within the cylinder or case F is placed a superheating-coil *i*, which is located in front of the burner A or in some position to be heated by or exposed to the flame. Said coil may be a part of the pipe *h;* but in any event the supply of water or steam is to pass from the tank G, Fig. 2, through the pipe *h* and coil *i* to the spray-nozzle, in its passage being superheated.

To start this burner, it is only necessary to supply heat from some outside source, as from waste or any light combustible material by burning such substances within the case F or directly about the superheating pipe or coil *i*. When this is properly heated, a small amount of water is then permitted by means of the valve in the pipe *h* to flow into the superheater-coil, where steam is instantly formed. Said steam escapes under pressure when a suction of the oil is produced, and the latter is commingled therewith and delivered exteriorly of the cap, together with the escaping steam, where they become ignited or may be ignited. From this time the burner is self-operating. The steam produced from water derived from the tank G maintains the suction, and fuel is fed continuously so long as the flame exists. As before premised, the size and power of the flame are controlled by the regulating-cap E and the pressure of the water, which is governed by the height of the tank above the burner, or the pressure of the water-works.

It is evident that this burner can be used by means of steam supplied from a boiler or any other source or by compressed air, superheating being effected by our arrangements, and still be made exceedingly effective. In such cases, however, this objection exists: Should the fire go out, the steam or air supply continuing, oil would still be supplied, and too much might escape into the furnace before a new fire could be started. When it started the great flame evolved might be dangerous.

What we claim is—

1. In combination, a tube B, closed at one end, and a nozzle *b*, extending longitudinally therethrough, the annular oil-chamber *c* being formed by said tube and nozzle, and the adjustable regulating-cap E, the said cap being provided with an annular inwardly-extending flange *e* at right angles to the line of discharge, a central perforation *f*, and a concave outer face, substantially as specified.

2. In combination, a tube B, closed at one end, a nozzle *b*, extending longitudinally therethrough, the annular oil-chamber *c* being formed by the said tube and nozzle, the coil *i*, arranged in the line of discharge of the said nozzle, the pipe *h*, connecting the said coil with the said nozzle, and the adjustable regulating-cap E, provided with an annular inwardly-extending flange *e* at right angles to the line of discharge, a central perforation *f*, and a concave outer face, substantially as specified.

In testimony whereof we affix our signatures in presence of witnesses.

THOMAS L. STURTEVANT.
THOMAS J. STURTEVANT.

Witnesses to signature of Thomas L. Sturtevant:

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M. HEATON.

Witnesses to signature of Thomas J. Sturtevant:

H. E. LODGE,
JOHN A. DOUGHERTY.