

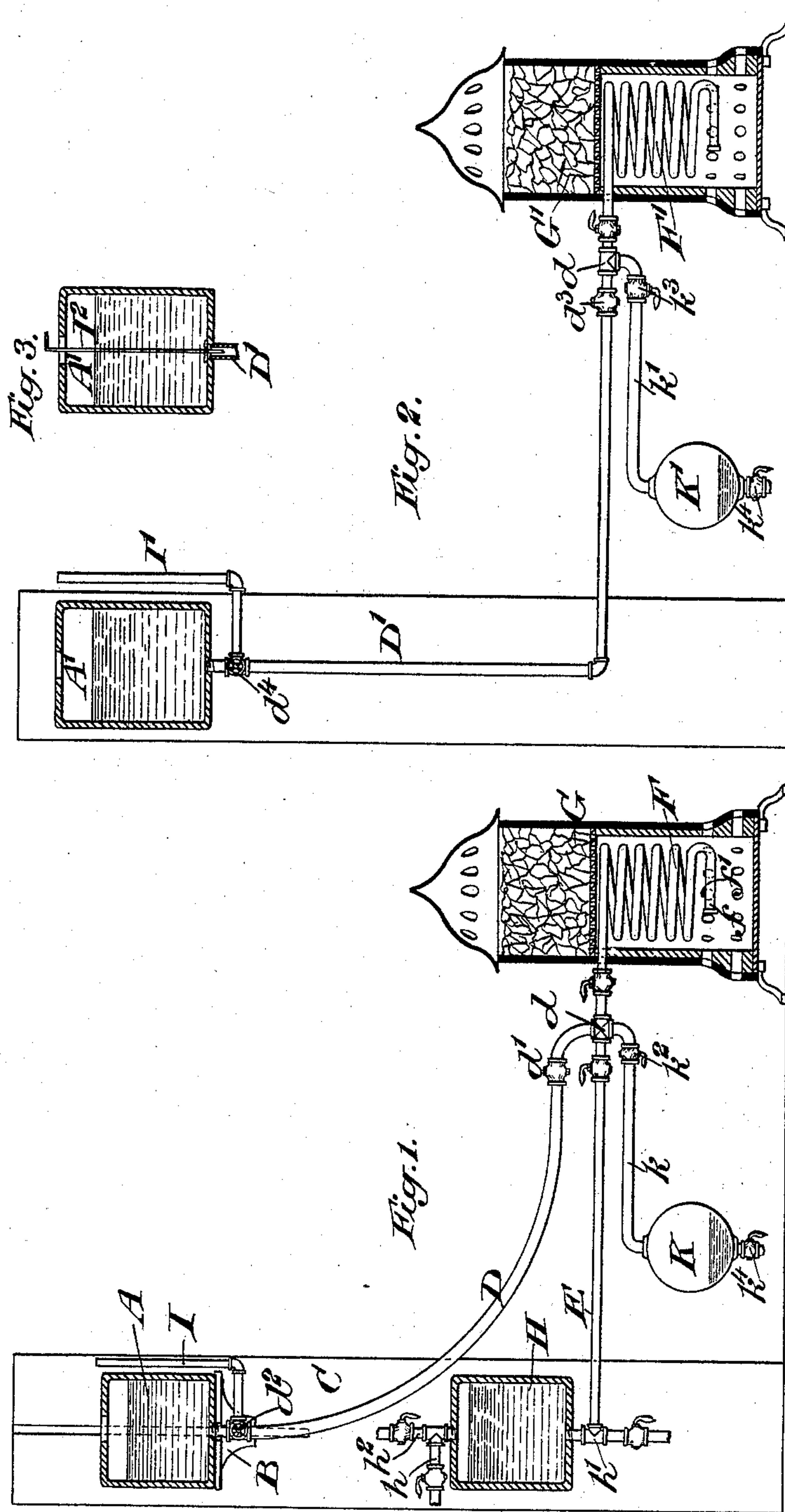
(No Model.)

S. TURNER.

APPARATUS FOR SUPPLYING LIQUID FUEL TO BURNERS.

No. 540,369.

Patented June 4, 1895.



Witnesses:-
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR SUPPLYING LIQUID FUEL TO BURNERS.

SPECIFICATION forming part of Letters Patent No. 540,369, dated June 4, 1895.

Application filed March 12, 1895. Serial No. 541,417. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL TURNER, of the city and county of New York, in the State of New York, have invented a new and useful
5 Improvement in Apparatus for Supplying Liquid Fuel to Burners, of which the following is a specification.

My invention relates to an improvement in apparatus for supplying liquid fuel to a
10 burner in which provision is made for exerting a temporary or auxiliary return pressure upon the liquid fuel in proximity to the burner when, from any cause, it has been momentarily driven back to a greater or less extent
15 from the burner, thereby rendering the flame steady and permanent. In connection with such auxiliary return pressure device, I have also shown means for feeding water to the
20 burner by the pressure of a liquid hydrocarbon, means for flushing the hydrocarbon feed pipe and an automatic check for preventing back pressure upon the liquid hydrocarbon in the reservoir and feed pipe leading therefrom.

25 In the accompanying drawings, Figure 1 represents the apparatus in side elevation, partly in vertical section. Fig. 2 is a similar view with the water-reservoir and feed-pipe omitted; and Fig. 3 is a view in detail of the
30 hydrocarbon-reservoir, showing a different arrangement of the vent for flushing the feed-pipe.

Referring to Fig. 1, A represents some suitable means for retaining a body of liquid hydrocarbon, in the present instance a rectangular shaped tank supported upon a bracket B
35 adapted to be raised and lowered to increase or diminish the head under which the liquid hydrocarbon is fed. C represents any suitable support for the bracket B and the tank
40 A. A feed pipe D leads from the tank A to a coupling d where it is joined by a pipe E leading from a water tank H, in the present instance fixed to the support C and provided
45 with suitable filling and discharge pipes h , h' and h^2 . From the coupling d a pipe leads to a coil F, terminating in a burner f beneath the coil, the said burner being provided with a nipple f' . At d' there is a check valve in
50 the pipe D, to prevent back pressure on the liquid hydrocarbon within the said pipe and

there is also a stop cock d^2 near the bottom of the reservoir A. A vent pipe I leads from a point at or below the stop cock d^2 to a point
above the surface of the liquid within the
55 tank A. Said vent pipe may be located outside of the tank A, as shown in Figs. 1 and 2, or within it, as shown in Fig. 3.

Referring to Fig. 2, the hydrocarbon tank is denoted by A', the oil feed pipe by D', the
60 check valve by d^3 and the coil above the burner by F'. The vent pipe is here denoted by I' and in Fig. 3 by I². The stop cock for cutting off the supply of liquid hydrocarbon from the feed pipe D' is here denoted by d^4 .
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In Fig. 1 the heater, provided with refractory material to be rendered incandescent by the flame, is denoted by G and in Fig. 2 by G'.

In the form shown in Fig. 2 where the water supply is omitted, the flame at the burner
70 is yellowish white in color and may serve either for purposes of heating, as shown, or for purposes of lighting as may be found desirable.

In both of the arrangements shown in Figs.
75 1 and 2, there is provided a return pressure chamber. Shown in the present instance as of globular form and denoted by K in Fig. 1 and K' in Fig. 2. This chamber K or K' is connected by a pipe k or k' with the feed
80 pipe, preferably near the coil F or F', conveniently by means of the coupling d . These pipes k , k' are each provided with a stop cock, denoted respectively by k^2 , k^3 and the return pressure chamber K or K' is provided with a
85 discharge cock k^4 .

In operation, the oil alone, or the oil and water mingled together, is or are forced to the burner by the pressure of the liquid hydrocarbon, under gravity; or artificial pressure
90 upon the oil in the tank might be employed. The inlet and outlet pipes in connection with the water tank H are both tightly closed when the burner is in operation, so that a portion of the hydrocarbon creeps back along the
95 pipe E and, rising upwardly through the liquid within the tank H, exerts a pressure upon the top of the water in that tank to feed it, together with the liquid hydrocarbon, to the burner. A portion of the hydrocarbon
100 or hydrocarbon and water, as the case may be, gathers within the pipe k' or k and tends

to compress the air within the return pressure chamber K' or K. It is intended that the pipes *k*, *k'* shall be so restricted in respect to their bore that the oil or oil and water combined therein shall cut off the free passage of water past the liquid in the pipe and hence cause the air to drive the liquid before it as the air expands. When from any cause there is a sudden expansion of gases within the coil F which would tend to make the flame puff and send back the fuel from the coil, it will close the check valve in the feed pipe D' or D and its effect will be felt along the pipe *k'* or *k*, discharging a small quantity of oil or mingled oil and water into the return pressure chamber and at the same time further compressing the air therein. The moment the sudden expansion of gas ceases, the compressed air within the return pressure chamber will force the liquid fuel again into the coil F regardless of the time required for the check valve in the feed pipe to open and will thereby not only form a relief for the sudden pressure which takes place within the coil but a quick response after such sudden expansion takes place to keep the feed and the pressure of the fuel within the coil constant.

The vent pipes I, I', I² serve the purpose of flushing the feed pipes with the liquid hydrocarbon in starting the apparatus and during its operation.

What I claim is—

1. An apparatus for feeding liquid fuel to a burner, comprising means for containing a body of liquid fuel, a feed pipe for conducting the liquid fuel from the supply to a burner, a

return pressure chamber and a connection between the return pressure chamber and the feed pipe, the said connection being adapted to retain a supply of liquid fuel subject to the impulse of the expanding air within the pressure chamber, substantially as set forth.

2. Means for containing a body of liquid fuel, a feed pipe for conducting the liquid fuel to the burner, a check valve in said feed pipe, a return pressure chamber and a connection between the return pressure chamber and the feed pipe, the said connection communicating with the feed pipe at a point intermediate of the check valve and burner and adapted to retain a charge of liquid fuel subject to the impulse of the expanding air in the return pressure chamber, substantially as set forth.

3. Means for containing a body of water, means for containing a body of liquid hydrocarbon under head or pressure, means for transmitting pressure to the water through the medium of the liquid hydrocarbon, means for bringing the two liquids into intimate contact in their passage to the burner, a return pressure chamber and a connection between the return pressure chamber and the means for bringing the two liquids into intimate contact, said connection being adapted to transmit air pressure from the return pressure chamber to a charge of liquid fuel intermediate of the return pressure chamber and the burner, substantially as set forth.

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Witnesses:

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