No. 652,157. Patented June 19, 1900.

H. C. BARDEN.

TANK HEATER.

(Application filed Sept. 12, 1899.

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

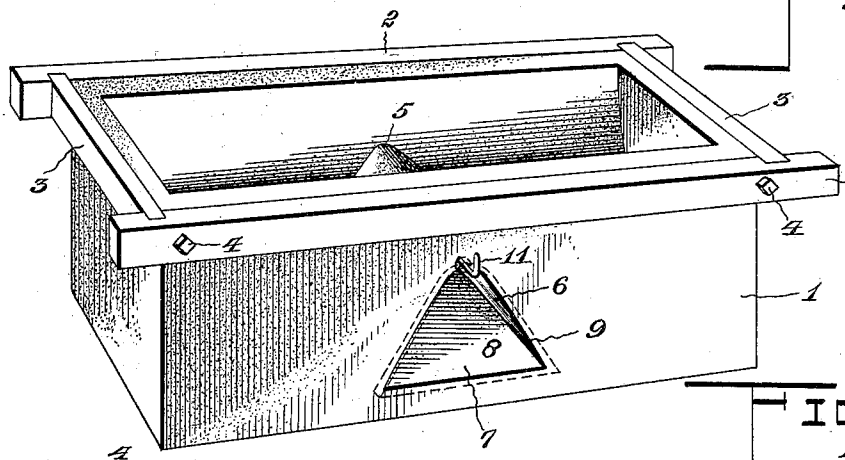
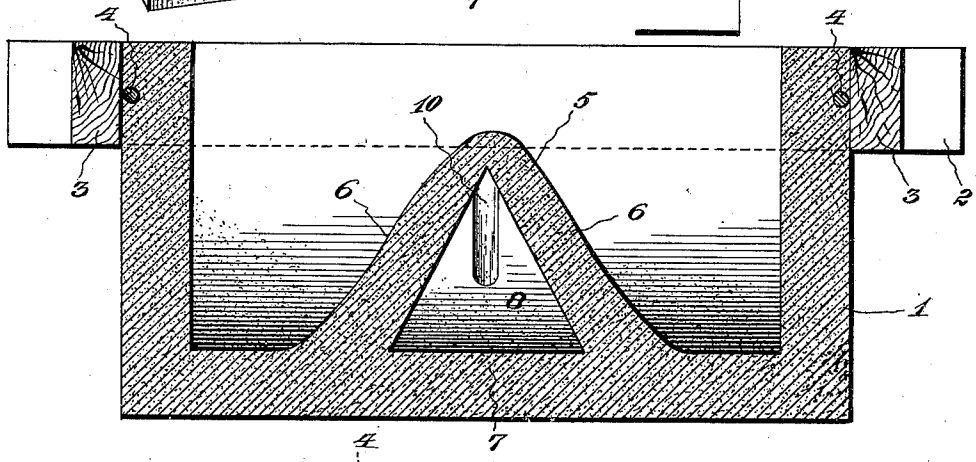


FIG. 2.



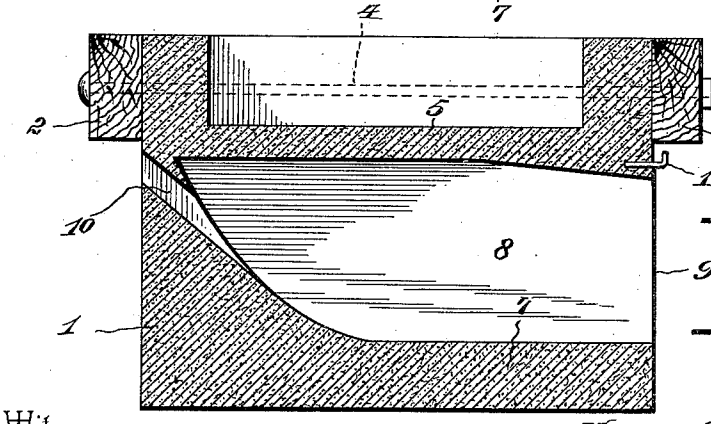


FIG. 3.

Witnesses
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(No Model.) (Application filed Sept. 12, 1899.) 2 Sheets—Sheet 2.

FIG. 5.

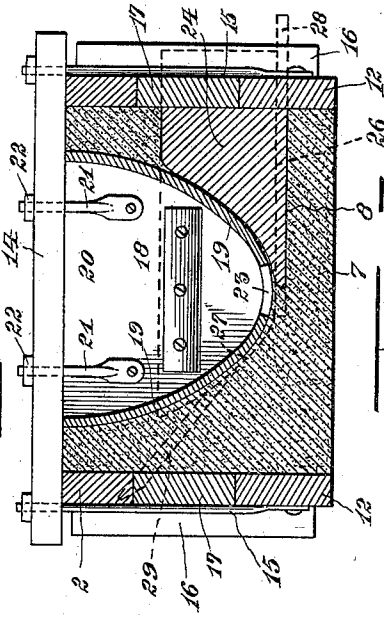


FIG. 7.

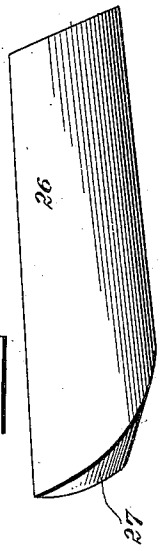


FIG. 8.

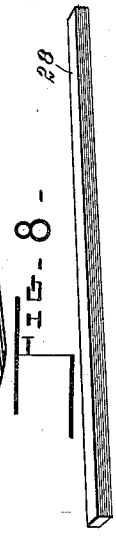


FIG. 10.

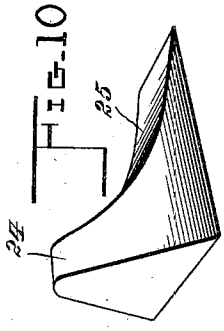


FIG. 9.

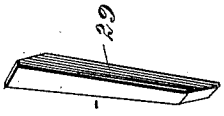


FIG. 4.

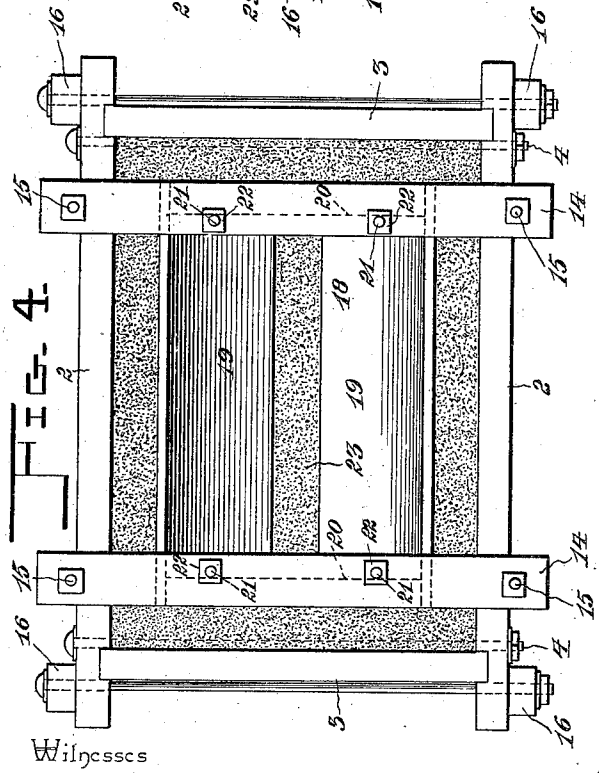
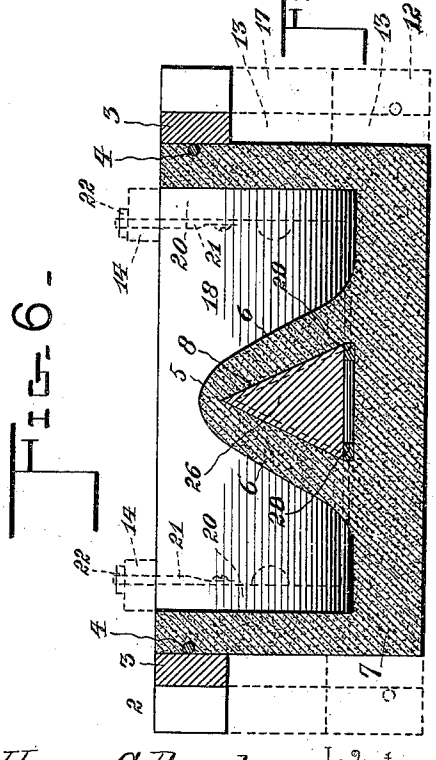


FIG. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

HENRY C. BARDEN, OF LESLIE, MICHIGAN.

TANK-HEATER.

SPECIFICATION forming part of Letters Patent No. 652,157, dated June 19, 1900.

Application filed September 12, 1899. Serial No. 730,245. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. BARDEN, a citizen of the United States, residing at Leslie, in the county of Ingham and State of Michigan, have invented a new and useful Tank-Heater, of which the following is a specification.

This invention relates to tank-heaters; and the object of the same is to provide a device of this character having means for protecting the heat-generator and prevent ignition of surrounding or adjacent combustible material without detracting in the least from the operation or desired result to be obtained by the said heat-generator and at the same time have an extended heat-radiating surface disposed to the best advantage to regularly temper the water and render the same palatable for stock.

Other objects and advantages will be hereinafter described and the novel features claimed and the preferred embodiment of the invention illustrated in the accompanying drawings, wherein similar numerals are employed to indicate corresponding parts in the several views, and in which—

Figure 1 is a perspective view of a water-tank embodying the invention. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a transverse vertical section through the heating-chamber. Fig. 4 is a top plan view of a mold used in making the tank. Fig. 5 is a transverse vertical section of the mold as arranged in Fig. 1. Fig. 6 is a longitudinal vertical section of the partially-molded tank, showing another core substituted for finishing the heating-chamber. Fig. 7 is a detail perspective view of a transverse core-piece. Fig. 8 is a similar view of one of the rests for the core-piece shown by Fig. 7. Fig. 9 is a similar view of the draft-opening core. Fig. 10 is a similar view of the starting-core for the heating-chamber.

The numeral 1 designates the improved form of tank, which is preferably molded from suitable plastic material or composition of different materials and has surrounding the upper portion thereof a guard-frame comprising opposite longitudinal bars 2, connected by cross-bars 3, the entire frame being firmly held in position on the upper part of the tank by binding-rods 4, which are positioned with the said guard-frame at the time the tank is molded. This guard-frame prevents the upper part of the tank from being crumbled or broken away, and means can also be more readily connected to the said tank through the frame for transporting it from one place to another.

The tank is divided for a greater portion of its vertical height on the inside by a transversely-extending partition 5, consisting in the present instance of opposite walls 6, which slope or diverge at their lower portions toward the opposite ends of the tank and have their upper parts merging at a point of convergence, the said walls, with a part of the base-wall 7 of the tank, inclosing a heating-chamber 8, having an entrance 9 through one of the sides of the tank. The chamber 8 is substantially triangular in form, and the lower part gradually slopes upwardly at the terminal opposite the said entrance 9 thereto, and communicating therewith is a draft-opening 10, having an upper obliquity. Over the apex of the entrance 9 is an exteriorly-projecting hook or analogous device 11, on which may be swung a door or analogous device, as shown in dotted lines in Fig. 1.

It will be understood that the improved device is for use in heating or tempering water in very cold countries or localities, so that stock will drink the same, and in devices of this nature as heretofore constructed it has been difficult to control the heating medium with safety and prevent igniting adjacent combustible material. The heating attachments have also been ineffective and irregular in their operation, and at times the water would either become too hot or the temperature lowered to such a degree that freezing would ensue and defeat the purpose of the heater. By the use of the partition 5 the tank is divided into what may be termed "opposite troughs," and the walls 6, absorbing the heat from the chamber, present an extended heating-surface, and it is manifest that the temperature of the water can be maintained at a regular degree by such heated wall exposure. The surrounding side, end, and bottom walls of the tank are intended to be thick enough to avoid too-rapid exterior heat

radiation or at least to obstruct this undesirable feature sufficiently to assist the walls 6 in practically serving their intended purpose.

As a safe means for generating the heat it is preferred that a lamp be used (not shown) and rested on the flat bottom of the chamber 8. After the lamp is in position in said chamber the door or slide over the entrance-opening 9 is closed down and a draft sufficient to encourage combustion in the lamp is created through the opening 10, the upward direction or deflection of the latter preventing the ready entrance of moisture or other matter into the chamber. The walls 6 soon become heated from the lamp, and the water in the tank is likewise affected. By using a lamp as the heating medium sparks or flame is prevented from issuing from any part of the tank, and consequently the improved device may be located indoors with perfect safety, and the lamp being confined within the chamber 8 will be shielded from upsetting. A further advantage of the improved device is the great strength and durability derived from molding it and which also cheapens the manufacture and sale of the same. It is not subject to decay or corrosion and when placed in a desirable position will remain so by reason of its weight.

In Figs. 4 to 10, inclusive, a mold is illustrated for forming the tank hereinafter described. This mold comprises a main body having opposite removable sides 12 and similar ends 13. The guard-frame, comprising the longitudinal bars 2, connected by cross-bar 3 and firmly held in position by the binding-rods 4, primarily constitutes a part of the said mold and before the plastic material becomes united thereto in the manner hereinbefore set forth. The sides 12 and ends 13 are arranged below the bars 2 and 3, and the bottom of the mold is entirely open and is closed by being rested upon a suitable flat surface or base. Across the top of the mold and resting on the longitudinal bars 2 are transverse bars 14, having in their outer terminals or extremities tie-rods 15, that are connected to the lower strips of the sides 12, the said tie-rods having their upper ends extending through the cross-bars 14 and supplied with removable nuts. Turning-arms 16 are also connected to the lower strips of the sides 12 and are brought up over the said sides to hold the intermediate strips 17 in place, the said strips 17 being interposed between the lower strips of the sides and the longitudinal bars 2. The ends 13 of the mold are adapted to be easily detached after the tank is completed to a certain extent, and their removal is facilitated by the detachment of the strips composing the opposite sides 12 below the longitudinal bars 2. Suspended within the sides and ends of the mold is a semi-elliptical core 18, composed of longitudinal convex members 19, connected at opposite ends by heads 20, to which are attached the lower ends of suspending-rods 21, which pass upwardly through the bars 14 and have nuts 22 on their upper ends for the purpose of detachment at such time when it becomes necessary to remove the core from the mold. The inner lower edges of the members 19 have an opening 23 between them for the entrance below the core of the plastic material of which the tank is to be formed, and in the initial preparation the mold will appear as in the cross-section in Fig. 5. Before the plastic material is run into the mold a starting-core 24 is held against one side of the core 18, said starting-core being of the form shown by Fig. 10, having opposite sloping sides and an inner concave surface 25, which snugly coincides with the convex outer surface of one of the members 19, as shown by Fig. 5. After this arrangement of parts the plastic material is run into the mold completely to the level of the upper edges of the bars 2 and 3 of the guard-frame and over the starting-core. The semi-elliptical core suspended within the mold produces a hollow, having a corresponding concave contour and which is partially broken in its continuity by the position of the starting-core 24. After the plastic material has been filled in and around the parts specified the sides and ends are removed by turning down the arms 16 and disconnecting the bars 14 from the tie-rods 15 and simultaneously withdrawing the semi-elliptical core. As indicated in Figs. 1, 2, and 3, the guard-frame remains on the molded tank and the starting-core 24 will be exposed at its outer end and removed. This removal takes place at a time when the plastic material is soft enough to permit such operation without destroying the general contour of the tank. As thus far completed and in place of said starting-core the transverse chamber-core 26 (shown by Fig. 7) is substituted and enters the opening formed by the said starting-core, said transverse core being pushed across a predetermined distance to have its inner curved beveled end 27 close enough to the opposite wall of the tank to practically produce the heating-chamber 8. At the time this transverse core 26 is placed in position the opposite side edge portions of its base are rested upon supporting strips or rests 28, so as to provide means for the quick withdrawal of the said transverse core-piece when it shall have performed its function and after the heating-chamber has been completed. As will be seen from the accompanying drawings, the shape of the core 26 is that of a triangle and the entire device has the contour of a substantially regular elongated quadrangular pyramid. After the transverse core 26 has been arranged as set forth the draft-opening core 29, as shown by Fig. 9, is then inserted through the side wall of the plastic material opposite the inner curved end 27 of the said core-piece 26 at an angle or inclination, as shown in dotted lines in Fig. 5, the opposite ends of the

said draft core-piece being beveled in reverse directions to cause a flush fitting of the inner end with the adjacent curved end of said core-piece 26 and the outer end to about stand flush with the outer molded surface of the plastic material. When the core-piece 26, with its rests 28, and the draft core-piece 29 have been disposed in the manner stated, the tank is ready for completion, and, as shown by Fig. 6, the plastic material is applied over the opposite inclined sides of the said core-piece 26 to construct the transversely-extending chamber opposite the heating-walls thereof, which are exposed within the body of the tank and which have been hereinbefore specifically referred to. After completing this work the rests 28 are withdrawn to permit the transverse core-piece 26 to fall away from the inner upwardly-converging walls of the heating-chamber and permit an easy removal of said core-piece. The draft-opening core-piece 29 is also at this time drawn outwardly, and the tank in this form is left to dry and harden, when it will be fit for use, as shown in Fig. 1. This mold is very simple in its construction, and by the addition of the core-pieces the molding operation can be effectively carried on. The expense of the mold is reduced to a minimum in view of the comparatively-reduced number of parts and can be successively used in the construction of the tank, having the improved features heretofore specified.

The material of which the tank is composed may be hydraulic cement and sand or any other suitable substance, and it will be understood that other cements or other material having a kindred nature may be equally well used for the purpose. In the preparation of the mass of material it is made soft enough for pouring, so that it will run into all parts of the mold and around the formers.

It will be obviously apparent that changes in the form, proportion, and minor details may be resorted to without in the least departing from the nature or spirit of the invention.

Having thus described the invention, what is claimed as new is—

1. A molded water-tank completely open at the top, and divided by a transversely-extending partition with outwardly-sloping sides and terminating below the upper edge of the tank, a heating-chamber being formed in the lower central portion of the tank and extending transversely thereof, the walls of the partition forming the opposite side walls of the heating-chamber and the latter having an exterior ingress-opening and a vent, and means for heating the said chamber.

2. A molded water-tank with a full-open top portion provided with a transversely-extending central partition with opposite inclined or sloping walls directed toward the opposite ends of the tank and terminating below the upper edge of the latter, a heating-chamber being formed within the confines of the partition and having an entrance-opening at one side and an upwardly-directed vent-opening at the opposite side of less dimension than the portion of the chamber with which it communicates, means for closing the entrance end of the chamber, and means for heating the said chamber and the partition.

3. A molded water-tank having an open top portion, opposite side and end guards surrounding the upper edge of the tank and of different material, the upper edges of the said guard members being flush with the upper edges of the tank, and bonding-rods connecting the side guard members and partially embedded in the material of which the tank is composed.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HENRY C. BARDEN.

Witnesses:
WILLIAM F. PRESCOTT,
M. P. COMPTON.