

Sept. 18, 1923.

1,468,561

H. A. FRIEND

TANK HEATER

Original Filed Aug. 7, 1920

Fig. 1.

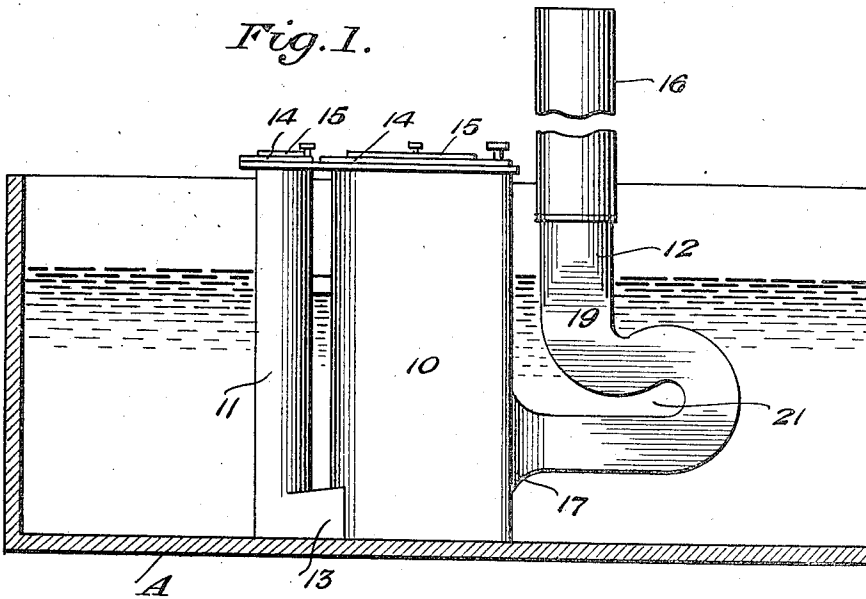
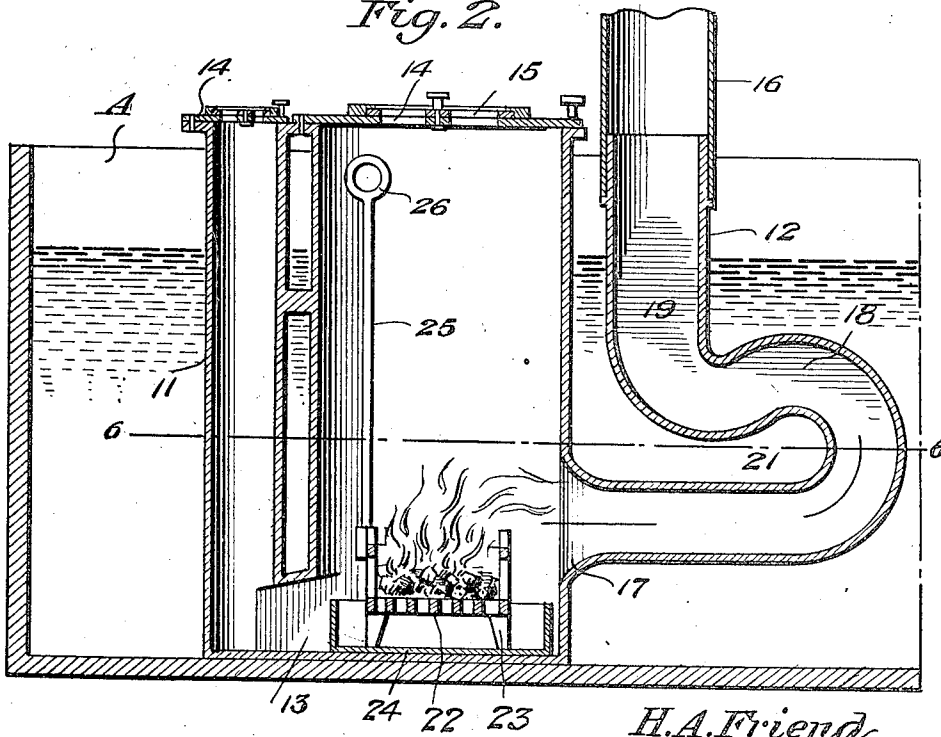


Fig. 2.



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Patented Sept. 18, 1923.

1,468,561

UNITED STATES PATENT OFFICE.

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TANK HEATER.

Application filed August 7, 1920, Serial No. 401,923. Renewed April 6, 1923.

To all whom it may concern:

Be it known that I, HARDY A. FRIEND, a citizen of the United States, residing at Albert Lea, in the county of Freehorn, and State of Minnesota, have invented new and useful Improvements in Tank Heaters, of which the following is a specification.

This invention relates to tank heaters wherein the heater is submersed and of a peculiar formation to afford a large heating area or surface, and in addition to provide a circuitous passage for the heat, whereby the latter is maintained within the tank an appreciable time before passing out of the chimney, thus heating the water in quick order for drinking purposes, as well as preventing freezing of the water over night.

To these ends, I provide the heater with an exhaust flue designed to cause the heat to pursue a zigzag passage from the combustion chamber to the chimney, the flue being designed to provide a pocket in which the heat is choked to some extent, thus forcing the heat to remain in the pocket an appreciable time before passing into the chimney, this pocket forming with the heat flue, a water space opening at both sides of the flue, which promotes circulation of the water about the heater, thereby subjecting all parts in the entire area of the heater to the water so as to quickly heat the same to the proper temperature for drinking purposes.

Another object of the invention resides in the provision of a removable grate which is provided with a handle of suitable length to facilitate the insertion of the grate within the combustion chamber or its removal therefrom when the occasion requires.

The nature and advantages of the invention will be better understood when the following detail description is read in connection with the accompanying drawings, the invention residing in the construction, combination and arrangement of parts as claimed.

In the drawings forming part of this application like numerals of reference indicate similar parts in the several views and wherein:

Figure 1 is a sectional view through a tank showing the heater in side elevation in position for use.

Figure 2 is a vertical sectional view through the tank and heater.

The heater forming the subject matter of my invention includes a plurality of units

10, 11 and 12 respectively, which may be cast into a one-piece construction, or made up of separable parts connected together in any suitable manner. 10 indicates the body portion of the heater which is of substantially tubular formation in cross section and constitutes the combustion chamber, which is arranged between the units 11 and 12 respectively. The unit 11 represents a cold air pipe which is coextensive in length with the body portion 10 of the heater, being spaced therefrom for the major portion of its length, this pipe being of increased width at its lower end which is offset as at 13 where it joins the main body portion 10. Both the main body portion 10 and the cold air pipe 11 are provided with movable closures 14, and each equipped with a damper 15 for regulating the draft. The unit 12 constitutes the heat flue which terminates flush with the upper end of the main body portion 10, but which has associated therewith one or more pipes 16 constituting the chimney. As clearly shown in the drawings, both the cold air pipe 11 and the heat flue 12 are spaced from the main body portion 10 of the heater, so that the entire area of the latter, as well as the heat flue is presented to the water or contents of the tank A. The heat flue 12 communicates with the body portion 10 at a point above the point of communication between the cold air pipe 11 and the body of the heater, and as clearly illustrated the heat flue 12 widens from an appropriate point in its length to its point of connection with the body portion as at 17. As shown in this specific instance, the heat flue projects horizontally from the body portion 10 and is then curved upwardly and downwardly to provide what I term a heat pocket 18, the flue being further continued in an upward direction as at 19 in spaced parallel relation to the body portion 10. The vertically disposed portion from its point of juncture with the heat pocket 18 is gradually reduced toward its upper end as at 20 for the purpose of choking the heat to some extent, and thus causing the heat to remain an appreciable length of time in the pocket 18 before passing into the chimney 16. This obviously provides for a quick heating of the water within the tank A. In addition to the units 11 and 12 being spaced from the body portion 10 for the purpose above mentioned, it will be further noted that the inwardly and downwardly curved

portion of the heat flue forming the pocket 18 is spaced from the horizontally disposed portion of the flue which leads from the body portion 10, thus providing a water space 21 which opens at both sides of the flue 12, for the expressed purpose of promoting circulation of water about the flue 12 and also about the body portion 10 of the heater. By reason of the space 21 all sides of the heat flue throughout the entire length of the latter are presented to the water so that the heater in its entirety affords a maximum heating surface or area for the purpose intended. It is of course to be understood that the heat flue 12 may vary in shape and configuration in carrying the principle of the invention into effect.

In Figure 2 I have shown the grate used in conjunction with the invention, this grate being indicated at 22 and including a bottom, side and end walls to receive and support the fuel which may be coal, wood or cobs. Depending from the bottom of the grate are supporting legs 23 which maintain the bottom of the grate in spaced relation to the bottom of the main body portion 10 of the heater. Arranged beneath the grate is an ash pan 24 which is removable through an opening in the wall of the combustion chamber, this opening being normally closed by the front wall of the ash pan. A handle 25 rises from the grate and is of sufficient length for the convenience of handling the grate when placing the latter within the combustion chamber or removing the grate therefrom. This handle terminates to provide a finger receiving ring 26, which when the grate is in position for use, is arranged immediately beneath the upper edge of the main body portion 10.

In practice, the cold air is conveyed to the combustion chamber through the pipe 11, and is admitted to the combustion chamber under the grate 22. The draft may be regulated by means of the dampers 15. The heat passes from the combustion chamber

into the horizontally disposed portion of the flue 12 which communicates with the combustion chamber at a point immediately above the grate as shown. The heat follows a circuitous passage by reason of the formation of the flue 12, and by reason of the gradual reduction in size of the vertical portion 19 of the flue, the heat is choked to some extent at this point, thereby forcing the heat to remain for an appreciable length of time within the pocket 18 formed by the upwardly, inwardly and downwardly curved portion of the flue. The heat not only is maintained within the heater for a considerable length of time, but as above stated, the passage for the water between the horizontally disposed portion of the flue 12 and the pocket 18 causes the water to circulate much faster around the entire area of the flue 12 and the main body portion 10, than it would otherwise.

While it is believed that from the foregoing description the nature and advantages of the invention will be readily apparent, I desire to have it understood that I do not limit myself to what is herein shown and described, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

What I claim is:—

A stock tank heater comprising a vertical tubular combustion chamber; a vertical cold air pipe spaced from said heater and communicating with the bottom thereof, closures pivotally secured to the upper ends of said chamber and provided with dampers, a square horizontal flue extending from said combustion chamber, bent upon itself to provide a heat retaining pocket and provided with a circular vertical upper end, an ash pan removably positioned in said combustion chamber, a grate supported upon said ash pan, and a vertical handle extending from one side of said grate.

In testimony whereof I affix my signature.
HARDY A. FRIEND.