(No Model.)

2 Sheets—Sheet 1.

G. A. SHELEY.

HYDROCARBON BURNER.

No. 496,911. Patented May 9, 1893.

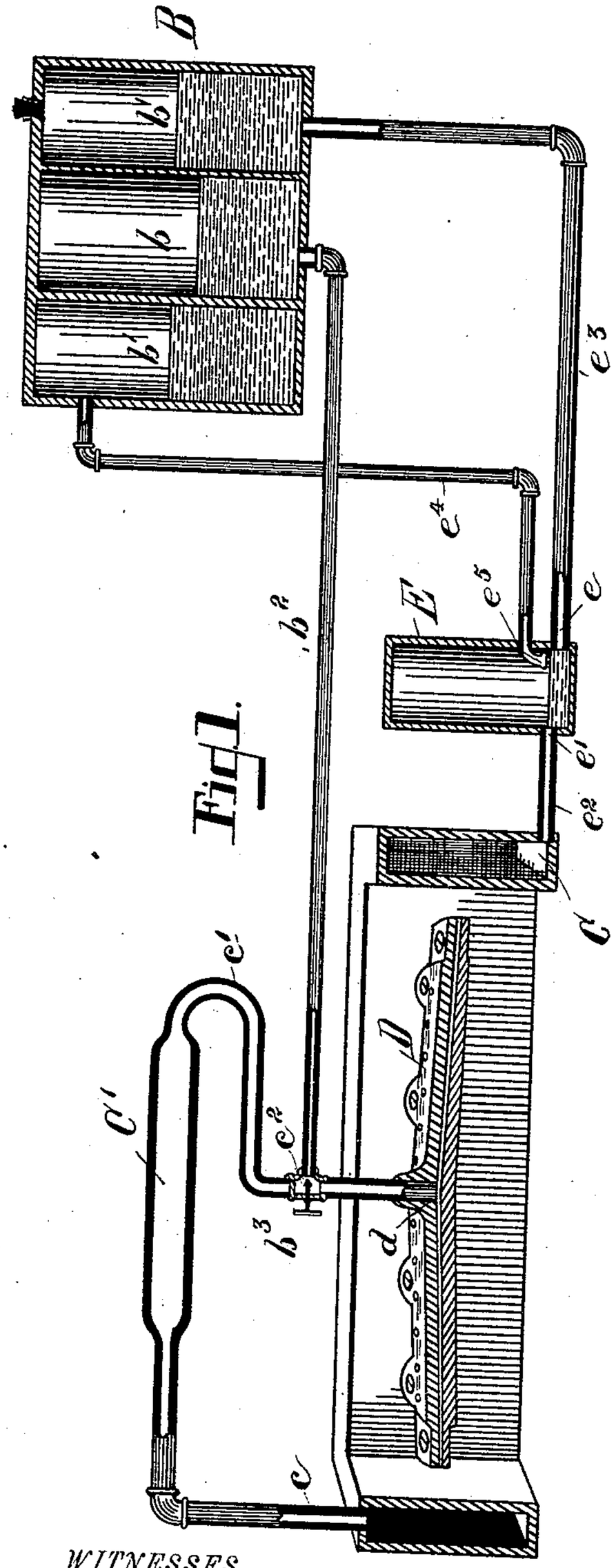

Fig. 1.

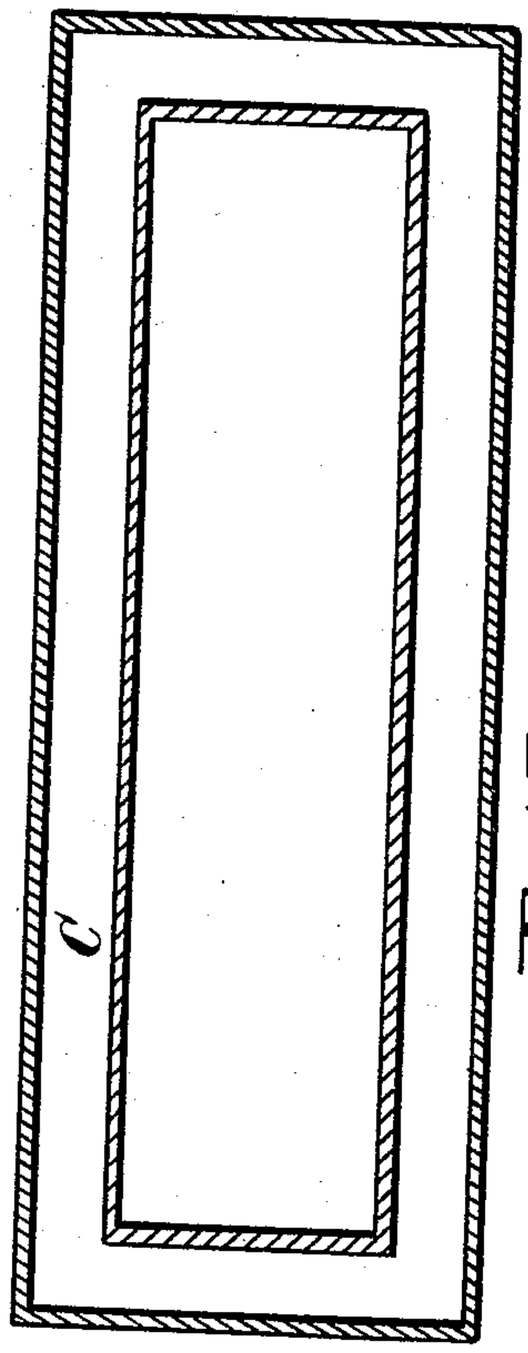

Fig. 2.

WITNESSES

H. Clough.

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INVENTOR

George A. Sheley

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His Attorneys.

(No Model.)

2 Sheets—Sheet 2.

G. A. SHELEY.

HYDROCARBON BURNER.

No. 496,911. Patented May 9, 1893.

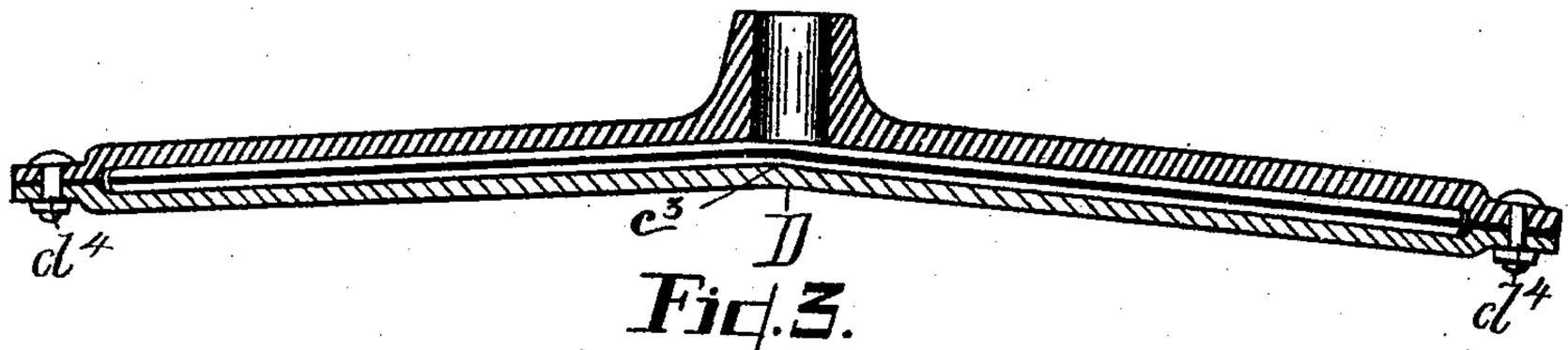

Fig. 3.

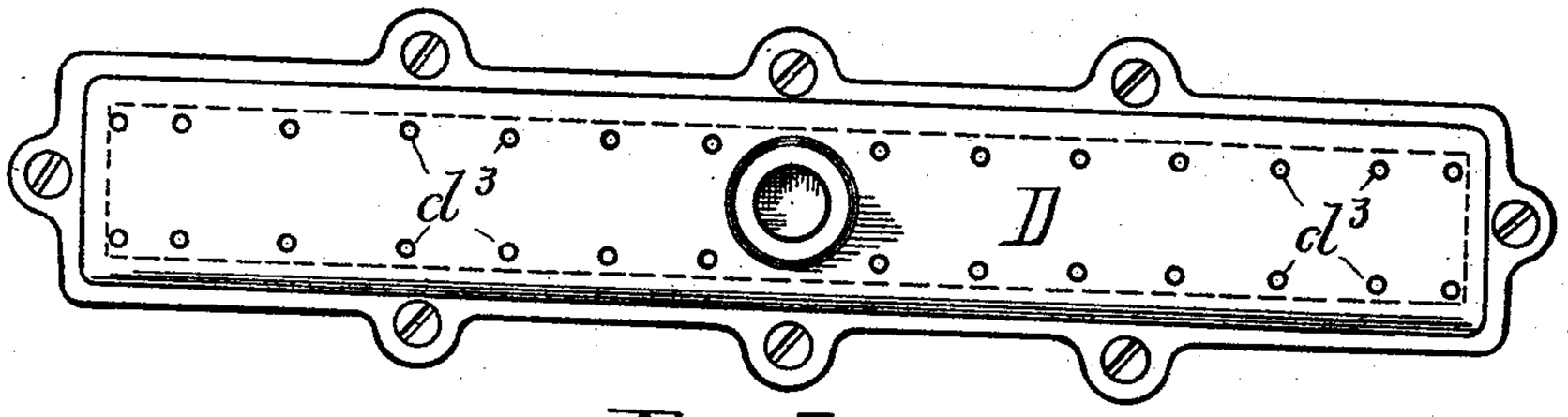

Fig. 4.

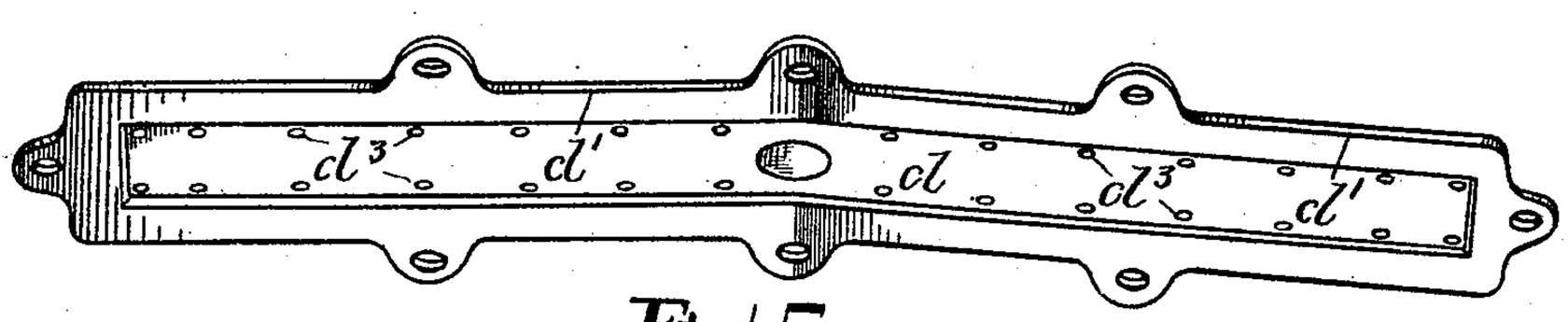

Fig. 5.

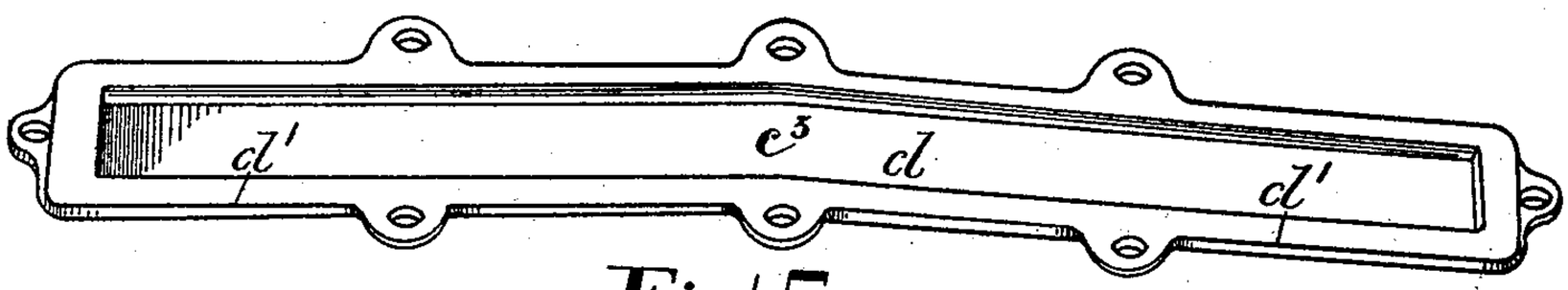

Fig. 6.

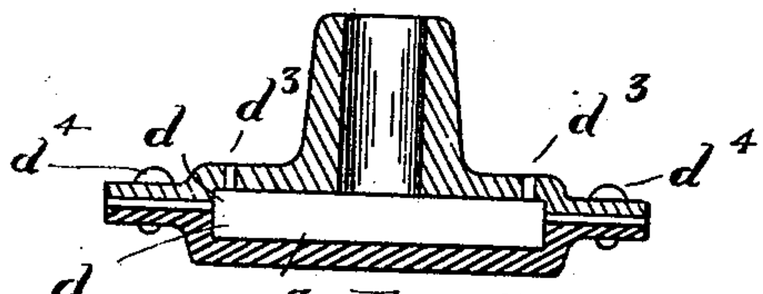

Fig. 7.

WITNESSES
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UNITED STATES PATENT OFFICE.

GEORGE A. SHELEY, OF DETROIT, MICHIGAN.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 496,911, dated May 9, 1893.

Application filed November 9, 1891. Serial No. 411,333. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. SHELEY, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Hydrocarbon-Burners; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to hydro-carbon burners, of that class in which a hydro-carbon oil, and water vapor are combined and burned, and its special object is to provide means for supplying the water to a vaporizing chamber, and an improved form of burner for mixing and distributing the oil and the water vapor.

One purpose of my invention is to regulate the supply of water to the vaporizing chamber, so that a constant amount of water can be at all times provided in the vaporizing chamber and this constant supply is automatically controlled so as to avoid flooding the burner on the one hand, or a failure of a sufficient amount of water for vaporizing purposes, on the other hand. I accomplish this result by the employment of what I call a "surface seal," which will be particularly described hereinafter. It is desirable to provide the supply of water steadily and in the proper proportions, without the supply fluctuating. In the burner employed, I provide for distributing the combined vapor from the oil and the water over the interior surface of a burner, so formed that, in case liquids are injected into the burner, they will flow to the extreme outward end of the burner, and to a lower point than the point of entry, so as to avoid what is known as "trapping" in the burner, *i. e.*, accumulation of liquids at the point of entry in the burner.

In the drawings, Figure 1 is a sectional elevation of the burner, tanks and connecting pipes. Fig. 2 is a plan view of the vapor generating tank. Fig. 3 is a vertical longitudinal section of the burner. Fig. 4 is a plan view of the burner. Fig. 5 is a view of the inside of the upper section of the burner. Fig. 6 is a view of the lower section of the burner. Fig. 7 is a vertical cross section of the burner, showing the inlet pipe and the chamber within the burner and the packing.

In the drawings B is a tank provided with two compartments, b, for the oil, and b', for the water.

C, is a water vaporizing chamber, or hollow wall surrounding the burner D.

E, is an auxiliary water tank, located alongside of the water vaporizing chamber C, and provided with a water inlet e, and a, water outlet e', leading through the pipe e^2, into the water vaporizing chamber C, near the bottom of the chamber C.

e^3, is a water supply pipe leading from the water compartment b', of the tank B. The auxiliary water tank E, is air tight and has no entrance into it except through the three pipes just described. The supply pipe e^3, leads into the bottom of the auxiliary water tank E', and the exit e, is located on a plane just above the inlet from the pipe e^3, so that a flow of water through e^3, will fill the auxiliary tank up to the outlet e', when the water will flow through the pipe e^2, into the water vaporizing chamber. The object of this arrangement is to provide for a flow of water through the outlet e', and the pipe e^2, into the water vaporizing chamber so as to keep just a film of water over the bottom of the chamber, and not permit it to rise above a certain point in the auxiliary chamber and the outlet e'.

An air pipe e^4, leads from the top of the water compartment b', in the tank B, to the auxiliary tank E, and equalizes the air pressure in the compartment b', and in the auxiliary water tank E, until the water coming from b', has flowed into E, and its surface has raised above the mouth of the air pipe e^4. The pipe e^4, extends into the tank E, and is provided inside with an elbow e^5, and presents the mouth of the pipe downward toward the surface of the water. As soon as the water flowing through the pipe e^3, fills the auxiliary tank up to the level of the mouth of the opening in the elbow e^5, it automatically closes or seals the free air passage way, and the passage of air through the pipe into the water tank b', is stopped, and the further flow of water from the tank through the pipe e^3, is also stopped. As soon as the water flows into the water vaporizing chamber C sufficiently to lower it in the auxiliary tank E, below the mouth of the

pipe e^5, the water will again flow through the pipe e^3. The operation of this arrangement will keep the level of the water in the auxiliary tank up to the mouth of the elbow e^5, and the level of the water in the water vaporizing chamber will be the same as that in the auxiliary chamber E. The chamber E, should be so located relative to the chamber C, as to furnish a constant yet small amount of water in the chamber C. The relation between these two tanks can be made adjustable if desired, and the sealing dip of the pipe e^4, into the auxiliary water tank may also be made adjustable so as to increase or decrease the supply of water to the vaporizing chamber C, if desired; although I find it sufficient to have one fixed relation between the respective parts.

The burner D, is located in the compartment formed by the inner walls of the chamber C, leaving a space around the outside of the burner.

From the top of chamber C, preferably at the side opposite the inlet pipe e^2, is an outlet pipe c, connecting the chamber C, with the heating chamber C', from which the pipe c', conducts the heated vapor to the burner D. The oil supply pipe b^2, enters the pipe c', at c^2 above the burner, and the combined oil and vapor enter the burner at d, striking the surface of the lower section of the burner at the highest point. The object for taking the pipe c, from the chamber C, opposite the inlet pipe is to heat the water and the vapor arising from it as much as possible in passing around through the chamber C to the outlet. The supply of oil is regulated by the valve b^3. When the relative heights of the parts are so adjusted as to furnish only a thin film of water on the bottom of the chamber C, there will be little or no resistance to back pressure of the steam generated in the chamber C, and while the pressure of steam in the chamber C, never will be great because there is always a way of escape through the burner, still it would pass through the pipe c^2, and escape from the tank E, into the room, if the tank E, were open; the pressure of steam passing through pipe c^2, into the tank E, will rarely if ever be sufficient to overcome the weight of the water in the tank b', and pipe c^3, and break the seal at e^5; should it do so however, the steam and air in the tanks b', and E, will immediately equalize as before. The entire combination acts to furnish a very thin film of water in the bottom of the chamber C, keep it constant and prevent the escape of steam into the outer air except through the burner.

The burner itself I prefer to make rectangular in form, as shown in Fig. 4, having an angle at the middle point and a dip from the middle to each end as shown in Fig. 3, so that any unvaporized oil entering at the point c^3, will flow toward one of the ends, and if there be any accumulation of oil in the burner, it will be at the extreme outward ends of the burner. The upper and lower sections of the burner are recessed at d, d, so that when the sections are bolted together, a compartment is formed in the burner, and the edges d', of the sections are provided with asbestus cement when the burner is bolted together, so that the only outlets from the burner chamber are through the orifices d^3. The purpose of this construction in which the ends of the burner dip from the middle to the ends, is to prevent the accumulation of oil in the vicinity of the inlet pipe. The burner is bolted together with the bolt d^4, or in any other suitable manner.

I am not aware that a device, such as that shown by me for automatically regulating the flow of liquids, has ever been, used or known; or that a surface seal such as is shown and described has ever been used or known; and I desire to claim the same independently of the special use made of it in connection with a hydro-carbon burner.

If desired, the auxiliary water tank may be dispensed with, and the water supply and surface seal provided within the water vaporizing chamber, although I prefer the construction shown.

What I claim is—

1. In a device for regulating the flow of liquid, the combination of an air tight supply tank, an air tight receiving tank a conductor pipe for liquids leading from said supply tank to said receiving tank, an air pipe leading from above the liquid in said supply tank, to said receiving tank and terminating therein with a downwardly opened mouth and an exit pipe from said receiving tank below the termination of said air pipe, substantially as and for the purpose described.

2. In a device for regulating the flow of liquids, the combination of an air tight supply tank, an air tight receiving tank a conducting pipe for liquids, leading from the bottom of said supply tank to the bottom of said receiving tank, an air pipe leading from above the liquid in said supply tank into said receiving tank and terminating therein, at the desired level for the liquid to be received therein, and an exit pipe, from said receiving tank below the termination of said air pipe, substantially as and for the purpose described.

3. In a device for burning hydro-carbon oils, the combination of an air tight water tank, an air tight receiving tank, a water vaporizing chamber, a water conducting pipe between said tank and said receiver, an equalizing air pipe between said tank and said receiver, a communicating pipe leading from the receiver to the vaporizing chamber, and a burner adapted to heat said vaporizing chamber, substantially as and for the purpose described.

4. In a device for burning hydro-carbon oils, the combination of an air tight water tank, a vaporizing chamber, an air tight receiving tank, between said water tank and said vaporizing chamber, pipes adapted to regulate the flow of water from said water tank, through the receiving tank and into the va-

porizing chamber, and maintain a constant level in said receiving tank, substantially as and for the purpose described.

5. In a device for burning hydro-carbon oils, in combination with an air tight water tank, a vaporizing chamber, an air tight receiving tank interposed between said water tank and said vaporizing chamber, water and air conducting pipes, adapted to maintain a constant level of water in said receiving tank, and in said vaporizing chamber, a heating chamber, an oil tank, a burner, suitable pipes leading out of said vaporizing chamber to said heating chamber, suitable pipes leading out of said heating chamber to said burner, and a pipe leading from said oil tank, to and uniting with, the pipe leading from said heating chamber to said burner, substantially as and for the purpose described.

In testimony whereof I sign this specification in the presence of two witnesses.

GEORGE A. SHELEY.

Witnesses:
DELL J. BROWNE,
CHARLES H. FISK.