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N. M. NELSON.

TANK HEATER.

APPLICATION FILED JAN. 2, 1906.

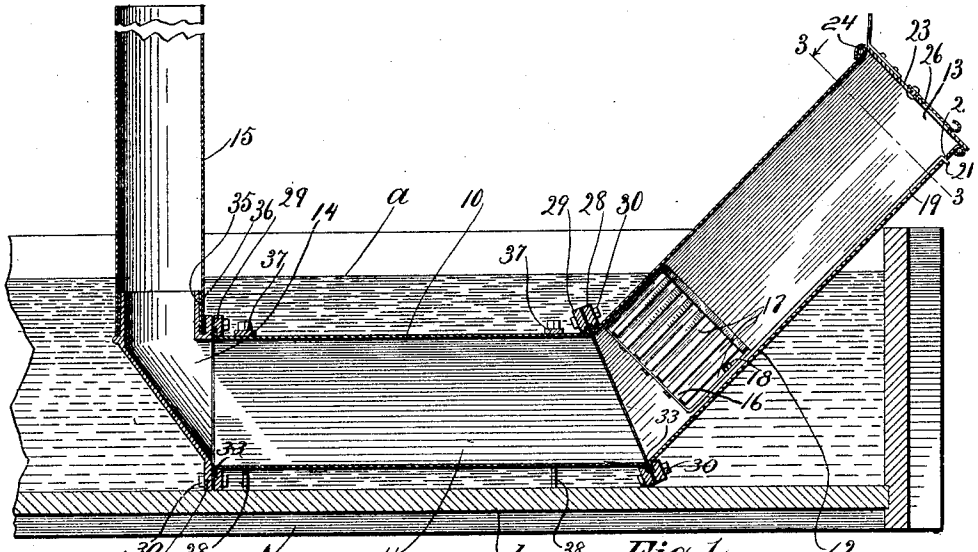


Fig. 1.

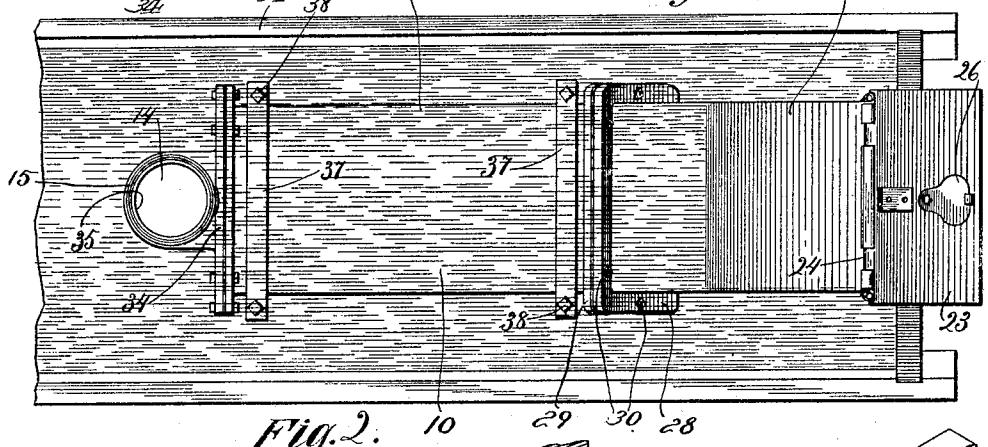


Fig. 2.

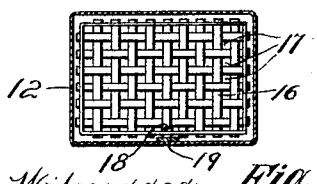


Fig. 3.

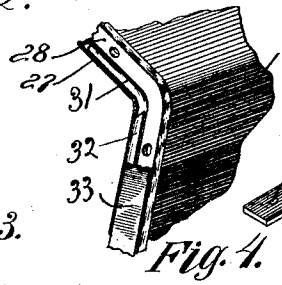


Fig. 4.

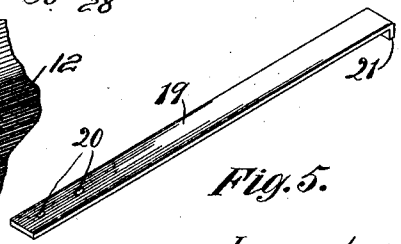


Fig. 5.

Witnesses:

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# UNITED STATES PATENT OFFICE.

NELS M. NELSON, OF DEERFIELD, WISCONSIN.

## TANK-HEATER.

No. 836,526. Specification of Letters Patent. Patented Nov. 20, 1906.

Application filed January 2, 1906. Serial No. 294,311.

*To all whom it may concern:*

Be it known that I, NELS M. NELSON, a citizen of the United States, and a resident of Deerfield, county of Dane, and State of Wisconsin, have invented certain new and useful Improvements in Tank-Heaters, of which the following is a specification and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to a heating-stove adapted to be placed in tanks of water for the purpose of warming their contents and being particularly useful for warming the supply of drinking-water provided for live stock.

The invention has for its object to provide a heater of this class of simple and durable construction, efficient in operation and presenting a convenient opening for obtaining access to its interior for attending the fire or removing ashes.

A detail of the invention provides a fire-grate of improved construction for supporting a fire of wood, charcoal, or other solid fuel within the body of the heater in such a manner that it may be removed intact when it is necessary to clean the interior of the heater.

The invention is exemplified in the structure to be hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical section of a tank-heater constructed according to the invention, showing a detail of a watering-tank to which it is applied. Fig. 2 is a plan view of the same. Fig. 3 is a sectional view on the line 3 3 of Fig. 1, and Figs. 4 and 5 show details of construction drawn in perspective and on an enlarged scale.

The body 10 of the heater may be of any convenient form, but preferably such that a considerable portion of it may be submerged within the contents of a watering-tank. As shown, it is of rectangular cross-section and is composed of sections so united that any one may be readily disconnected from the others or replaced for the purpose of making repairs. One of these sections 11 preferably occupies when the device is in use a substantially horizontal position near the bottom of the watering-tank, and a second section 12 is upwardly inclined and extends from one end of the part 11 for a sufficient distance to bring its end 13, through which access to the interior of the heater is obtained, well above the surface of the material to be heated. The section 12 is crossed by a grate 16, on which the fire is built, and at the farther end of the horizontal section 11 there is attached a flue-section 14, from which extends vertically a smoke-pipe 15 of considerable length to provide the required draft for combustion of the fuel, and the device takes, therefore, a U shape, the fire for heating being in one leg of the U and the draft therefrom down through the horizontal portion and out at the other leg.

As shown, the fire-grate 16 crosses the inclined section 12 near its lower end in order that the greater portion of the fire supported thereby may be below the surface level of the contents of the tank, and it preferably takes the form of a metal basket (most clearly shown in Fig. 3) and is formed of any convenient material, but in such a way as to provide numerous openings 17 for the passage of air in its side walls and bottom.

For supporting the fire-grate in the desired position it is secured by a bolt 18 to a strap 19, which, as shown, lies along the floor of the inclined section 12 of the heater-body and is provided with an overturned end or hook 21 for engaging an opening or socket 22 in the wall of the heater near its mouth. In this way the fire-grate 16 is firmly held in position, but may be easily removed through the end 13 of the heater-body by using the strap 19 as a handle. In order, moreover, that the height at which the grate 16 is supported may be adjusted, the strap 19 is provided with a plurality of apertures 20, through any one of which the clamping-bolt 18 may be inserted.

Preferably an openable cover 23, hinged to the wall of the heater-body at 24, normally closes the end 13 of the heater, access being had to its interior for the purpose of feeding the fire or removing the grate 16 by turning the cover back upon its hinge, and a damper-opening 26, by means of which the supply of air admitted to the fire within the heater may be regulated, is provided, it being, as shown, in the cover-plate 23.

The walls of the sections 11 12 of the device are most conveniently formed of sheet metal, as indicated at 27, Fig. 4, and the meeting edges of these sections are provided with flanges 28 29, united by bolts 30. As shown, the flanges 28 29, are formed of heavier material, as cast-iron, than the body of the sections, and each fits over the adjacent section and is provided with a groove 31 on its

face for receiving the overturned edge 32 of the material 27 of which the section-body is formed. A layer of packing material 33, preferably of asbestos, is inserted between the faces of the flanges 28 29, so that a tight joint may be formed between the sections when the bolts 30 are drawn up.

The flue-section 14 of the heater is preferably formed of a single casting having a flange 34, by means of which it is secured to the forward end of the section 11 in the manner just described for uniting the other sections. A flange 35 is also provided upon the flue-section for receiving the smoke-pipe 15, this flange being preferably slightly tapered, as shown, and faced with a layer 36 of packing material, so that a tight joint may be formed when the smoke-pipe is firmly seated upon it.

A detail of a watering-trough is shown in the drawings at A, the surface level of its contents being designated *a* and the bottom of the tank *b*. In use the heater will be placed within the tank, the flanges, as 29, of the section 11, resting upon the bottom *b* thereof, and, if desired, the heater may be firmly secured in place by means of straps 37, fitting over the body of the section 11 and clamped to the floor *b* of the tank by means of screw-bolts 38. A fire of wood, charcoal, or other solid fuel will be built in the fuel basket or grate 16, preferably by putting the coarser fuel onto the grate first and the kindling material on top. Then after igniting the fuel the cover 23 may be closed and the supply of air for combustion regulated from time to time by adjusting the damper-opening 26, the draft being downward through the fuel to the body-section 11 of the heater and out by way of the flue-section 14 and smoke-pipe 15. The ashes from the fire drop through the side walls and floor of the fuel-basket onto the floor of the section 11 of the heater and may be easily removed with a small shovel when required, after first raising the cover 23 and removing the fuel-basket through the open end 13 of the heater, using the strap 19 as a handle. The basket form of grate, which I prefer to employ, may be removed in this way without disturbing the fire and in replacing it may be supported at its proper position by inserting the hooked end 21 of the strap 19 in the socket 22, provided for that purpose in the heater-wall.

The flanges 28, 29, and 34 of the several sections of the heater provide a convenient means for insuring a space being provided between its walls and the floor and walls of the tank in which it is placed for the circulation of the contents of the tank about the heater to prevent the burning out of its walls, and if at any time it is necessary to replace or repair any of the parts of the heater it may be easily taken apart for this purpose by loosening the bolts 30.

By means of the improved form of heater which I employ a large portion of the walls heated by the fire are submerged within the contents of the tank and but little heat is lost by radiation.

I claim as my invention—

1. A tank-heater comprising, in combination, a horizontal body-section, a fire-section inclined upwardly therefrom and having a recess in its floor near its mouth, a fire-grate crossing the fire-section, a strap bolted to the fire-grate lying along the floor of the inclined section and having a hooked end lying in the recess, and a flue leading out of the body-section.

2. In a tank-heater having a horizontal body-section and a fire-section inclined upwardly therefrom, in combination, a fire-grate in basket form, means for removably securing the fire-grate within the upwardly-inclined fire-section, and a flue leading out of the body-section.

3. A tank-heater comprising, in combination, a horizontal body-section, a fire-section inclined upwardly therefrom and having a recess in its floor near its mouth, a fire-grate in basket form crossing the fire-section, a strap bolted to the fire-grate lying along the floor of the inclined section and having a hooked end lying in the recess, and a flue leading out of the body-section.

4. In a tank-heater, in combination, a plurality of pairs of juxtaposed frame members, a member of each pair having a marginal edge adapted to rest on a fixed support and a member of one of the pairs having a flanged seat for a smoke-flue, a clamping-bolt uniting the members of each pair, a removable smoke-flue fitting the seat, and a plurality of body-sections each having a flanged marginal edge adapted to fit between the frame members of one pair, one of the body-sections having a damper-opening in its wall and a fire-grate within its body.

5. In a tank-heater, in combination, a pair of juxtaposed frame members, one of the members having a marginal edge adapted to rest on a fixed support, a clamping-bolt uniting the members, a body-section having a flanged marginal edge adapted to fit between the frame members and having a damper-opening in its wall, a fire-grate within the body-section, and a smoke-flue removably connected to one of the frame members and communicating with the interior of the body-section.

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Witnesses:
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