J. S. CHRISTENSEN.

TANK HEATER AND FEED COOKER.

APPLICATION FILED MAR 30, 1908.

922,457. Patented May 25, 1909.

2 SHEETS—SHEET 1.

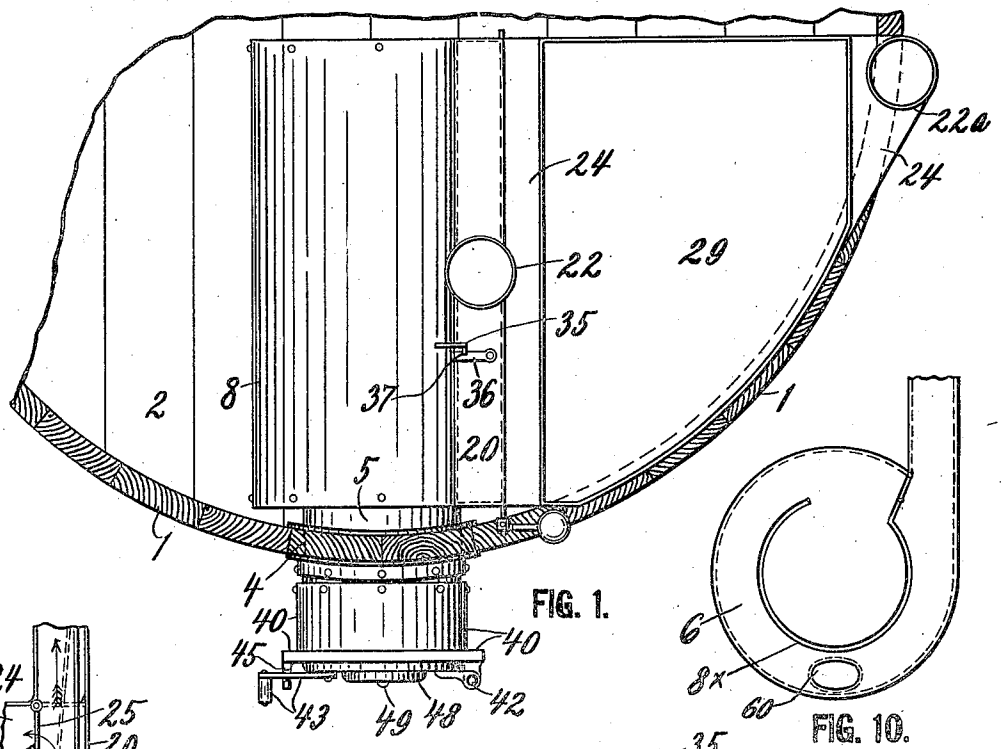


FIG. 1.

FIG. 10.

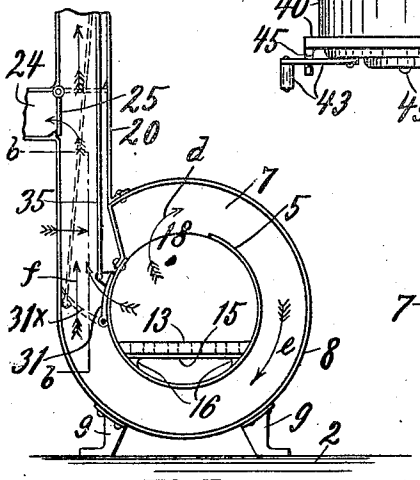


FIG. 7.

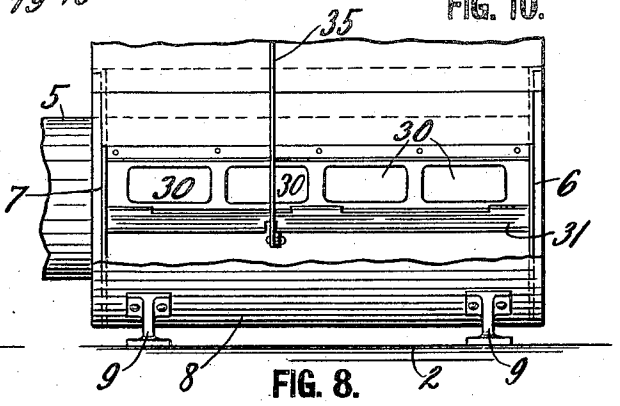


FIG. 8.

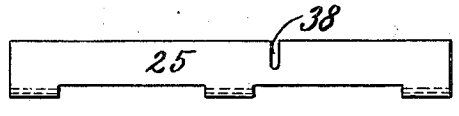


FIG. 9.

WITNESSES:

D. E. Carlsen.

M. M. Carlsen.

INVENTOR:

John S. Christensen.

BY HIS ATTORNEY:

A. M. Carlsen.

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2 SHEETS—SHEET 2.

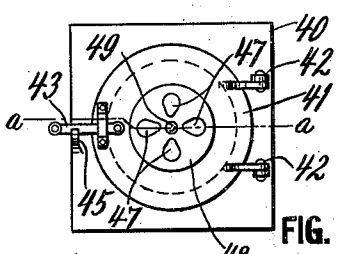


FIG. 4.

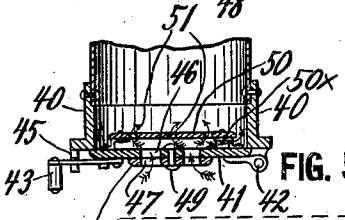


FIG. 5.

FIG. 2.

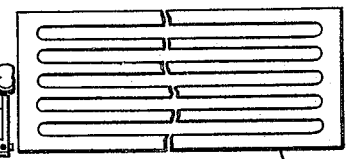


FIG. 6.

FIG. 3.

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BY HIS ATTORNEY:

A. M. Carlsen.

UNITED STATES PATENT OFFICE.

JOHN S. CHRISTENSEN, OF NORWAY LAKE, MINNESOTA.

TANK-HEATER AND FEED-COOKER.

No. 922,457. Specification of Letters Patent. Patented May 25, 1909.

Application filed March 30, 1908. Serial No. 424,196.

To all whom it may concern:

Be it known that I, JOHN S. CHRISTENSEN, a citizen of the United States, residing at Norway Lake, in the county of Kandiyohi and State of Minnesota, have invented a new and useful Tank-Heater and Feed-Cooker, of which the following is a specification.

My invention relates to improvements in water tank heaters and feed cookers for the class of tanks used to water cattle, sheep etc. on large farms, ranches or other places where stock is kept.

The object of the invention is to provide a new and improved device of said class, which is simple and durable, easily operated and of a minimum cost to construct.

In the drawings—Figure 1 is a top view of the complete device and a portion of a circular tank in which the device is applied. Fig. 2 is a front view of the device with the furnace door removed and the outline of the tub in dotted lines. Fig. 3 is a left hand side elevation of the complete device in place in a tank, with the latter in section. Fig. 4 is a front view of the fire door of the device. Fig. 5 is a horizontal section of Fig. 4 on the line *a*—*a*. Fig. 6 is a top view of the grate. Fig. 7 is a rear end elevation with the end wall removed and some minor parts omitted. Fig. 8 is a partly sectional elevation of the main body of the device with a portion of one side wall removed as on the line *b*—*b* in Figs. 2 and 7. Fig. 9 is a detail view of the damper used to regulate the course of the draft. Fig. 10 is the rear end plate of the heater seen from its inner side.

Referring to the drawing by reference numerals, 1 and 2 represent respectively the body and bottom of any water tank used to water stock, and 3 designates the water in such tank.

The heater proper is composed of a water tight almost cylindrical shell 8, supported on legs 9, secured by bolts 10 to the bottom of the tank, and a fire flue or fire box 5 held concentrically therein by having one end inserted in the groove $8^{\times}$ (see Fig. 8) of the rear plate 6 of the shell and its front portion riveted to a flange $7^{\times}$ (see Fig. 2) of the annular front end plate 7 of the shell.

The fire box 5 is projected forward, passed through a hole 4 in the side of the tank, in which it is fitted or made water tight, and outside the tank is secured on it a casting 40 to which is hinged at 42 a door 41, having a latch 43 engaging a catch 45 on the casting. Said door is of the type shown in Figs. 4 and 5 to have a draft regulating plate 48 pivoted at 49 and provided with apertures 47 through which and a similar aperture 46 in the door, more or less air is admitted to the fire (not shown) resting upon the grate 13, which is supported by bars 15 and brackets 16 in the fire box. To prevent sparks from flying out through the openings 46—47, and to prevent over-heating of the door, the latter carries on suitable studs or brackets $50^{\times}$ some distance from the inner side of the door a shielding plate 50, which may have apertures 51, only they must not register with the apertures 46—47. The air thus passes to the fire partly through the apertures 51 and partly over the edges of the shield, the latter being smaller than the door opening.

From one side of the shell 8 and communicating with the interior thereof extends upwardly a smoke flue or chimney 20 terminating in a smoke stack 22 having a spark arrester 23. Into this flue 20 the hot air and smoke from the fire may pass either directly through apertures 30 (see Fig. 8) in the side of the fire box nearest the flue, or a damper 31 operated by a rod 35 may close said apertures and the hot air and smoke must then pass out through the port 18 in the top of the fire box and heat the entire shell by passing as arrows *d*, *e*, *f* into the smoke flue 20. Said flue 20 is provided with a horizontal branch 24 supported at $24^{\times}$ upon the edge of the tank and terminating in a smoke stack 22^{a} with spark-arrester 23^{a}. The upper side of the horizontal branch flue 24 is formed into or with a pan 29 in which to heat or cook feed for pigs and such other stock as may sometimes need it.

At the junction of the flues 20 and 24 is pivotally arranged a damper 25 operated by a rocker arm 26 held by a weight 28. This damper may close alternately the passage of the smoke from either the vertical or the horizontal flue. When the feed box or pan 29 is to be heated the damper is swung across the flue 20 and if the feed box is not in use the damper is placed across the flue 24. The other damper 31 is thrown open while starting a fire on the grate and then closed so as to cause the hot air to heat the shell 8 and its end plates and thereby the water in the tank. If however the feed pan is to be heated in a hurry or to a high degree, then the damper 31

may be opened so as to let the hot air pass to the flue 24 without paying out any of its heat through the shell 8.

The dampers may be arranged and operated in various manners, but I prefer to operate the damper 31 by a vertical rod 35, which projects upwardly through one of the shoulders 21 of the flue 20 and is provided with a side projection 37 supported on a pivoted latch or catch 36 when the damper is closed, and when it is to be open, as at $31^{\times}$ the latch 36 is disengaged from the rod and the latter is allowed to drop until the damper supports it by resting in the position $31^{\times}$ in the flue 20.

In Fig. 9 is shown that the upper damper 25 has a clearing notch 38 for the rod 35 of the lower damper.

The back wall 6 of the heater may be provided near the bottom with a hand hole plate 60 (see Fig. 10), which may be removed and thereby make easy access to clean cinders, ashes and dirt that may have fallen between the fire-box and the shell 8.

Having thus described my invention, what I claim is:—

1. In a device of the kind described the combination with a water tank, of a heater having legs fixed upon the bottom of the tank; said heater comprising a horizontal cylindrical shell submerged in the water in the tank some distance from its walls and having at one side an opening with a vertical smoke flue extending above the water and terminating in a smoke stack with a spark arrester on it, a cylindrical fire box with a grate therein, said fire box being substantially concentrically mounted in the shell and extending throughout its entire length, it also extending beyond the front end of the shell and water tight through the side of the tank, a fire door with suitable frame mounted on the end of the fire box that protrudes beyond the wall of the tank, said fire box having near its top an opening for the hot air and smoke to escape into and pass through the entire shell to the smoke flue, and another opening directly to the smoke flue, a damper arranged to open and close alternately the direct passage and the passage through the shell, a horizontal smoke flue branching off from the vertical flue and terminating in a vertical smoke stack with spark arrester, a heating or cooking pan at the upper side of the horizontal flue, and a damper at the junction of the vertical and the horizontal flues for directing the hot air and smoke alternately into either of them as may be desired.

2. In a device of the kind described, the combination with a water tank, of a heater having legs fixed upon the bottom of the tank; said heater comprising a horizontal cylindrical shell submerged in the water in the tank some distance from its walls, and having at one side a longitudinal opening, a flat broad smoke flue extending from said opening vertically up through the water and being above the water reduced to a smoke-stack, a horizontally flat broad branch flue extending from one side of the vertical flue and being supported on the tank and having its outer end reduced to an upright smoke-stack; a damper arranged at the junction of the vertical and the horizontal flat flues for directing the hot air and smoke alternately into either of them, a feed-cooking pan formed in the upper side of the horizontal flue; a fire-box in the shell and extending beyond one end of it and water tight through one side of the water tank a damper arranged to direct the hot air and smoke from the fire alternately into the smokestack directly from the fire, or indirectly around the firebox so as to heat the entire shell; said damper having a controlling rod extended upwardly through the vertical flue and provided with a handle near the smokestack on said flue.

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

JOHN S. CHRISTENSEN.

Witnesses:
JAS. O. ESTRUN,
NELS QUAM.