

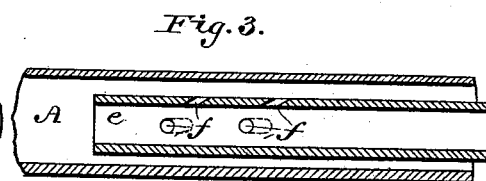
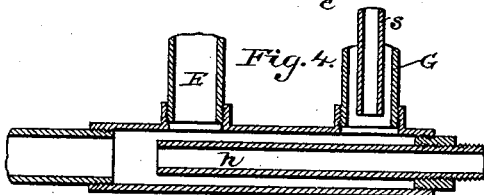
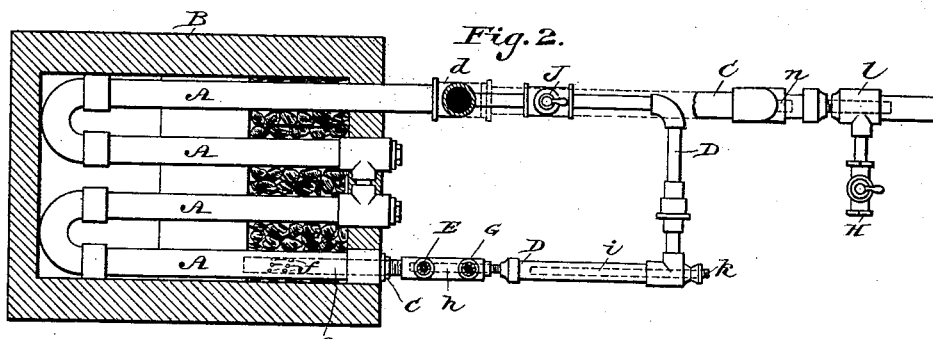
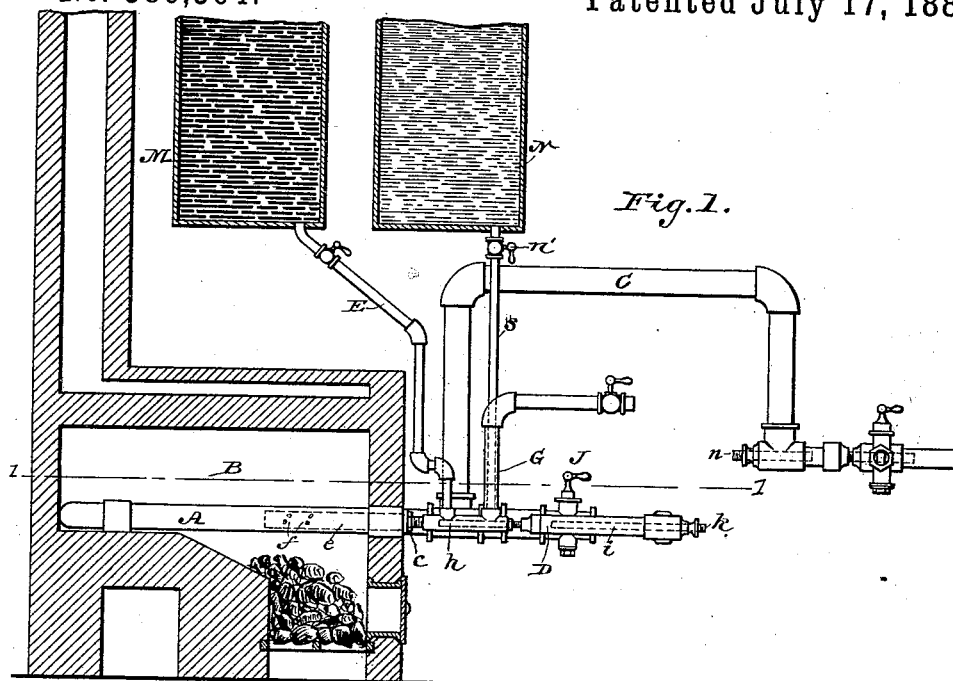
(No Model.)

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APPARATUS FOR THE MANUFACTURE OF VAPOROUS AND GASEOUS FUEL.

No. 386,364.

Patented July 17, 1888.



Witnesses.

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APPARATUS FOR THE MANUFACTURE OF VAPOROUS AND GASEOUS FUEL.

SPECIFICATION forming part of Letters Patent No. 386,364, dated July 17, 1888.

Application filed January 17, 1888. Serial No. 261,002. (No model.)

To all whom it may concern:

Be it known that I, CHARLES STILWELL, a citizen of the United States, and a resident of Trenton, Mercer county, State of New Jersey, have invented certain new and useful Improvements in Apparatus for the Manufacture of Vaporous and Gaseous Fuel, Illuminating-Gas, &c.; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents, in side elevation, apparatus embodying my invention in connection with a heating-furnace shown in vertical section. Fig. 2 represents a plan view of said apparatus and a sectional view of the furnace upon a plane indicated by the line 1 1 of Fig. 1. Fig. 3 represents an enlarged detail sectional view of the inlet portion of the retort and its feed-pipe, and Fig. 4 represents a like view of the injecting device for supplying the retort and returning the residuum thereto.

Similar letters of reference indicate similar parts throughout the several views.

My present invention relates to the construction of apparatus for the manufacture of vaporous and gaseous fuels; and the object is to simplify the construction of such apparatus and to render it more efficient.

Heretofore great difficulty has been experienced in the generation of fuel-gases from petroleum, naphtha, gasoline, &c., in retorts owing to the practical impossibility of securing a uniform current through the retort of the fluid to be volatilized. Various devices have been introduced to obviate this difficulty; but they have proved of little value, owing largely to their tendency to produce an accumulation of carbon within the retort, which soon chokes it and obstructs the passage of the fluid, &c. There has also been a considerable residuum of oil, &c., after volatilization in the retort, which either went to waste or had to be collected and reintroduced into the retort by laborious processes. My present invention embodies the means of securing a uniform current through the retort of the fluid to be volatilized, and at the same time does away with all obstructions in the retort and its connections which would tend to facilitate the accumulation of carbon therein, and also affords means of repassing all waste materials through

the retort and securing their volatilization without manual intervention.

I will now proceed to describe my invention more fully.

In the drawings, A is the retort, which is placed within the walls of a furnace, B, and brought in contact with the heat of the fire therein, the inlet *c* and the outlet *d* of the retort projecting through the outer wall of the furnace.

C is the outlet-pipe, connected with one end of the retort and conducts from it the volatilized fluid.

D is the circulating-pipe passing from the outlet of the retort back to the inlet, and through it the residuum of the gas-producing material ejected from the retort returns to the inlet of the retort and into it, and is thus again subjected to the action of the heat of the furnace.

e is a back-pressure pipe within the retort A and is provided with perforations *f*, directed inwardly toward the mouth of the pipe, as more clearly shown in Fig. 3, and for the purposes hereinafter described.

E is the supply-tube through which the liquid hydrocarbon passes from a tank or receiver, M, containing the same to the retort A.

G is a pipe through which air and water may be passed into the retort A.

Within the circulating-pipe D is located a pipe or tube, *h*, as shown in dotted lines in Figs. 1 and 2 and in full lines in Fig. 3. This pipe or tube is of smaller external diameter than the internal diameter of the circulating-pipe D and extends beyond the inlet-opening of the supply-pipe E. A pipe or tube, *i*, extends into the pipe D, whereby air or steam may be forced into said pipe D, if desired. A similar injecting-pipe, *m*, is provided for the introduction of an air or steam blast into the gas-pipe C.

H is a pipe for the introduction of air into the gas as it passes off from the retort through the pipe C, the flow of the air being regulated by a stop-cock, as shown in the drawings.

My apparatus is operated thus: A fire being kindled in the furnace B, the stop-cock J in the circulating-pipe D is closed. The petroleum, naphtha, or other fluid from which the gas is to be generated is then allowed to flow

through the pipe E into the retort in such volume as is desired, the flow being regulated by a stop-cock in the pipe E. The oil or fluid passes into the retort A and into the circulating-pipe D, and when the operation has progressed far enough to produce a sufficient level of the residuum in the retort the stop-cock J is opened and the residuum enters the pipe D, the air which is in the pipe D being displaced by the fluid.

The current through the retort A and circulating-pipe D is induced and maintained as follows: The fluid being heated is in part volatilized, and said volatilized portion passes into and through the tube C, while the non-volatilized portion passes on through the circulating-pipe D and re-enters the retort. As the pressure of the fluid and vapor or gas through the perforations *ffff* is toward the mouth of the back-pressure pipe, owing to the internal inclination of the perforations toward the mouth, the pressure of the contents of the retort at the mouth of the pipe *e* is neutralized, and the current of the fluid naturally sets toward the point of escape of the gas in the pipe C, and is thus maintained.

To facilitate the volatilization of the fluid in the retort, atmospheric air is introduced through the air-pipe G into the circulating-pipe D, which is not quite filled with fluid, at the base of the pipe G. The fluid flowing through the pipe or tube *h* toward the retort A tends to form a vacuum in the circulating-pipe D at the base of the pipe G, and the air is drawn in through the circulating-pipe D and passes with the fluid into the retort A.

In generating gas for fuel a larger quantity of petroleum or other fluid material is introduced into the retort A and a greater accumulation of carbon within the retort is commonly occasioned. To obviate this accumulation of carbon, water is commingled with the fluid in the retort. This is done by dropping a small quantity of water through the air-pipe G from a tank, N, the flow of water being regulated by a stop-cock, *n*, in a small pipe, *s*, leading from the water-tank N into the air-pipe G. The action of the gas-producing fluid passing through the pipe or tube *h* draws the water with the air into the retort A.

In generating illuminating-gas the use of water is not necessary; but after the process is finished and the flow of oil in the pipe E is cut off it is advisable to introduce water into the retort, as above mentioned, to carry off in its

vaporization the residuum of fluid and leave the retort clear and clean.

To render the gas perfectly combustible it is necessary after its generation to introduce into it a certain proportion of atmospheric air. This air is introduced through the pipe H and its flow regulated by a stop-cock, as shown in Fig. 1. Within the outlet-pipe C at *l* is an air-inlet pipe. (Shown by dotted lines.) The passage of the gas through the pipe C toward the tank or receiver tends to produce a vacuum in that part of the pipe C at the end of the pipe H, and the air is thus drawn in and commingled with the gas.

The use of an air or steam blast to maintain a current or flow of fluid through the retort A and pipe D is unnecessary in this apparatus; but, if desired, it may be introduced into the circulating-pipe D at the point *k* and directed through the retort A, or it may be introduced into the escape-pipe C at *n* and directed toward the gas receiver or tank.

Having thus described my invention, I desire to claim—

1. The circulating-pipe D, containing the pipe *h*, in combination with the fluid-supply pipe E, the escape-pipe C, and the retort A, containing the pipe *e*, substantially as shown and described.

2. The circulating-pipe D, containing the pipe *h*, in combination with the fluid-supply pipe E, the pipe G, the escape pipe C, and the retort A, containing the pipe *e*, substantially as shown and described.

3. The retort A, containing the pipe *e*, in combination with the escape-pipe C, containing the pipe *l*, the circulating-pipe D, containing the pipe *h*, and the pipe E, substantially as shown and described.

4. The retort A, containing the pipe *e*, in combination with the escape-pipe C, containing the pipe *l*, the circulating-pipe D, containing the pipe *h*, the pipe E, and the pipe G, substantially as shown and described.

5. The retort A, containing the pipe *e*, in combination with the pipe C and the pipe D, said pipe D being located in substantially the same plane as the retort and connecting the delivery end of the retort with the inlet-pipe, substantially as shown and described.

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