No. 878,142. PATENTED FEB. 4, 1908.

F. KITZSTEINER.

VAPOR BURNER.

APPLICATION FILED APR. 8, 1907.

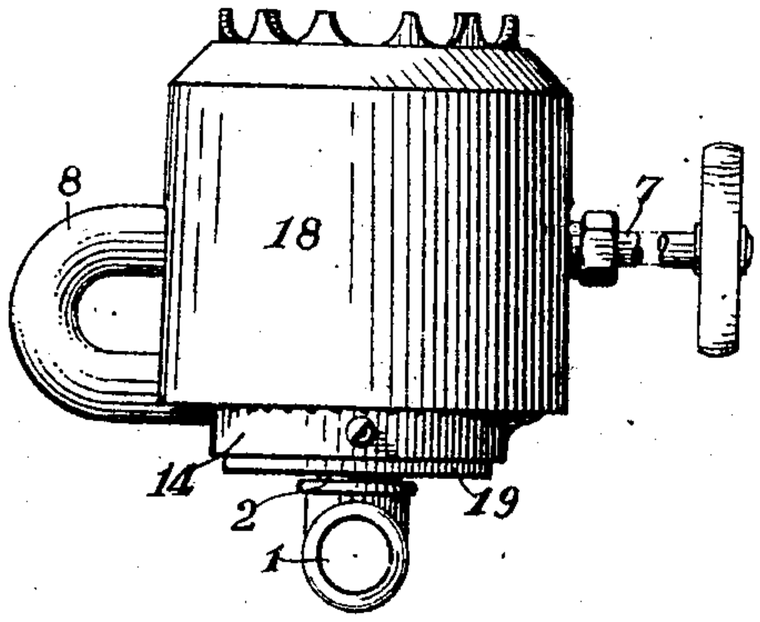

Fig. 1.

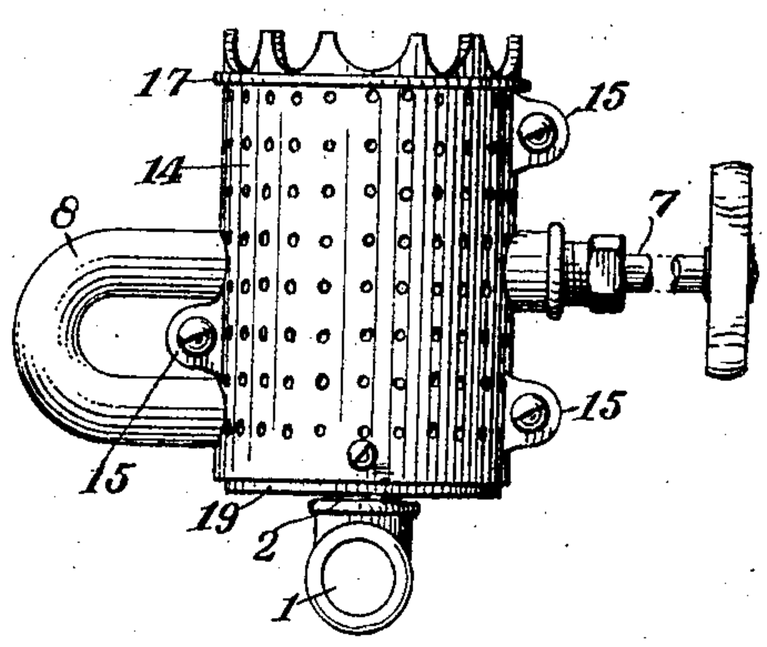

Fig. 2.

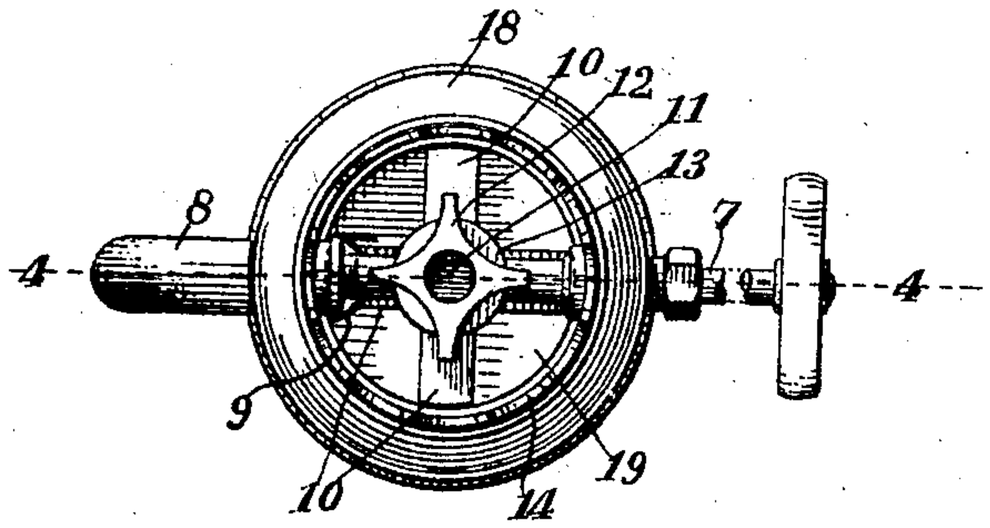

Fig. 3.

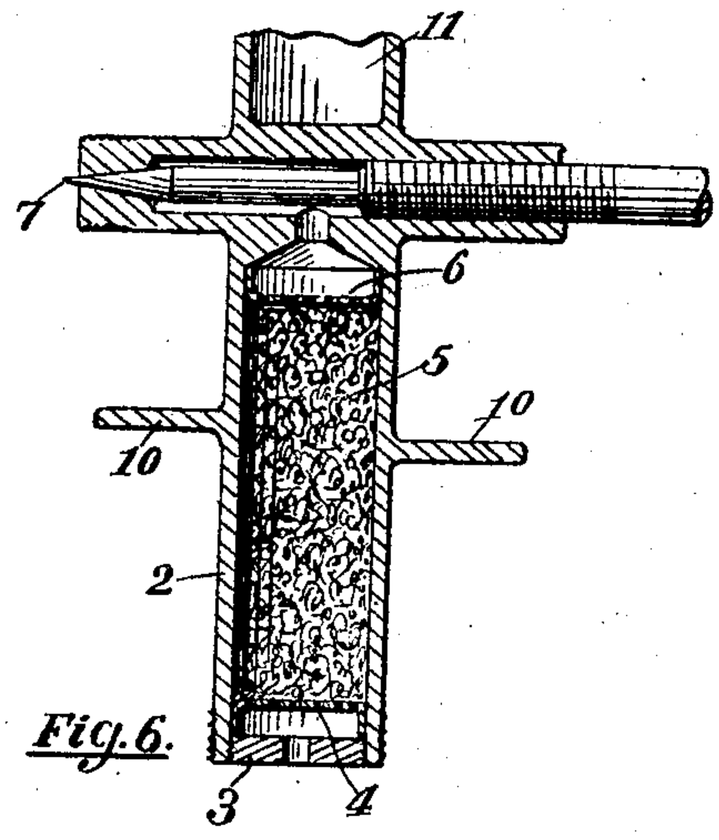

Fig. 6.

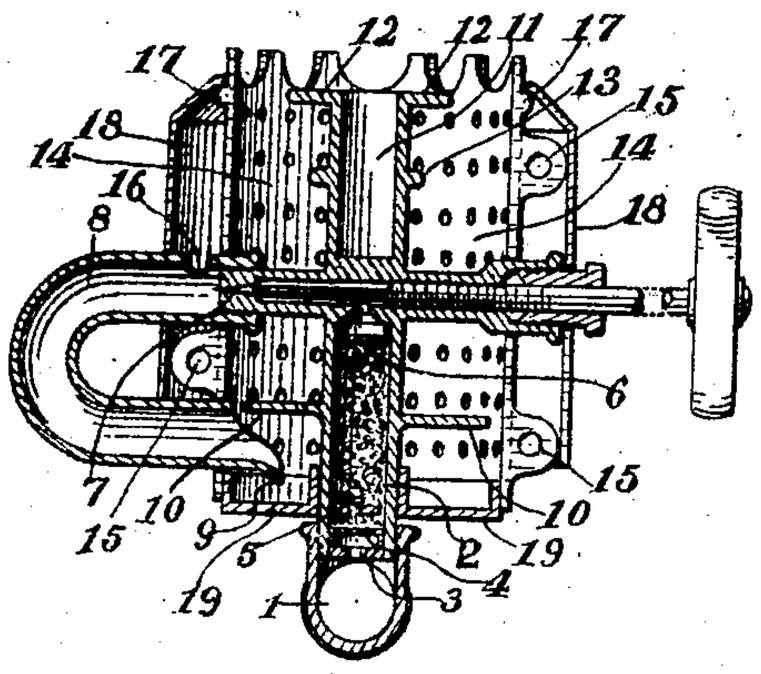

Fig. 4.

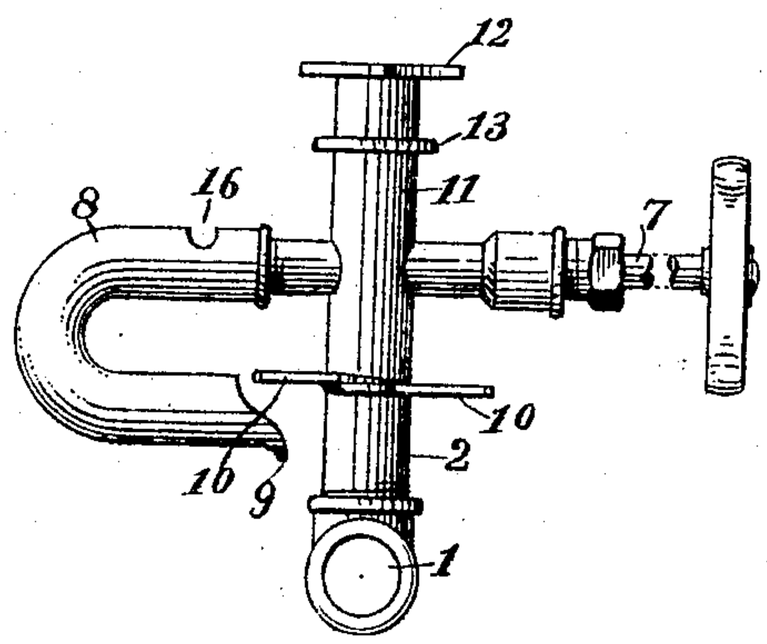

Fig. 5.

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UNITED STATES PATENT OFFICE.

FRANK KITZSTEINER, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO THE QUICK WORK STOVE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

VAPOR-BURNER.

No. 878,142. Specification of Letters Patent. Patented Feb. 4, 1908.

Application filed April 8, 1907. Serial No. 366,978.

To all whom it may concern:

Be it known that I, FRANK KITZSTEINER, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Vapor-Burners; 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.

My invention relates to improvements in vapor burners, and more particularly to burners for alcohol; and its object is to provide a simple and effective device for the purpose, having various new and useful features hereinafter more fully described and particularly pointed out in the claims, reference being had to the accompanying drawings, in which:

Figure 1. is a side elevation of a device embodying my invention; Fig. 2. the same with the hood removed; Fig. 3. a plan view of the same as shown in Fig. 1.; Fig. 4. a vertical section of the same on the line 4—4 of Fig. 3.; Fig. 5. an elevation of the generator, mixing tube and needle valve; and, Fig. 6. an enlarged detail section of the generator and needle valve.

Like numbers refer to like parts in all of the figures.

1 represents means for attaching a pipe to supply alcohol to the device. Communicating with this means is a vertically extended tube 2 forming the generator chamber in which the alcohol is converted into vapor by means of heat. The lower end of this tube is closed with a plug 3 having a central opening for the passage of the alcohol therethrough. Above this plug is a diaphragm of perforated sheet metal 4 having its edges turned down to support the diaphragm at a distance, and spaced apart from the plug. Above this diaphragm the chamber 2 is filled with asbestos, or heat resisting foraminous material 5. Above this material is another perforated diaphragm 6 through which the vapor escapes upward to the needle valve 7 arranged transversely above this chamber. This material serves to steady the generation of vapor and prevent pulsation of the burner.

8 is a U-shaped mixing tube open at both ends, one end of which is in communication with the needle valve 7, to receive the vapor escaping therefrom. In the upper side of this tube and close to the needle valve is an opening 16 to admit air to mingle with the alcohol vapor. The lower end of this tube is located beneath the needle valve and opens opposite and close to the lower portion of the generator 2 and is also provided with a downwardly turned lip 9 to direct the flow of alcohol into the annular cup 19 surrounding the lower part of the generator. The generator is also provided with radial heat absorbing plates 10 projecting radially from about the middle of the same, substantially close above the plane of the opening in the lower end of the tube 8, whereby the flame and heat is retained about the lower end of the generator, thus insuring a sufficient heating of the same. The generator is also extended upward above the needle valve in tubular form as at 11 and provided with radially extended members 12 and 13. This extension and the members thereon also serve to assist in heating the generator and especially increasing the temperature of the upper part thereof and of the needle valve to insure effective vaporization of the alcohol.

A perforated tube 14, having numerous small openings therethrough, surrounds the generator and upper extension thereof, and is spaced apart therefrom to afford room for the flames. The needle valve extends substantially through the middle portion of this tube, the upper end of the tube being open for the escape of the heat and flame, the lower end of the tube being closed by the annular cup 19. This tube is made in two equal parts divided vertically and recessed at its adjacent edges to receive the tube 8 and the needle valve, the vertically divided parts being secured by lugs 15 having bolts extending therethrough. Near the upper end of this perforated tube is an outwardly projecting flange 17 to support a hood 18 having a contracted upper end surrounding the tube and resting upon this flange. This hood is also recessed to extend downward at each side of the valve body and the mixing tube 8. This hood is also spaced apart from the tube 14 a sufficient distance to permit air to flow freely between the hood and said tube, this space being closed at the top and open at the bottom. The air passes upward between the perforated tube and hood and thence through the openings in the tube into the interior thereof and entering in fine

streams, mingles with the flame of the alcohol vapor, thus supplying air sufficient to afford complete combustion and high temperatures. The opening 16 being between the hood and tube, receives air that has been somewhat heated by the tube 14 and is also protected from anything that may come from above, which latter will pass down the outside of the hood and cannot get into the tube 8.

To heat the generator in the first instance, and start the device in operation a sufficient quantity of alcohol is permitted to flow through the needle valve into the cup 19, being directed into the same by the downwardly turned lip 9 at the lower end of the tube 8. The alcohol in the cup being ignited, will heat the generator sufficient to vaporize the alcohol therein, which vapor passing through the needle valve 7 will draw a portion of air through the opening 16 and mingle the same therewith, and the upward flow of the burning vapor escaping from the lower end of the tube 8 creates a draft between the hood and tube 14 and thus draws in a further supply of air through the openings in the tube, the result being a very effective and complete combustion of the alcohol vapor. It will also be noted that by locating the inlet of vapor below the needle valve and radial plates 10, and also near the bottom of the generator, the latter is sufficiently heated to effectively vaporize the alcohol and highly heat the vapor.

What I claim is:

1. In a vapor burner, a vertical tubular generator, a transversely disposed needle valve in said generator, a perforated tube surrounding the generator and spaced apart therefrom, an annular cup at the bottom of the generator and tube and closing the space therebetween, a hood surrounding the perforated tube and spaced apart therefrom, the space between said tube and said hood being open at the bottom and closed at the top and a U-shaped mixing tube extending from the needle valve to close above the cup and having a lateral opening between the tube and hood and a downwardly turned lip at the lower end.

2. In a vapor burner, a generator comprising a vertically disposed tube, a perforated tube surrounding the same, radial plates on the generator tube and near the lower end thereof and spaced apart from the perforated tube, a transversely disposed needle valve above the generator and communicating therewith, and a U-shaped tube in one end of which the needle valve is inserted, said tube having a lateral opening near the needle valve, and having its other end opening toward the lower part of the generator, and below the radial plates thereon whereby the plates deflect the flame toward the perforated tube.

3. In a vapor burner, the combination of a generator comprising a vertically disposed tube open at the top and closed near the middle by a transverse needle valve communicating with the lower part of the tube, means for supplying fluid to the lower part of the tube, radial heat absorbing members arranged at intervals on the tube, a U-shaped mixing tube having the needle valve inserted in one end and the other end opening toward the lower part of the generator tube and below the needle valve and heat absorbing members, a perforated tube surrounding the generator and spaced apart therefrom, a hood surrounding the perforated tube and spaced apart therefrom, and means for closing the space between the upper end of the hood and the perforated tube.

4. In a vapor burner, an axially disposed tube extending vertically therethrough, means for supplying fluid to the lower end of said tube, a transversely disposed needle valve extending through the tube near the middle thereof and communicating with the lower part thereof, a filling of foraminous heat-resisting material in the lower part of the tube, a perforated tube surrounding the first named tube and spaced apart therefrom, an annular cup closing the space between the lower ends of said tubes, an outwardly projecting flange on the perforated tube and above the perforations therein, a hood surrounding the perforated tube and spaced apart therefrom, said hood also having a contracted upper end engaging the flange and supporting the hood, and a U-shaped tube in one end of which the needle valve is inserted, the other end of said tube being beneath the needle valve and opposite the lower part of the axial tube, said U-shaped tube also having a lateral opening near the needle valve and between the perforated tube and the hood.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK KITZSTEINER.

Witnesses:
LUTHER V. MOULTON,
H. M. CALVIN.