

(No Model.)

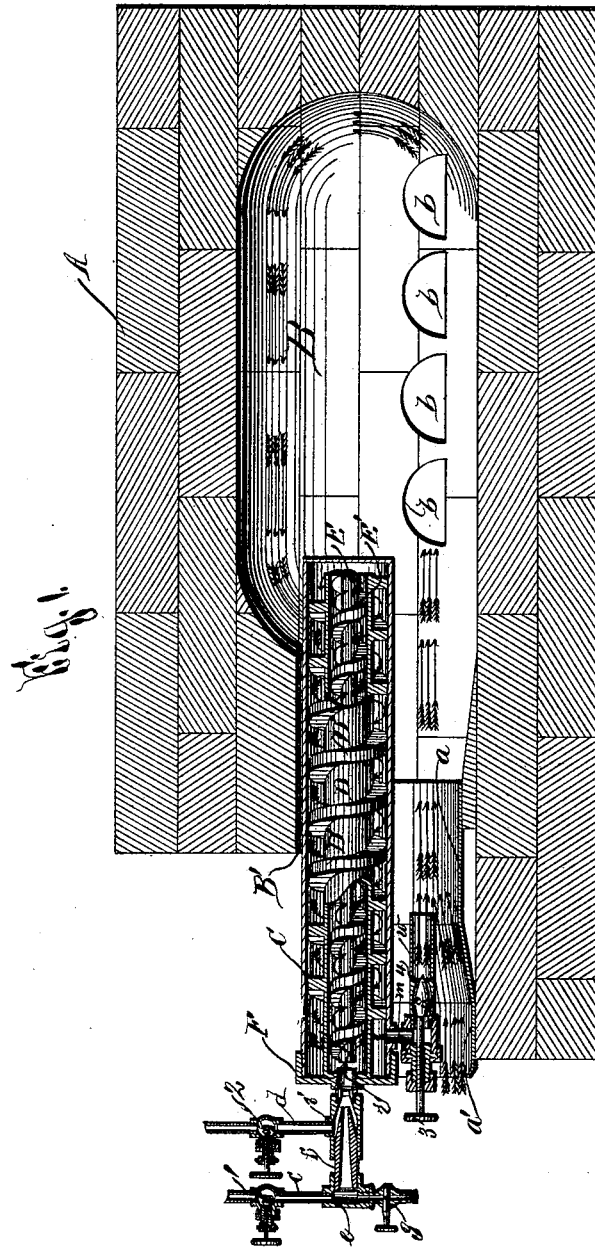
3 Sheets—Sheet 1.

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HYDROCARBON VAPORIZER AND BURNER.

No. 386,258.

Patented July 17, 1888.



WITNESSES:

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Fig. 2

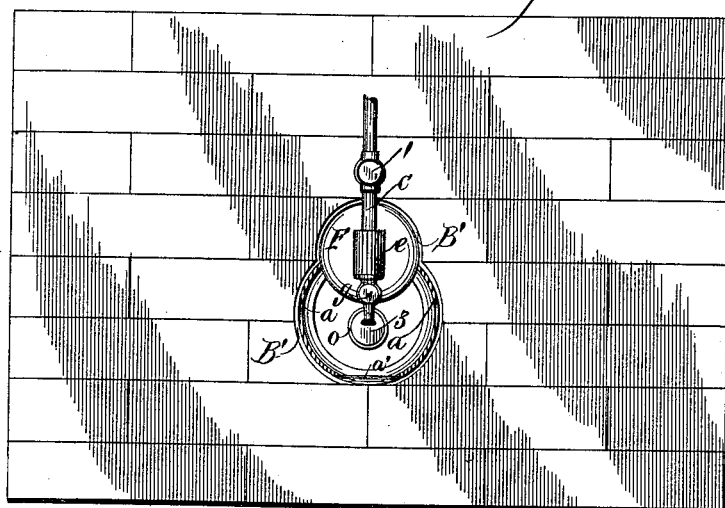
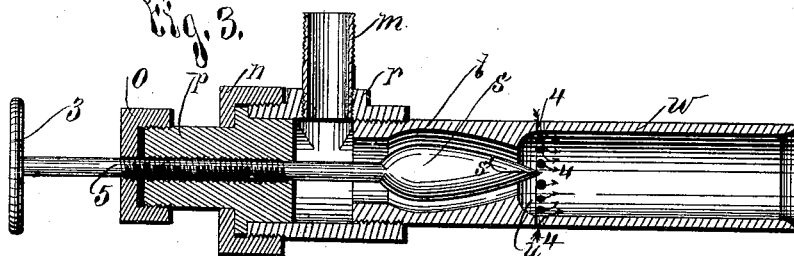


Fig. 3



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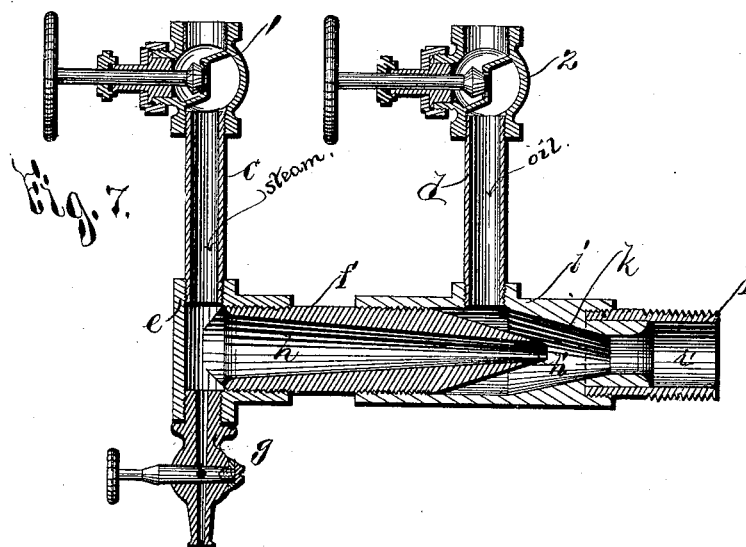
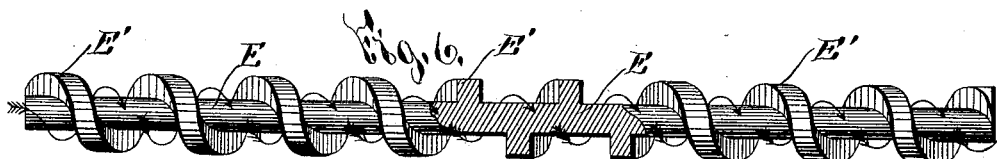
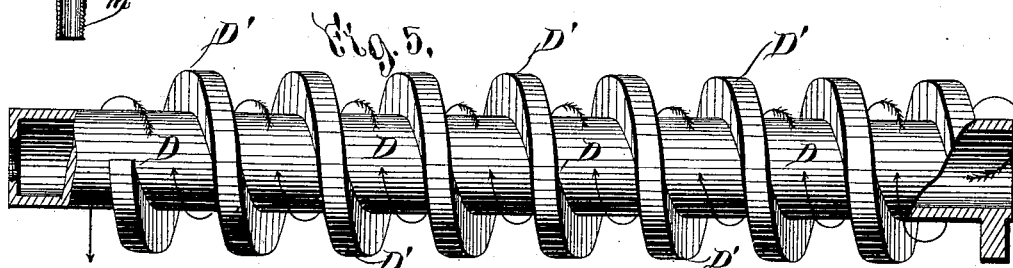
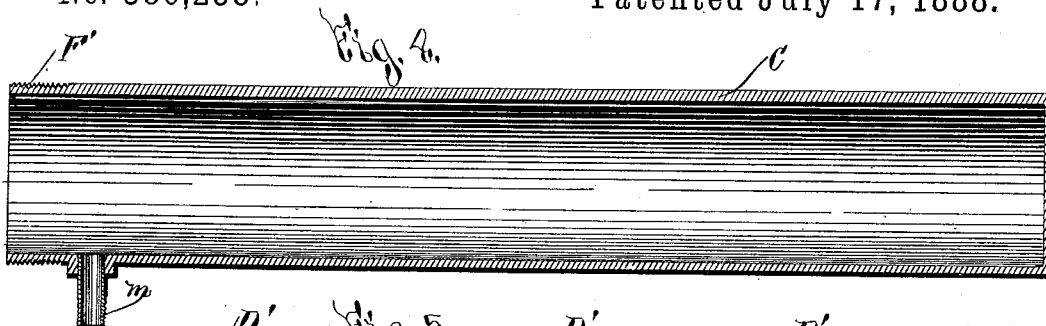
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# UNITED STATES PATENT OFFICE.

FRANK B. MEYERS, OF FORT PLAINS, NEW YORK.

## HYDROCARBON VAPORIZER AND BURNER.

SPECIFICATION forming part of Letters Patent No. 386,258, dated July 17, 1888.

Application filed September 8, 1887. Serial No. 249,079. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK B. MEYERS, of Fort Plains, in the county of Montgomery, in the State of New York, have invented new and useful Improvements in Hydrocarbon Vaporizers and Burners, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to improvements in hydrocarbon vaporizers and burners of the class wherein steam and oil are commingled and forced through the vaporizer and burner by the pressure of the steam in the form of a spray, whereby an intense heat is obtained from the combustion of the oil in contact with the steam; and to this end my invention consists in certain peculiarities of the construction and arrangement of the mixing or vaporizing chamber, the burner, and furnace, substantially as will be hereinafter more fully set forth and claimed.

In specifying my invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal section of my improved hydrocarbon-burner, showing the same applied in connection with a reverberatory combustion-chamber for generating steam or analogous heating purposes. Fig. 2 shows a front view of the same. Fig. 3 shows an enlarged detached view, in section, of the flame-spreader, illustrating more particularly the construction of the device. Fig. 4 is an enlarged longitudinal section of the case of the mixing or vaporizing chamber. Fig. 5 is an enlarged detached view of the concentric inner tube, which fits within the case or body of the chamber shown in Fig. 4, illustrating my preferred plan of constructing the retarding-passages within the body of the chamber. Fig. 6 is an enlarged detached detail of the smaller concentric spiral fitting within the concentric tube illustrated in Fig. 5, forming an additional return retarding-passage through the body or case of the chamber illustrated in Fig. 4; and Fig. 7 illustrates an enlarged detached detail, in section, of the steam and oil pipes and the atomizing or commingling nozzles.

A denotes the masonry of the boiler or other form of heater, provided with a reverberatory combustion-chamber, B, as best shown in Fig. 1, and in this example of my invention I have selected, merely for the purposes of illustration, the boiler structure or heater structure composed of masonry. I do not, however, restrict myself to such structure, since the only essential thereof consists of providing the reverberatory combustion-chamber B therein.

C is the body or case of my hydrocarbon-mixer, and the same consists, as shown in Fig. 4, of a cylindrical tube provided with the pipe *m*, which affords a connection to the spreader device or burner proper, *w*, as shown in Figs. 1 and 3. On the interior of the tube C and concentric therewith I place the tube D, having the spiral or scroll shaped wings *D'*, Figs. 1 and 5, the purpose of which will be presently explained, and on the interior of the concentric tube D, I place the rod E, provided with the spiral scroll *E'*, as best shown in Figs. 1 and 6. It will thus be observed that in the case or body C of the mixer spiral passages are provided leading from the inlet *i'* in Fig. 1 into the spiral passage formed by the spiral *E'*, encircling the rod E within the tube D, which terminates near the inner end of the body C within the combustion-chamber B, as shown in Fig. 1. The said passage then opens into the spiral passage formed between the exterior surface of the tube D and the spiral coils *D'*, where it finally opens into the pipe *m*, which connects the burner-body to the spreader-valve and burner proper, *w*. The object of thus providing the case C with the spiral passage one within the other, connecting with each other and with the spreader-valve and burner proper, will be apparent when it is noted that the steam and oil inlets are connected to the inlet *i'* of the mixing and vaporizing chamber, and that the commingled oil and steam pass through the spirals, and are thus retarded in their progress through the body and into the spreader-valve, where the flame is finally discharged to heat the combustion-chamber B.

The steam and oil inlet pipes are composed of the pipes *c* *d*, provided with valves 1 and 2, as shown in Figs. 1 and 7 of the drawings, said pipes being connected to suitable sources of supply and connected to the unions *e* *i*, the union *e* being provided with a blow-off valve,

g, in line with the steam-passage. Into the union *e* is screwed the conical screw-threaded nozzle *f*, provided with the tapering passage *h*, the opposite end of which is also screw-threaded and connected to the union *i*, which is provided with the conical nozzle *k*, within which the end *h'* of the tapering passage *h* within the nozzle *f* terminates. The union *i* is connected to the case or body C of the vaporizer by the screw-threaded connection *l'*, having the inlet-passage *l'*, Figs. 1 and 7. It will thus be observed that the oil and steam enter from their respective pipes the conical passage *k*. From this they are forced by the pressure of the steam into the body or case C of the vapor-burner, and pass through the retarding-passages until they finally emerge through the connecting-pipe *m* into the spreader S, from whence they are consumed within the burner proper, *w*, Figs. 1 and 3.

The spreader device is of a well-known form, consisting of the needle-pointed valve *s'*, seated within the conical opening *t* within the burner proper, *w*, and having the screw-threaded spindle 5 passing through the plug *p*, and the regulating or hand-wheel 3. The stem 5 passes through the cap O, connected to the plug *p*, which is provided with a screw-threaded cap, *n*, which secures it to the union *r*, in the opposite thread of which burner *w* is connected by means of the pipe *m* to the vaporizer-body C.

Immediately in front of the needle-pointed valve *s'*, I provide a series of perforations, 4, extending circumferentially around the burner *w*, and the said perforations serve to admit air to the flame issuing from the valve *s'*.

The burner *w* is located within the conical-shaped cylinder *a*, Fig. 1, and the said cylinder is provided with a space, *a'*, Fig. 1, through which air is supplied to the burner, as will be presently described.

The combustion-chamber is of the reverberatory form—that is, provided with low arched or curved extremities, as best shown Fig. 1—and the body or case C is located in relation thereto, so as to project inward, and an air-space, B', left between the casing and the body C.

It will be observed that the vaporizing-chamber C, projecting into the combustion-chamber, exposes the vaporizing-chamber to the heat of the combustion-chamber, and the object of doing this is to utilize the heat of the combustion-chamber to act upon the commingled oil and steam as they pass through the retarding-passages in the body, heating them intensely, so that when they enter the spreader an intensely-hot vapor is produced, which becomes further heated by the supply of oxygen taken in through the opening *a'* in the air-chamber *a*, and the result is that an intensely-heated flame is ejected into the combustion-chamber, and great heat thereby produced.

The operation of the burner is regulated by means of the valves 1 and 2 and the spreader-valve 3, so that the flame of the burner may be controlled as desired.

In order to allow for the escape of the products of combustion, and at the same time to keep the circulating current within the combustion-chamber, I provide small openings *b b b* in the side of the masonry at the ends of the combustion-chamber B, through which the same escapes.

It will be readily understood that my invention may be applied to furnaces of steam-generators or analogous purposes by setting the boiler over the combustion-chamber in proper position to utilize the heat of the combustion-chamber.

The operation of my invention is as follows: The steam-column and oil-column discharge through the inlet *i'* into the spiral passage in the tube D, from thence through the tortuous passage on the exterior of the tube D, formed by the spiral coils D', as previously described, and finally through the pipe *m* into the spreader-valve, following the direction of the arrows shown in Figs. 1, 5, and 6 of the drawings. The commingled oil and steam become intensely heated, as stated, by reason of the exposure of the inner end of the case or body C to the heat of the combustion-chamber. The result is that the commingled oil and steam are vaporized and issue from the valve *s'* in the form of a highly-heated gas or vapor, which rushes forth into the combustion-chamber with great power and emits an intense heat. The fresh air supply is further augmented by the vacuum which is caused in the air-passage *a* by the gaseous discharge from the spreader-valve *s'*, and the combustion is thereby rendered perfect by the generous supply of oxygen afforded through the air-passages.

The operation is indicated by the arrows in Fig. 1, and will be readily understood from the foregoing.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In a hydrocarbon-burner, the combination, with the combustion-chamber, the burner, and the retort, consisting of the case or body C, of the vaporizing-tube D, having the spiral or scroll shaped wings D', and the rod E, provided with the spiral scroll E', substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 29th day of August, 1887.

FRANK B. MEYERS.

Witnesses:

FREDERICK H. GIBBS,  
E. C. CANNON.