A. L. KAISER.

TANK HEATER.

APPLICATION FILED JULY 18, 1919.

1,322,024. Patented Nov. 18, 1919.

Fig. 1.

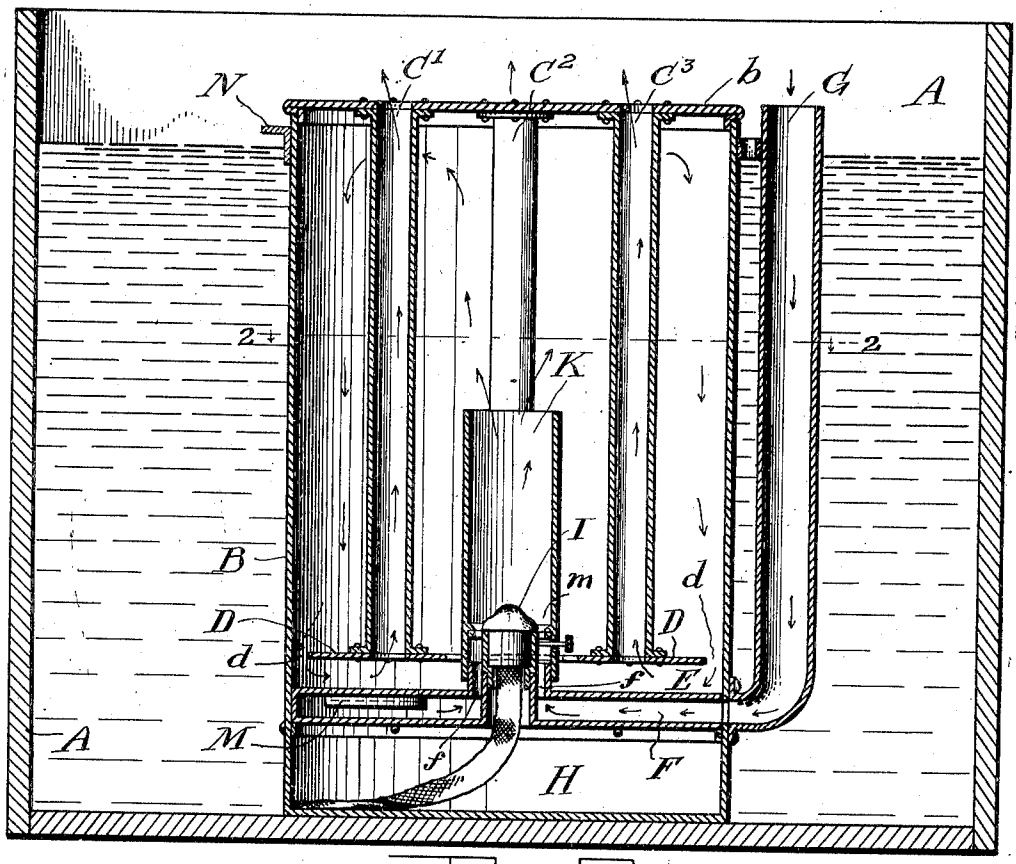
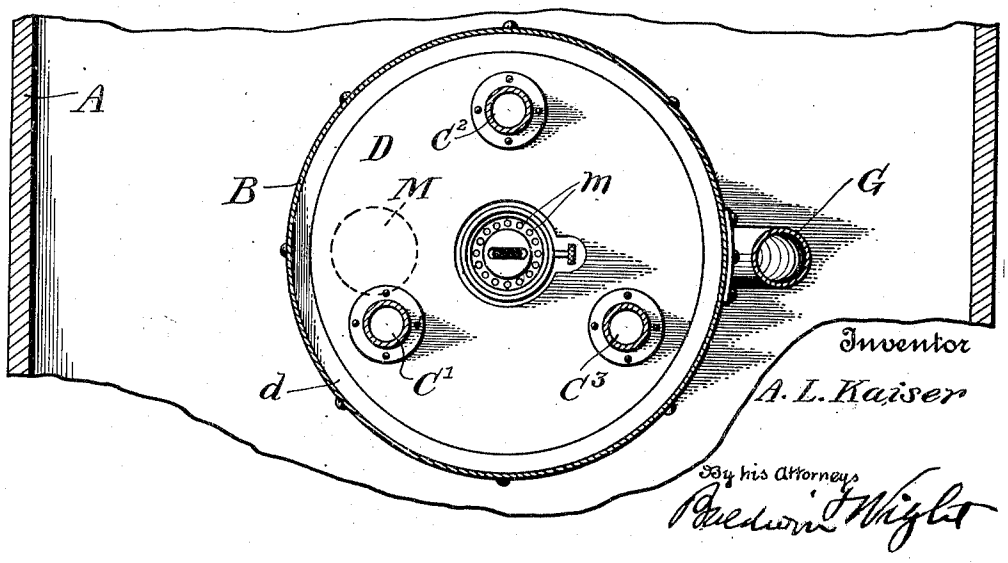


Fig. 2.



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UNITED STATES PATENT OFFICE.

ALVIN L. KAISER, OF MONONA, IOWA.

TANK-HEATER.

1,322,024. Specification of Letters Patent. Patented Nov. 18, 1919.

Application filed July 18, 1919. Serial No. 311,728.

To all whom it may concern:

Be it known that I, ALVIN L. KAISER, a citizen of the United States, residing in Monona, in the county of Clayton and State of Iowa, have invented certain new and useful Improvements in Tank-Heaters, of which the following is a specification.

This invention relates to tank heaters of the class in which the heater is submerged or partially submerged in the water which the tank contains. It particularly relates to heaters for stock waterers or those commonly used in barnyards for watering stock.

According to my invention, the heater comprises a casing within which an oil burner is arranged and which is provided with air inlets and outlets and means of novel construction for circulating the air within the casing before its exit therefrom. The casing is closed water-tight but has an air inlet at the side near its bottom which connects with a vertical pipe extending above the water level in the tank. The entering air passes from the inlet port to a chamber above an oil reservoir and below a burner. From this chamber the air passes to a chamber or chimney above the burner, and then passes into the main chamber of the heater and raises the temperature thereof. The air which comes in contact with the side walls of the casing is chilled and falls or descends and enters a chamber below a series of vertical outlet tubes which extend through the top of the casing. The air rises and passes out to the atmosphere through these tubes and in so doing causes a partial vacuum to be formed by which the chilled air in the casing is drawn downward and then is caused to pass outward through the tubes.

In this way air is continuously drawn into the casing, heated and when chilled allowed to pass out. The result is that the casing is kept warm and effects the heating of the water in the tank which surrounds it. Other features of the invention will be hereinafter described.

In the accompanying drawings—

Figure 1 shows a vertical section of a tank heater embodying my improvements and shows how it is placed in the tank.

Fig. 2 shows a cross section on the line 2—2 of Fig. 1.

The tank A may be of any desired construction. My improvements are applicable to tanks of various kinds.

The heater comprises a casing B which is preferably cylindrical, as shown, and is provided with a removable cover *b*. To the cover are secured vertical tubes C′, C² and C³ which connect with openings in the cover and extend downward into the casing, the lower ends of the tubes being secured to a circular plate D which is of somewhat smaller diameter than the interior of the casing and is arranged centrally therein. There is an annular space *d* surrounding the outer edge or periphery of said plate.

Below the plate D there is an air space E, and below this space E there is a chamber F which connects with a vertical air inlet pipe G which extends above the water level in the tank. Below the air space E there is an oil chamber or reservoir H connected with the burner I which extends into the cylinder or chimney K arranged centrally in the casing and opening thereinto approximately midway between its upper and lower ends.

Air entering through the pipe G passes into the chamber F and then passes through the annular space *f* to the burner and through the openings *m* into the chimney K where it is heated. The heated air rises and spreads in an air chamber in the upper part of the casing in the manner indicated by the arrows. Soon the interior of the casing is heated and in turn heats the surrounding water in the tank. The air which comes in contact with the side walls of the casing is chilled and drops or descends and then passes through the space *d* and into the air space E where it rises and passes out through the tubes C′, C² and C³. As the air ascends through the tubes a partial vacuum is produced which serves to draw air through the heater in an obvious way and in the manner indicated by the drawings.

Water of condensation is received in a pan or well M of any suitable kind. The heater may be supported in the tank in any desired way. It may merely rest on the bottom, as shown, but preferably it is provided with brackets N by means of which it may be suspended or supported within the tank.

Practical experience has demonstrated

that a heater of the kind shown is most efficient and can be employed to heat stock waterers or stock tanks in barnyards or elsewhere when there is liability of the water in the tanks freezing.

It will be observed that the tubes C′, C², C³ are attached to the cover *b* and said tubes are also attached to the circular plate D. These may be removed from the casing without disturbing the latter, and the lamp or burner may be easily inspected and adjusted when required.

I claim as my invention:—

1. A tank heater, comprising a casing, a cover therefor, vertical air outlet tubes suspended from the cover and extending to the lower portion of the casing, a horizontally arranged plate secured to the lower ends of said tubes, an oil reservoir, a burner connected therewith, a chimney surrounding the burner and extending upwardly therefrom to the upper portion of the casing a considerable distance above the lower ends of the air outlet tubes, and means for admitting air from the atmosphere to the chimney.

2. A tank heater, comprising a casing, an oil reservoir in the lower portion thereof, a burner connected with the reservoir, a chimney surrounding the burner and extending to the upper portion of the casing, an air inlet pipe communicating with the chimney, a cover for the casing, air outlet tubes supported by the cover and extending to the lower portion of the casing to a plane considerably below the top of the chimney, and a plate to which the lower ends of the tubes are connected which is of smaller diameter than the interior of the casing to provide a space for the circulation of air across its periphery.

In testimony whereof, I have hereunto subscribed my name.

ALVIN L. KAISER.