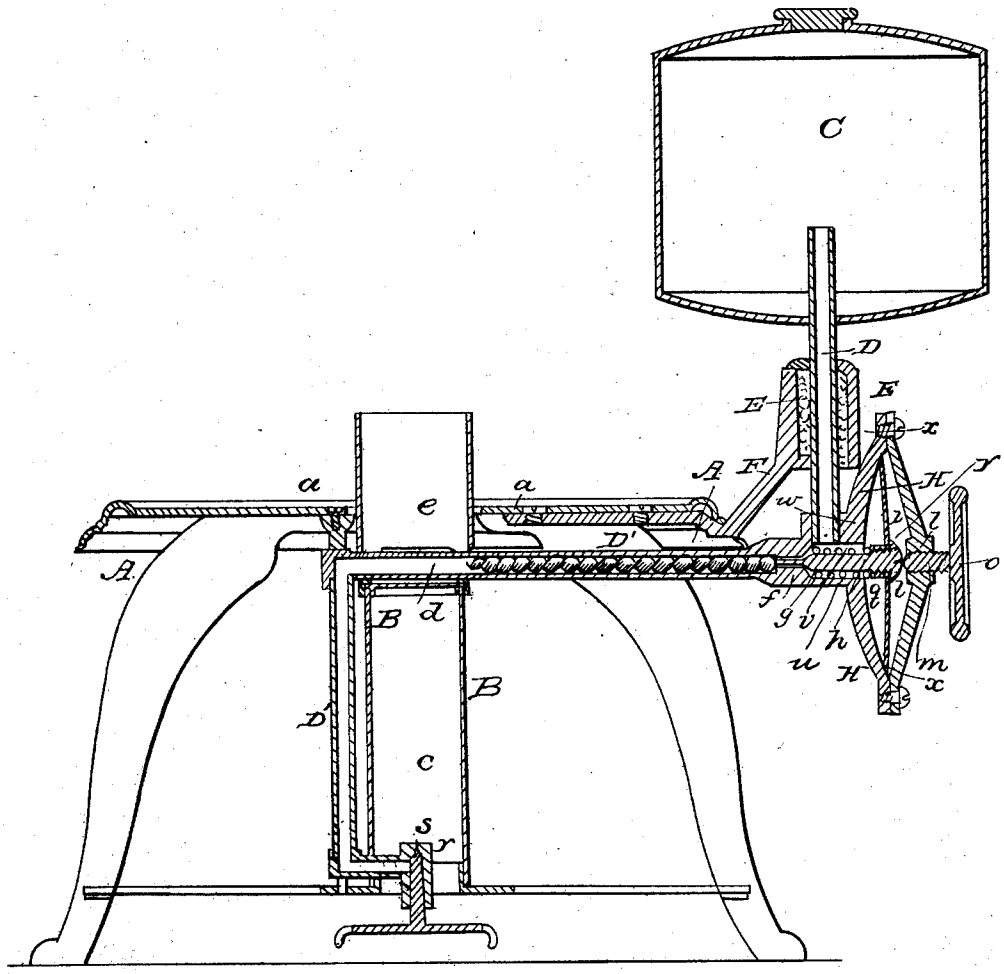
O. F. MORRILL.

Vapor Heater.

No. 41,635. Patented Feb. 16, 1864.



Witnesses
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UNITED STATES PATENT OFFICE.

OSCAR F. MORRILL, OF CHELSEA, MASSACHUSETTS.

IMPROVEMENT IN VAPOR-HEATERS.

Specification forming part of Letters Patent No. **41,635**, dated February 16, 1864.

To all whom it may concern:

Be it known that I, OSCAR F. MORRILL, a resident of Chelsea, in the county of Suffolk and State of Massachusetts, have made a new and useful invention having reference to aerovapor-burners or apparatus for generating heat from a mixture of air and the vapor of a liquid hydrocarbon; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawing, which is a longitudinal section of the apparatus containing my invention.

In the said drawing, A denotes a stand or frame, within which an aerovapor-burner, B, is arranged, as shown, the said burner being composed not only of a tube, *c*, (open at its lower end,) but of a foraminous plate or wire-gauze diaphragm, *d*, over which there is a perforated chimney, *e*, which extends upward and concentrically through the tablet *a* of the stand A.

Raised some distance above the stand A is a reservoir or close vessel, C, for holding "petroleum naphtha, or "carbon spirits," or any other liquid easily vaporizable and combustible, the said vessel being supported by a conduit or tube, D, which leads out of the bottom of the vessel and through an insulator or block of wood, E, held in place within and by an arm, F, projecting from the frame A. The conduit D opens into the elbow-joint *w* of another conduit or pipe, D′, or extension of the conduit D, which passes along underneath the tablet of the stand and goes through the chimney and directly over the burner and thence downward, and is turned horizontally into the burner, where it is furnished with a jet-tube, *s*, provided with an adjustable valve, *r*, the whole being as shown in the drawing.

Within the elbow-joint *w* there is a valve-seat, *f*, which is provided with a valve, *g*, formed on a rod, *h*, which, at its rear end, screws into and through a flexible, thin, metallic plate or diaphragm, *i*, the connection of the plate and valve-rod being such as to enable the latter to be drawn through and out of the plate in order not only that access through the diaphragm may be had to the seat *f* for the purpose of cleaning it, but that the valve may be removed from the apparatus at any time for the purpose of being cleaned. To this end the screw *g*, formed on the valve-rod *h*, projects beyond the rod, or has a diameter greater than that of the rod, and is screwed into a circular or annular collar or neck, *r′*, which goes through the plate *i* concentrically and is soldered or otherwise fixed thereto with a tight joint. If necessary, an annular washer of leather may be interposed between the screw-head *n* and the outer end of the collar or neck *r′*. The conduit D is arranged between the valve-seat *f* and the diaphragm *i*, the latter being fastened to a concavo-convex disk, H, which is applied to and opens into the elbow-joint *w*, as seen in the drawing. The flexible plate *i* at and around its periphery is connected to the disk H with a tight joint, *x*. A bar, I, goes diametrically across the disk H, and is fastened to it and has a female screw, *l*, made through its center and to receive a male screw, *m*, one end of which abuts against the outer end or head, *l′*, of the valve-rod. The screw *m* is provided with a hand-wheel, *o*, by which it may be revolved. A helical spring, *v*, is shown as arranged around the valve-rod *h*, and applied so as to press the valve in a direction away from its seat, such spring being only auxiliary to the flexible diaphragm, which, being an elastic plate of metal, will generally contain sufficient elasticity or spring to force the valve away from its seat. When such is the case, the spring *v* is not required, or it may be used, if desirable to employ it. The elastic diaphragm, when arranged and combined with the valve and its seat, the conduit or conduits, reservoir, and aerovapor-burner, as described, not only aids in operating the valve, but serves to prevent the loss of the vapor or fluid which will inevitably escape between the adjusting-screw of the valve when such valve is operated by a screw to be rotated in order to operate it. The pressure of the vapor in the conduit is often very great, or so considerable as to cause more or less of such vapor to be discharged, even when a stuffing-box about the valve-rod is employed. As a very small amount of hydrocarbon vapor or liquid suffices to produce a very disagreeable odor, it becomes necessary to prevent its escape from the apparatus otherwise than through the burner thereof. Therefore it is very desirable to have the operating mechanism of the valve so constructed that the wearing-surfaces of such mechanism will not allow of such an es-

cape of vapor. This I perfectly accomplish by the flexible diaphragm and its pressure-screw, when applied to the valve-rod and the concavo-convex disk and the valve and its seat are arranged with respect to the conduit D in manner as specified, for with such diaphragm and its pressure-screw *m* the valve-rod may be moved in a direction either toward or away from the valve-seat, the screw serving to impel the valve toward its seat, and the elastic spring of the diaphragm afterward operating to draw the valve away from its seat while the screw *m* may be in the act of being unscrewed. While the diaphragm *i* and the disk H allow of the proper movement of the valve-rod, they serve to prevent any escape of hydrocarbon vapor, except through the valve seat when there is a tight joint at the connection of the valve-rod with the plate *i*.

From the above it will be seen that pressure of the fluid of the reservoir operates to aid in opening the valve, or in moving it away from its seat. It will also be observed that the position or arrangement of the flexile diaphragm and its concavo convex disk H with respect to the conduit D and the valve *g* and its seat *f* causes the chamber within the disk H to serve as a means of receiving deposits or sediment which which would otherwise operate to choke the valve or impede its action.

I therefore claim—

1. The flexile or elastic plate *i* and its concavo-convex disk H, or the equivalent thereof, in combination with the pressure-screw *m*, or its equivalent, and the valve *g* and its seat *f*, the aerovapor-burner B, its conduit D or conduits D D′ and the reservoir C thereof.

2. The arrangement of the valve *g* and its seat *f* and the flexible diaphragm *i*, the concavo-convex disk H, and the conduit D, substantially as above described, so that the pressure of the fluid of the reservoir shall operate to open or aid in opening the valve or moving it away from its seat, the closing of the valve being effected by a screw, *m*, or its equivalent, arranged with respect to and so as to act on or move the diaphragm, substantially as specified.

3. The application of the valve-rod *h* to the plate *i* so as to enable the valve to be moved and access to be had to the valve-seat through the plate *i*, substantially in manner and for the purpose as specified.

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Witnesses:

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