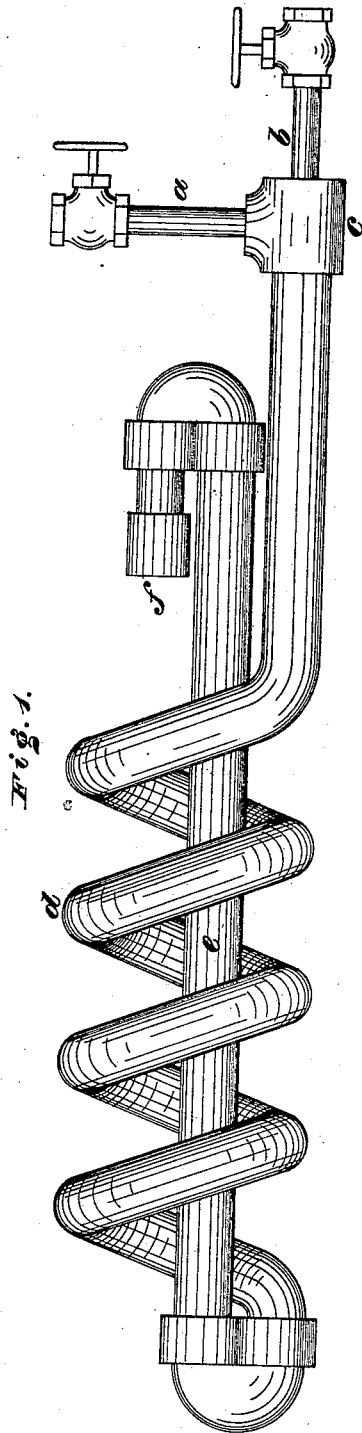
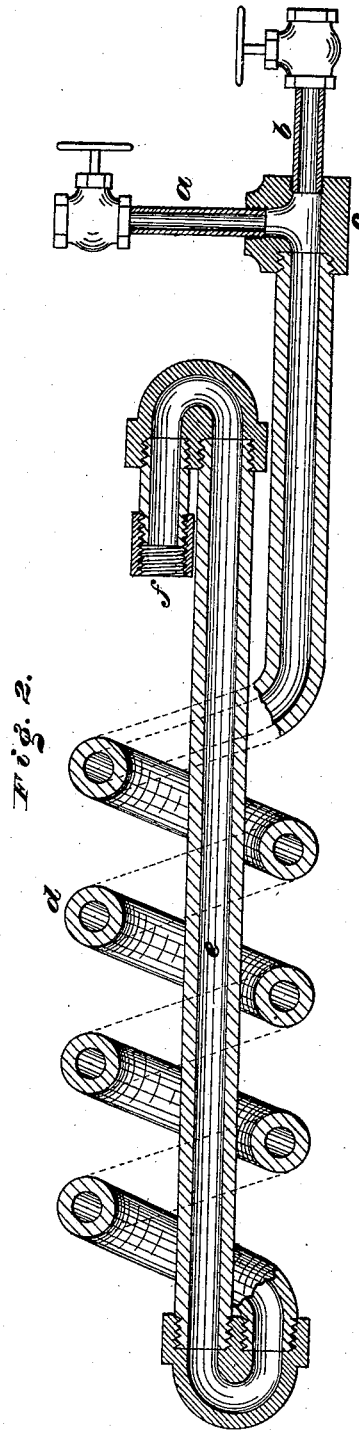


(No Model.)

H. W. WHITING.
APPARATUS FOR BURNING HYDROCARBON OILS.
No. 306,887.
Patented Oct. 21, 1884.



WITNESSES:
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UNITED STATES PATENT OFFICE.

HENRY W. WHITING, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR BURNING HYDROCARBON OILS.

SPECIFICATION forming part of Letters Patent No. 306,887, dated October 21, 1884.

Application filed November 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. WHITING, a citizen of the United States, residing at 3,700 Spring Garden street, in the city and county of Philadelphia, in the State of Pennsylvania, have invented a new Improvement in Apparatus for Burning Hydrocarbon Oils, of which the following is a specification.

My invention relates to improvement in apparatus for burning hydrocarbon oils by passing hydrocarbon oils alone, or by passing hydrocarbon oils and steam together, through heated pipes or chambers, either coiled, straight, or bent, whichever may be most convenient.

The invention consists of the following parts, in combination: a steam-pipe, an oil-pipe connected therewith, a superheater in the form of a coil, and a pipe passing through the coil and leading to the burner, which is so placed that the flame is discharged along the last-named pipe and through the superheater-coils, for the purpose of heating the mingled oil and steam on its passage to the burner.

The objects of my improvements are, first, the more complete and perfect vaporization of hydrocarbon oils; second, to insure perfect safety in burning hydrocarbon oils, by preventing back-pressure and danger from accumulated gases; third, to prevent carbonization or the formation of residuum within the apparatus. I attain these objects by the mechanism shown in the accompanying drawings, in which—

Figure 1 is an exterior view, and Fig. 2 is a sectional view, of an apparatus containing my invention, the nature of which is duly set forth in the claim hereinafter presented.

In Figs. 1 and 2 of the drawings, upright pipe *a* represents a conduit for supplying the oil to the apparatus.

Horizontal pipe *b* represents a conduit for supplying the steam or water (whichever may be used) to the apparatus.

The chamber *c* is the point where the oil and water or oil and steam come in contact.

d and *e* represent chambers wherein the vapor is superheated.

f is the orifice from which the vapor or gas is ejected.

The said chambers are formed in a tube con-

sisting of a coiled part, *d*, and a straight part, *e*, which extends backward through said coils, this straight part terminating in a burner, nozzle, or discharge-orifice, *f*, the flame from which is directed on the coils of the part *d* in a line parallel to the part *e*, and at a point near the latter, in order that both parts or chambers *d* and *e* of said tube may be duly subjected to the heat of said burner.

The apparatus, as shown in Figs. 1 and 2, is operated as follows: Open the valve at the conduit *a*, which will allow the oil to pass from a reservoir through the conduit *a* into the chamber *c*, then open the valve at *b*, so that the steam or water (whichever may be used) may pass through the conduit *b* to the chamber *c*, where it will come in contact with the oil from conduit *a*, then together from the chamber *c* they are passed into the chambers *d* and *e*, which are in the path of a flame and intensely heated, and in which they are together instantly converted into a hydrocarbon vapor or gas, which is forced to the orifice *f*, and from thence ejected and burned, the flame from which is thrown upon the chambers *d* and *e*, and which orifice, to prevent excessive pressure, is made larger than the conduits *a* and *b* combined.

Any suitable means may be applied to introduce the steam or the water (whichever may be used) into conduit *b*.

By experimentation I find that the diameter of the orifice of the superheating-chambers should be made large enough to allow any excess of pressure to pass out of the burner, thereby insuring perfect safety and freedom from clogging by the formation of residuum.

I am aware that prior to my invention hydrocarbon oils have been burned in conjunction with air in coiled pipes, and that also coiled pipes have been used to superheat steam for the purpose of heating and vaporizing the oil. I therefore do not claim such a combination, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

A hydrocarbon-burner formed of piping, and consisting of the following parts in combination: the steam-pipe *b*, oil-pipe *a*, connected therewith, the superheater *d* in the form of a coil, and the pipe *e*, passing through the

coil and leading to the burner, which is so placed that the flame is discharged along the pipe *c* and through the superheater-coils for the purpose of heating the mingled oil and
5 steam on its passage to the burner, substantially as described.

In testimony whereof I have hereunto set my

hand in the presence of two subscribing witnesses.

HENRY W. WHITING.

Witnesses:

ARCHER McLEAN,
W. J. SMYTH.