No. 806,307. PATENTED DEC. 5, 1905.

H. E. TOWNSEND.

WATER HEATER.

APPLICATION FILED NOV. 2, 1904.

2 SHEETS—SHEET 1.

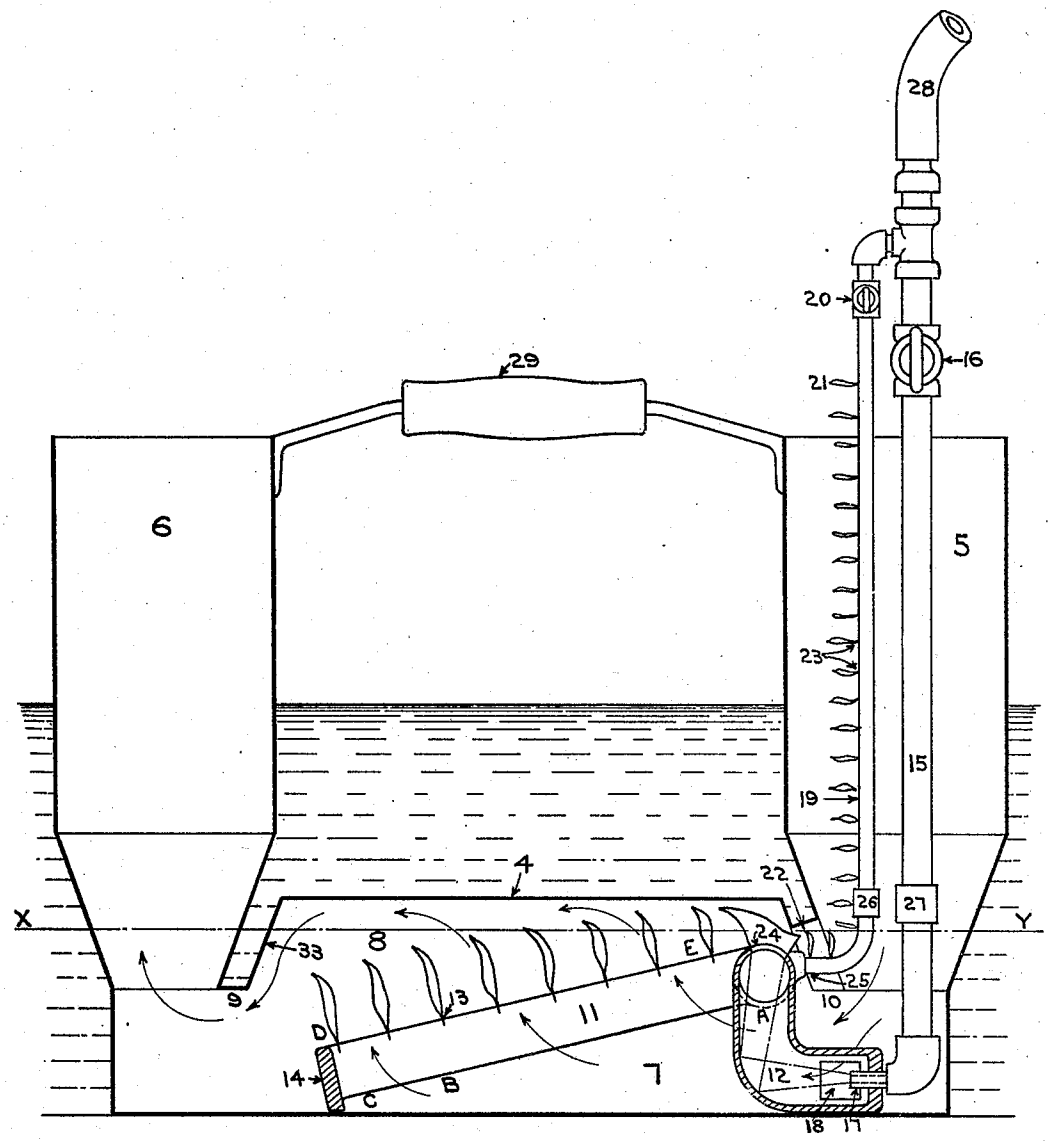


FIG. 1.

WITNESSES:

Andrew H. Miller

Grace P. Miller

INVENTOR

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2 SHEETS—SHEET 2.

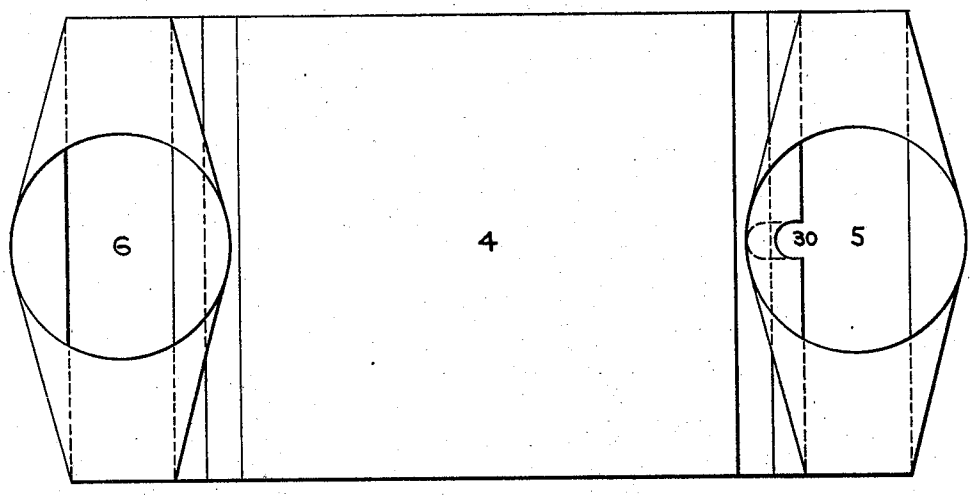


FIG. 2

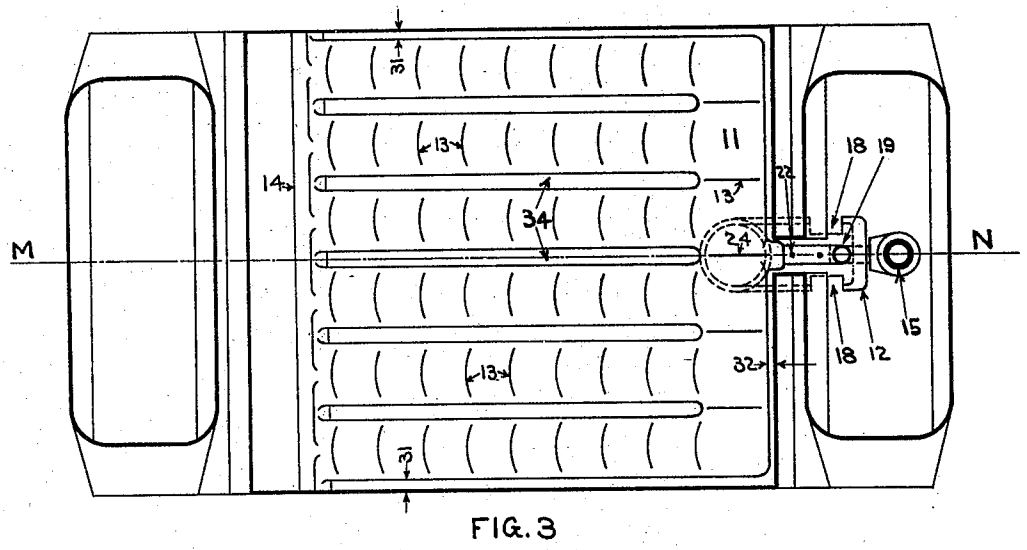


FIG. 3

WITNESSES:

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HARRY E. TOWNSEND, OF NEW YORK, N. Y.

WATER-HEATER.

No. 806,307. Specification of Letters Patent. Patented Dec. 5, 1905.

Application filed November 2, 1904. Serial No. 231,080.

To all whom it may concern:

Be it known that I, HARRY E. TOWNSEND, a citizen of the United States, residing in New York, State of New York, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

My invention relates to improvements in water-heaters; and it consists in the novel construction and arrangement of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a middle vertical longitudinal section on the line M N, Fig. 3. Fig. 2 is a top plan view showing casing only. Fig. 3 is a horizontal section on the line X Y of Fig. 1, showing section of casing and top plan of entire burner.

The object of my invention is to construct a heater that is portable and which can be partially submerged in a vessel, tub, or tank of water, the heat from the casing of the heater gradually raising the temperature of the water to any desired degree.

Referring to the drawings, 4 represents a water-tight casing, preferably of sheet metal, with brazed or soldered joints, having an air-inlet flue 5 at one end and an escape-flue 6 at the other. The top or roof of the casing is carried downward at a point 9 between the burner and the escape-flue, as shown, for the purpose of delaying the escape of the hot gases until the desired amount of heat has been transmitted by the casing to the water. The part 33 not only serves as a deflector, but having its outer surface in contact with the water in which the heater is immersed transmits heat directly thereto. Said roof is also carried downward at a point 10 between the burner and the air-inlet flue 5 for the purpose of causing the incoming air to pass under the burner and also to prevent the escape of the hot gases through the air-inlet flue.

11 is a burner having several branches, as shown, and is supplied with gas through the inlet branch 12. All of the branches except the branch 12 have openings 13 in their upper side of suitable size and shape for the escape of gas from within the burner.

14 is a bar or web connecting the ends of the branches of the burner, as shown, and extending from side to side of the casing. Its bottom edge projects somewhat below the under side of the burner and resting on the floor of the casing closes the space between the bottom of the casing and the end of the burner to which it is attached, thus preventing the air entering the heater from reaching the escape-flue 6 without first passing upward through the open spaces 31 32 34, between the several branches of the burner and between the burner and the walls of the casing, to the combustion-chamber 8. This arrangement, in connection with the air-inlet flue discharging under the burner, causes the air to flow continuously in the direction indicated by the arrows in Fig. 1.

The open spaces 31 32 34, above referred to, are made only large enough to admit of the passage through them of sufficient air for the purpose of combustion at that part of the burner served by each open space, respectively, the object being to cause an even distribution of the incoming air to all parts of the burner.

It will be observed that the burner is arranged with the end nearest the escape-flue 6 close to the bottom of the casing, while the opposite end is raised above the level of the lower end of the air-inlet flue. The object of this arrangement is to provide an air-passage 7 under the burner and a combustion-chamber 8 above it, both of sufficient capacity and at the same time admitting of a minimum height of casing requiring a minimum depth of water to cover it. That the arrangement shown provides this will be made clear by a consideration of the following facts: The air-passage 7, Fig. 1, at the point A must be large enough to admit of the passage of enough air to supply nearly the entire burner, while at B it need only be large enough to supply that part of the burner between B and C. Similarly, the space above the burner at D must be large enough to admit of the passage of the gases of combustion from the entire burner, while at E the space may be much smaller. If the burner were placed horizontally, the height of casing required would be the height of the space under the burner at A plus the height of the space above the burner at D plus the thickness of the burner, which would be much greater than in the arrangement shown.

15 is a feed-pipe with a cock 16 to control the supply of gas to the burner.

17 is a nozzle connected to the feed-pipe and discharging into the burner through the branch 12.

18 18 are openings in the branch 12 for the admission of air to mix with the gas to produce a blue flame at the burner. The branch 12 is carried downward, as shown, so as to rest

on the floor of the casing, thus forming a support for the end of the burner to which it is attached and giving room for securing the pipe 19 to the burner, as shown.

The conducting-tube 19, with the cock 20 to control the supply of gas to the same, is a lighting attachment by means of which a flame applied at the point 21 is communicated by the gas issuing from the series of holes 23 to the point 22 at the combustion-chamber. The opening 24 in the upper side of the burner is directly over the branch 12 and extends as far as possible in the direction of the pipe 19, so as to bring the gas issuing from it into immediate contact with the igniting-flame 22. The lower end of the pipe 19 is screwed into or otherwise secured to the burner at the point 25. The sloping roof or cover of the casing and the adjacent side of the air-inlet flue are cut away and the space between them inclosed, as shown at 30, so as to form a passage through them for the pipe 19.

26 and 27 are unions having right and left hand threads to facilitate the coupling of the various parts of the pipes 15 and 19.

29 is a suitable handle secured to the flues, as shown.

The method of operating the heater is as follows: The heater is immersed in water of a depth sufficient to cover the casing 4, and is connected with a gas-supply by means of the tube 28. Gas is admitted to the pipe 19 by opening the cock 20. A flame is applied at the point 21, whence it extends by means of the gas issuing from the holes 23 to the point 22. Gas is next admitted to the feed-pipe 15 by opening the cock 16, from which it issues through the nozzle 17 into the branch 12 of the burner, where it mixes with air from the openings 18 18. The mixture being projected against the curved side of the branch 12 is deflected upward, and issuing from the opening 24 is immediately ignited at the flame 22, whence the process of ignition extends to the entire burner as rapidly as the gas issues therefrom. As soon as the gas in the combustion-chamber has been lighted the cock 20 is closed.

It will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention as set forth and claimed.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a water-heater, the combination of a casing, a burner within the casing, a feed-pipe for the burner, an escape-flue, an air-inlet flue discharging under the burner, the space between the side of the burner nearest the escape-flue and the bottom of the casing being closed to prevent the air from the inlet-flue from reaching the escape-flue without first passing through the combustion-chamber, all substantially as set forth.

2. In a water-heater, the combination of a casing having an air-inlet flue and an escape-flue, a burner within the casing, a feed-pipe for the burner, said burner being so arranged with reference to the casing that the air entering the heater must first pass under the burner and thence upward through open spaces between the several parts of the burner or between the burner and the walls of the casing to the combustion-chamber, and thence to the escape-flue, said open spaces being only large enough to admit of the passage through them of sufficient air for the purpose of combustion at that part of the burner served by each open space respectively, substantially as set forth.

3. In a water-heater, the combination of a casing having an air-inlet flue at one end, and an escape-flue at the opposite end, a burner within the casing, a feed-pipe for the burner, said burner being arranged with the end nearest the escape-flue on or near the bottom of the casing, and the opposite end raised high enough above the bottom of the casing to admit of the air-inlet flue discharging under it, substantially as shown, for the purpose specified.

4. In a water-heater, the combination of a casing, a burner within the casing, a feed-pipe for the burner, an escape-flue, an air-inlet flue discharging under the burner, the space between the side of the burner nearest the escape-flue and the bottom of the casing being closed to prevent the air from the inlet-flue from reaching the escape-flue without first passing through the combustion-chamber, a lighting attachment consisting of a conducting-tube connected to the feed-pipe and having a cock to control the admission of gas to the same, all substantially as shown and described.

5. The combination in a water-heater of a casing having an air-inlet flue and an escape-flue, a burner within the casing, a feed-pipe for the burner, the roof or cover of said casing being carried downward at a point between the burner and the escape-flue, substantially as shown, for the purpose specified.

6. The combination in a water-heater of a casing having an air-inlet flue and an escape-flue, a burner within the casing, a feed-pipe for the burner, the roof or cover of said casing being carried downward at a point between the burner and the air-inlet flue, substantially as shown, for the purpose specified.

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

HARRY E. TOWNSEND.

Witnesses:

ANDREW H. MILLER,

GRACE P. MILLER.