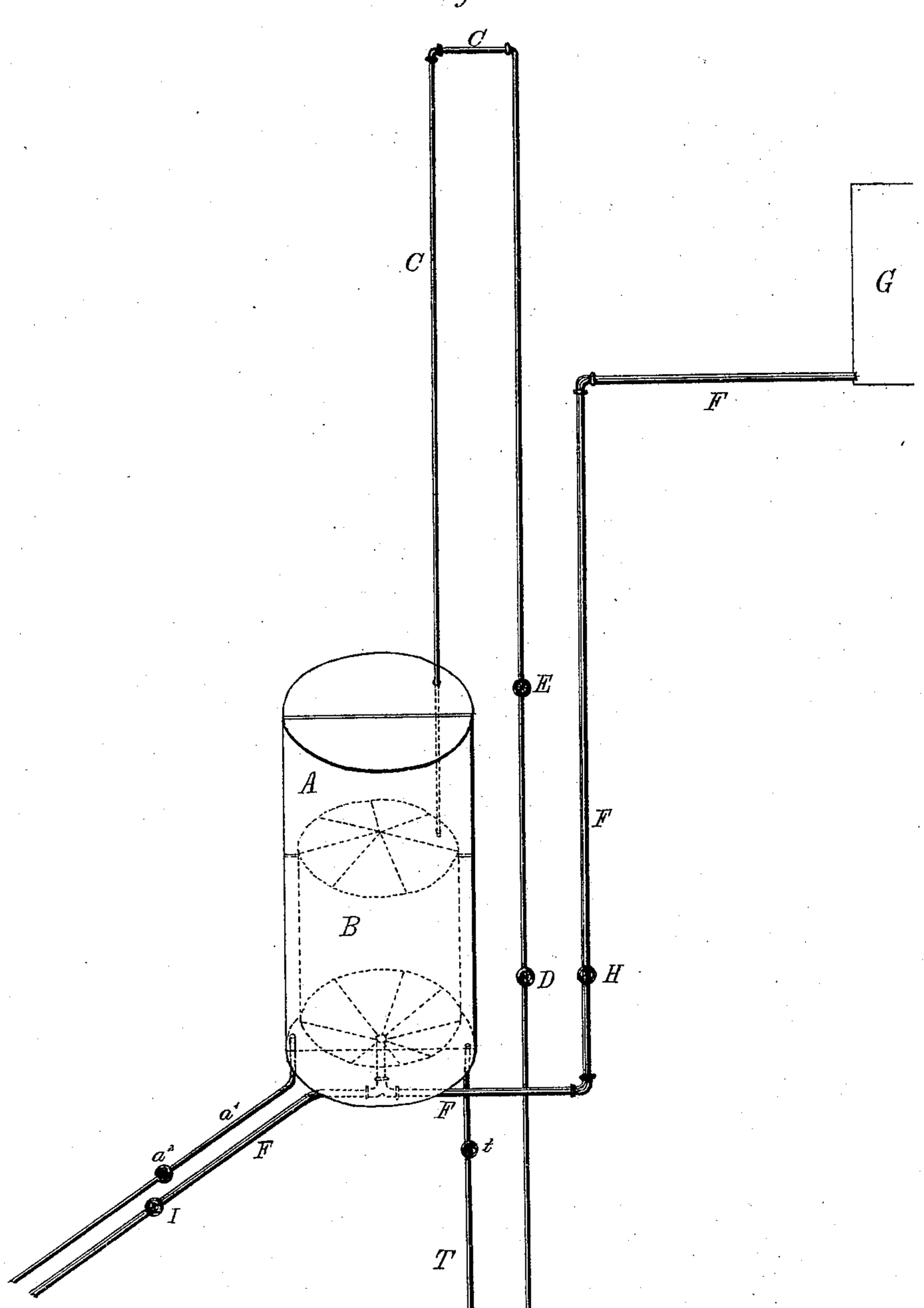
(No Model.) 2 Sheets—Sheet 1.

J. F. IRONS.

FEED REGULATOR FOR LIQUID FUEL.

No. 370,336. Patented Sept. 20, 1887.

Fig 1



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(No Model.) 2 Sheets—Sheet 2.

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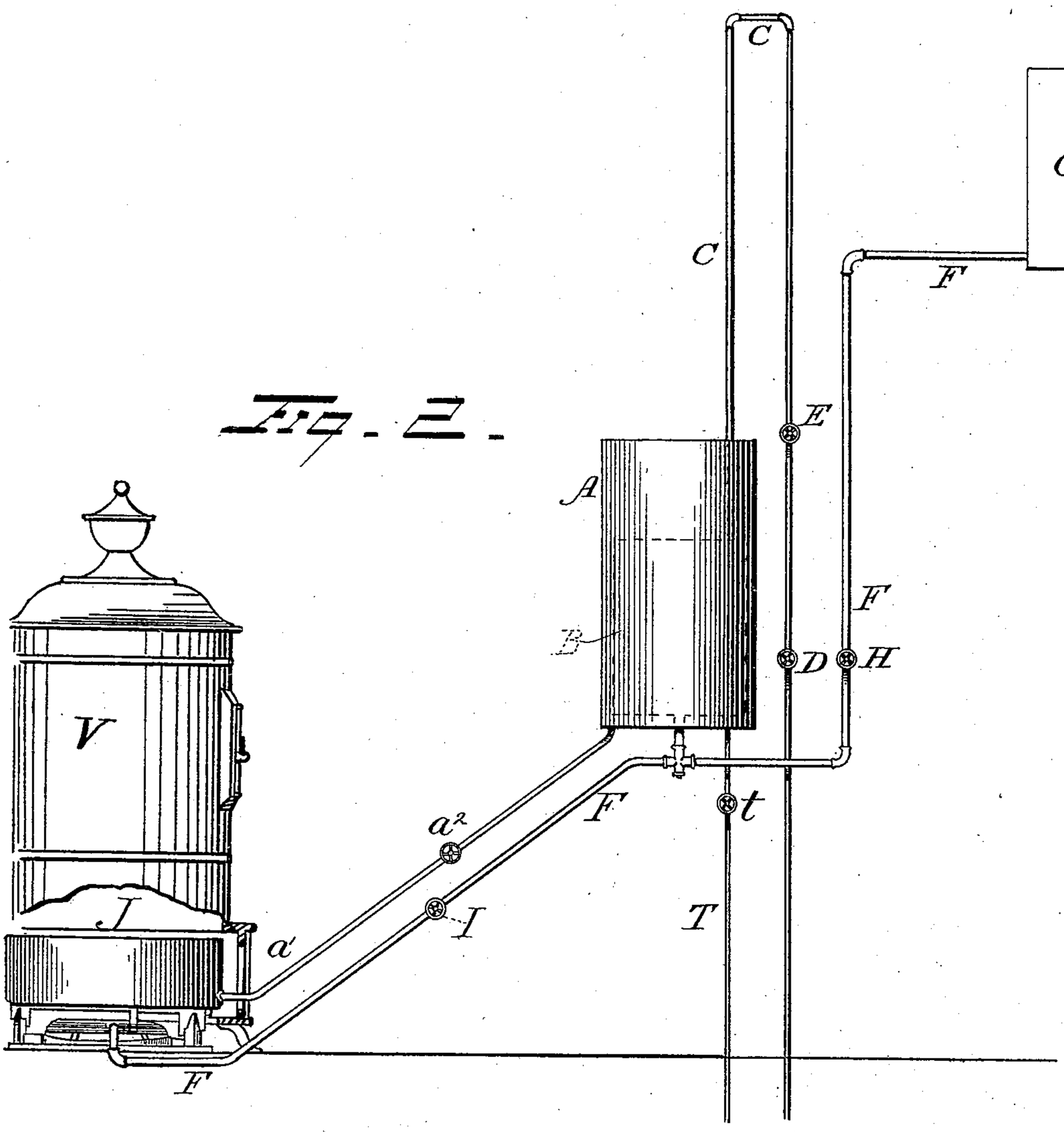
Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH F. IRONS, OF BRADFORD, PENNSYLVANIA.

FEED-REGULATOR FOR LIQUID FUEL.

SPECIFICATION forming part of Letters Patent No. 370,336, dated September 20, 1887.

Application filed December 31, 1885. Serial No. 187,264. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH F. IRONS, a citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Feed-Regulators for Liquid Fuels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to provide an effectual means to secure a regular flow of liquid fuel from a tank; and it consists in making the tank air-tight, protecting it from sudden changes of temperature, and governing the flow by admitting air to the tank in just such quantity as to allow the proper amount of liquid to flow out. It is very difficult, if not impossible, to regulate precisely the flow of liquid by any ordinary stop-cock, especially where the required flow is small, for if the stop-cock is made precise and delicate enough to allow only the proper quantity to flow the aperture will soon become clogged by the impurities present in ordinary liquids.

My invention is particularly adapted for governing the feed of oil to burners, and it will be shown and explained when used for that purpose.

I attain the object of my invention by the apparatus shown in the accompanying drawings, in which—

Figure 1 is a representation of the oil and water tanks and pipes with connecting-pipes and stop-cocks Fig. 2 represents an elevation of the same device with the burner attached, the latter being shown in connection with a stove, the lower part of which is partly broken away and partly in section.

The apparatus shown in Fig. 1 is intended to be used with an oil-burner, in which water and steam, or either, are used to aid and improve the flame of oil. It will be described of the size which experience has shown to be well adapted for ordinary cook and heating stoves in dwellings.

A is a water-tank, say fourteen inches in diameter and twenty-four inches high. Its cover is hinged near its diameter, and it has a quarter-inch pipe, a', leading to the steam-generator, with a stop cock, a^2, thereon, by which the flow of water is regulated or shut off.

B is an oil-tank, say twelve inches in diameter and twelve inches high, with coned top and coned bottom, the height of the cone being about two inches. This is requisite in order to make the tank B proof against buckling or changes in form from variations in pressure upon its surface. The oil-tank B is placed inside the water-tank and is surrounded by water, and is thus kept from sudden or extreme changes of temperature, as the tank A is located in some place where the water will not be in danger of freezing, or of being highly heated—maintained somewhere between 40° and 80° Fahrenheit. Water changes its temperature so slowly that it forms a good protection to the oil-tank.

The oil-tank has a one-eighth-inch air-pipe, C, leading from its top and extending up some distance. It is then bent down and carried some distance below the level of the bottom of the water-tank A. This air-pipe C has its lower end open, and it has two stop-cocks—one, D, an ordinary stop-cock, and the other (the handle of which is designated E) is a needle-valve, which regulates the admission of air to the oil-tank B, and thereby regulating the feed of oil therefrom.

To the bottom of the oil-tank B is connected a branch of the oil-pipe F. This oil-pipe may be one-half inch in diameter, and at its upper end it is connected to the storage-tank G, which may, for convenience, be large enough to hold several barrels of petroleum. This storage-tank G should be so placed that its upper level shall be lower than the bend in the air-pipe C. It has two stop-cocks—one, H, between the storage-tank G and the oil-tank B, and the other, I, between the oil-tank B and the burner. The other end of oil-pipe F is connected to a burner, J, as shown in Fig. 2, which may have the construction described and shown in my application No. 124,281, filed March 15, 1884. No particular description of burner is here necessary in view of said application. For the purposes of the present application any other burner may be substituted. The pipe a', hereinbefore described, is connected, as already stated, to the steam generator, which forms part of said burner.

The stop-cocks a^2, D, H, and I are of ordinary construction; but the air-feed cock E is a needle-valve, having its aperture in its side, and placed between the stop-cock D and the oil-tank B.

In practice, in ordinary burners for cook-stoves or heating-stoves for dwelling-houses, it is never necessary to open the needle-valve more than half a turn, and it is necessary that it should be so constructed that it cannot be opened more than half a turn of the handle. This may be done in several ways.

The connections of the pipes C and F with the oil-tank B are all air-tight. The pipe T, with its stop-cock *t*, is merely to drain the water from tank A whenever it is desired.

The manner of operating the apparatus is as follows: The water-tank A is filled with water. This is poured in at the top, and the oil-tank B should be at all times covered with water. There being a supply of oil in the storage-tank G, the stop-cock H is opened to allow the oil to run into the tank B. The stop-cock D is also opened, so as to allow the air in the tank B to escape. The tank soon fills. When filled, the attendant will know it by the gurgling of the oil in the pipe C. As the bend of the pipe C is higher than the level of the oil in the tank G, no oil can be lost. The stop-cocks H and D are then closed. They may be covered with a hinged box, so they can be locked up. The handle E of the needle-valve is turned so as to open the aperture, and the stop-cock I is also opened, and oil is run into the burner and ignited, and at the proper time water is admitted through the stop-cock a^2 to the steam-generator or water-burner. After the fire is fully started the feed of the oil to the burner is regulated by turning the handle E of the needle-valve. After the fire is properly started the handle E is not touched, except to increase or decrease the fire.

As the quantity of oil burned by an ordinary stove is about four gallons (nine hundred and twenty-four cubic inches) in twenty-four hours, the amount of air admitted through the aperture of the needle-valve is less than forty cubic inches per hour. The needle-valve offers no appreciable obstruction to air passing through the pipe C when the stop-cock D is opened. Only when D is closed does the needle-valve regulate the passage of air in the pipe C.

The water-tank A should be placed about one foot above the level of the burner. The pipes connecting the oil and water tanks A and B to the burner may be as long or as bent as may be necessary. The tanks A and B can be in one corner of the room or in an adjoining apartment; but the handle E of the needle-valve should project into the room where the burner is, so that the attendant can turn the handle and observe the fire at the same time.

V, Fig. 2, designates a stove, the lower part of which is partly in section and partly broken away in order to show the arrangement of the burner underneath.

When this invention is applied to a burner that does not use water, or when it is applied to any other liquid than oil, or to oil except in connection with a stove, any ordinary known means of protecting the tank B from sudden changes of temperature may be adopted.

I am aware that it is not broadly new to locate one receptacle for liquid within another, nor to use air-pressure for expelling liquid from a reservoir, nor to employ a needle-valve for governing the influx of air, nor to provide a pipe with two valves—one for cutting off and the other for controlling the flow of fluid through it. I do not claim any of these; but

What I claim as new is—

1. An oil-tank in combination with a pipe leading thereto from a source of oil-supply, a pipe leading from said tank to a burner, a bent air-pipe extending from said tank above the level of the source of supply for oil, and an air-inlet valve arranged in said air-pipe and operating substantially as set forth.

2. An oil-tank in combination with a water-tank surrounding it, an air-pipe extending through said water-tank to said oil-tank, an air-inlet valve in said pipe, and a pipe leading from said oil-tank, substantially as set forth.

JOSEPH F. IRONS.

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