O. SUBBY.

STOCK TANK HEATER.

APPLICATION FILED APR. 9, 1917.

1,279,934.

Patented Sept. 24, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

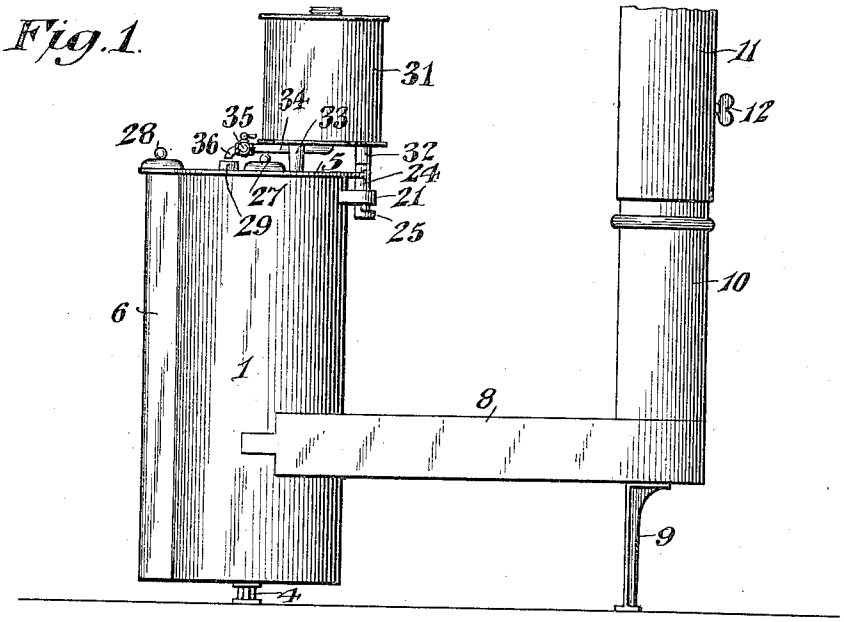
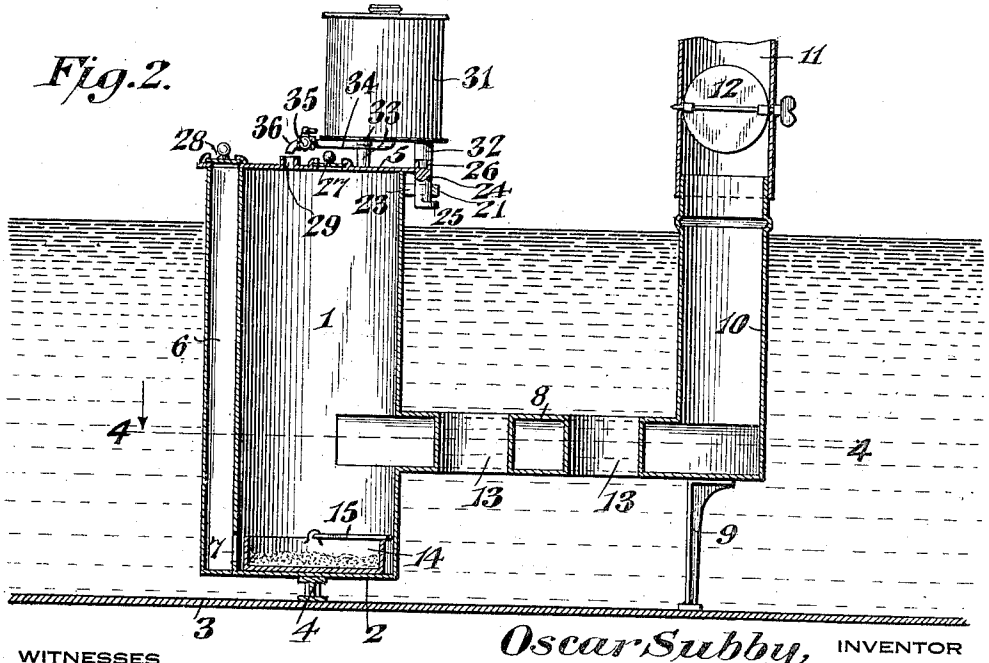


Fig. 2.



WITNESSES

Jas. K. McCathran

Howard D. Orr.

Oscar Subby, INVENTOR

BY E. G. Siggers

J. K. Siggers.

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

O. SUBBY.

STOCK TANK HEATER.

APPLICATION FILED APR. 9, 1917.

1,279,934.

Patented Sept. 24, 1918.

2 SHEETS—SHEET 2.

Fig. 3.

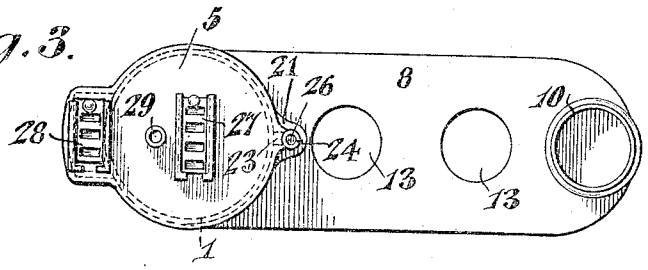


Fig. 4.

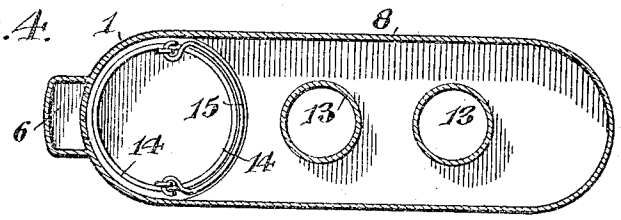


Fig. 6.

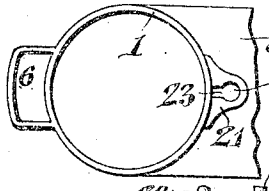


Fig. 5.

WITNESSES

Jas. E. McCathran

Howard D. Orr.

Oscar Subby, INVENTOR

BY E. G. Siggers & G. S. Siggers

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

OSCAR SUBBY, OF ALBERT LEA, MINNESOTA.

STOCK-TANK HEATER.

1,279,934. Specification of Letters Patent. Patented Sept. 24, 1918.

Application filed April 9, 1917. Serial No. 160,785.

To all whom it may concern:

Be it known that I, OSCAR SUBBY, a citizen of the United States, residing at Albert Lea, in the county of Freeborn and State of Minnesota, have invented certain new and useful Improvements in Stock-Tank Heaters, of which the following is a specification.

This invention relates to stock tank heaters.

The object of the invention is to provide a heating device for stock tanks capable of being readily placed within the tank and having its major portion located beneath the level of the water therein, in order to maintain the latter at a temperature to prevent freezing when the tank is located in an exposed position.

Another object is to provide a heating device for the above purpose, which may be readily adapted for the use of oil as a fuel for generating the desired heat, or which may be readily arranged for the consumption of other fuel, such as wood, coal, cobs, etc.; the device having provision for supplying fuel in a manner which obviates the necessity for frequent attention in replenishing the same within the fire chamber.

A further object is to provide means for controlling the drafts to the fire chamber whereby, upon starting a fire therein, air may be admitted beneath the fuel to accelerate combustion, and, by manipulating certain dampers, the course of the air may be changed and admitted upon the top of the fire so that the latter will be checked and the heat confined to the bottom of the device, where submerged, and caused to traverse a heat radiating member forming part of the device, to obtain a complete circulation of the heated water.

A still further object is to construct a heater of this class having a shell or casing composed of a single casting, thus dispensing with rivets, bolts, or other fastening means, which are liable to become rusted and destroyed through the action of the water, and to provide a heater which is capable, when not desired for use as above described, of being removed from the tank and installed for use in heating a room, barn, or other inclosure, without the necessity for any changes or alterations whatever.

A full and complete understanding of the invention will be obtained upon a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification; it being understood that while the drawings show a practical form of the invention, the latter is not confined to strict conformity therewith, but may be changed or modified as long as such changes or modifications mark no material departure from the salient features of the invention, as specifically pointed out in the appended claims.

In the drawings, in which like reference characters designate like parts in each of the several figures:

Figure 1 is a side elevation of the improved heater arranged for the use of oil as a fuel.

Fig. 2 is a vertical longitudinal sectional view thereof, the oil supply tank being in elevation and shown in position within a stock tank.

Fig. 3 is a plan view of the device, the oil supply tank being removed.

Fig. 4 is a horizontal sectional view on the line 4—4 of Fig. 2.

Fig. 5 is a vertical longitudinal sectional view similar to Fig. 2, showing the device adapted for the use of fuel other than oil and located within a stock tank.

Fig. 6 is a detail plan view of the fire chamber, with the top removed.

Referring to the drawings, there is shown a stock tank heater of the submergible type, in which the entire casing, including certain radiating means to be referred to, is preferably cast in one piece, thus eliminating all rivets, bolts or other fastening devices, which rapidly succumb to the action of the water and render the device unfit for use. The casing includes a vertically disposed tubular fire chamber 1 having a bottom 2 and an open upper end and is adapted to be placed within a water tank 3. The bottom 2 is supported in spaced relation to the bottom of the tank 3 by a leg member 4, thus providing a space beneath the fire chamber for the free passage of water.

The chamber 1 is of sufficient height to extend above the maximum level of the water within the tank and has means provided at its upper open end for the detachable and pivotal connection thereto of a lid or closure 5. The lid 5, in the present instance, consists of a flat, circular cast iron plate,

having thereon certain means for controlling the drafts of air for regulating the fire within the chamber 1.

A vertically disposed air duct 6 is cast integrally with the fire chamber 1 and is located upon the outside of the wall of the fire chamber, the bottom end of the duct being closed by an extension of the fire chamber bottom 2 while the upper end is open like the upper end of said fire chamber. A passageway or port 7 is provided at the lower end of the air duct 6 and connects the same with the lower portion of the fire chamber 1.

At a point diametrically opposite from the air duct 6, a hollow radiating arm 8 is provided, which is cast integrally with the fire chamber 1 and extends laterally a distance approximately equal to the height of the fire chamber 1. The arm 8 may, however, extend a much greater or less distance and is of a width, interiorly, equal to the diameter of the fire chamber 1. The arm 8 is joined to the fire chamber 1 at a point substantially one third of the height of the fire chamber, from the bottom thereof, and is adapted to be supported at its outer end by a suitable leg 9 resting upon the bottom of the tank. Thus, the hollow arm 8 is supported a considerable distance from the bottom of the tank and permits of a volume of water to lie beneath the same.

An upstanding tubular stack 10 is cast integrally with the hollow radiating arm at the outer end thereof, and communicates with the passageway therethrough. This stack 10 extends upwardly a distance equal to the height of the fire chamber 1, and thus the upper end thereof is located above the level of the water within the tank 3. A suitable smoke pipe 11 is applied to the upper end of the stack 10 and has a suitable damper 12 located therein within easy reach of an operator.

Vertically disposed water passages 13 are cast integrally with the hollow radiating arm 8, the diameter of said passages 13 being considerably less than the width of the hollow arm 8, thus allowing ample space upon either side of the passages 13 for the ready egress of the products of combustion from the fire chamber 1. It will be seen that a column of water located within the walls of the passages 13 will be completely surrounded by the heated products passing through the hollow arm 8 and that there will be a constant tendency for the heated water to rise therethrough, drawing other and colder water therein, thus causing a constant circulation of water within the tank. It will, furthermore, be seen, that by reason of the space beneath the chamber 1, that the action of the fire within said chamber will cause a similar circulation of the water beneath and around the chamber 1.

A shallow open-ended ash pan or receptacle 14 having a suitable bail 15 is adapted to be placed within the fire chamber 1 and to rest directly upon the bottom thereof. The ash receptacle 14 is of a diameter somewhat less than the diameter of the fire chamber 1. Thus, an annular channel is provided around the same, communicating with the port 7 at the bottom of the air duct 6, and which is adapted to permit the ready inflow of air through the port 7.

A grate member 16, of the same diameter as the ash receptacle 14, is adapted to be supported by the top edges of the walls of the latter and to be spaced away therefrom by legs 17, thus providing air inlets 18 therebetween immediately below grate bars 19 in the grate member 16 and adapted to support the fire bed, when such fuel as wood, coal, cobs, etc. is used. The grate member 16 is provided, around the top edge of its annular wall, with a series of spaced upstanding fingers 20 adapted to confine said fuel within the grate member 16, and at the same time to permit of the ready upward passage of the air currents through and around the fuel.

A horizontally disposed lug 21 is formed on the fire chamber 1, directly over the center line of the arm 8 and at a point slightly below the top edge of the fire chamber 1, thus being located above the water level within the tank 3. This lug 21 is provided with a vertically disposed passageway 22 with which communicates a slot 23.

The lid 5, shaped to conform to the outlines of the fire chamber 1 and the air duct 6, extends slightly beyond the margins thereof, and is provided with a downwardly extending pivotal post 24, adapted to traverse the passageway 22 and to permit of the ready swinging movement of the lid 5 in either direction laterally. The pivotal post 24 is provided at its lower extremity with an outstanding lug 25, which, when the lid 5 is properly seated upon the fire chamber 1, is adapted to prevent the removal of the lid from its seat by underriding the lug 21.

When it is desired to apply the lid to the fire chamber 1, or to remove the same therefrom, it is necessary to turn said lid halfway around so that the lug 25 will register with the slot 23, the latter being directed toward the axis of the fire chamber 1. The pivotal post 24 extends slightly above the top surface of the lid 5 and is provided with a socket 26 for a purpose to be explained.

Suitable sliding dampers 27 and 28, of ordinary construction, are mounted on the lid 5 over the centers of the fire chamber 1 and the air duct 6, respectively, and are adapted to regulate the inflow of air through suitable apertures, in a well known manner. An aperture 29 is provided in the lid 5 at a point adjacent to the sliding damper 27 and

thus communicates with the interior of the fire chamber 1. The aperture 29 is preferably surrounded by an upstanding annular wall, which is adapted to receive a plug 30 or other closure, when the stock tank heater is arranged for the use of coal, wood, or cobs, as a fuel, as indicated in Fig. 5 of the drawings.

When it is desired to use oil as a fuel within the receptacle 1, the lid 5 is swung to one side sufficiently to permit of the removal of the grate member 16, and the ash receptacle 14, preferably with a quantity of ashes therein, is left in position within the bottom of the fire chamber 1. The plug 30 is then removed and an oil tank 31 is placed in position upon the top of the lid 5. The oil tank 31 which may be of any desired capacity has, near the periphery of its bottom, a downwardly extending post 32 suitably secured thereto. The post 32 is reduced at its lower end to enter the socket 26, thus locating the tank 31 in proper position upon the top of the lid 5. Suitably spaced legs 33 carried by the bottom of the tank 31, rest upon the top of the lid 5, and in conjunction with the post 32, serve to maintain the tank 31 in a horizontal position at all times. An oil outlet 34 having communication with the interior of the tank 31 and controlled by a valve 35 has a spout 36, which, when the tank is properly located, is in exact alinement with the aperture 29 and will permit of the dropping of oil therethrough into the interior of the fire chamber 1.

As before stated, a quantity of ashes is preferably left within the receptacle 14 when it is desired to utilize oil as a fuel. A small fire, such as supplied by the burning of paper, shavings, or other like material, sufficient to ignite the oil as it drops through the aperture 29, is first started within the receptacle 14 and the lid 5 closed, when continuous dripping of the oil will cause the steady burning of the fire at the extreme lower end of the fire chamber 1.

In the event of it being desired to burn wood, coal, or cobs, or other like fuel, the grate member 16 is positioned within the fire chamber 1, the oil tank 31 removed as before explained, and the aperture 29 closed. It is necessary in order to force the fire at the starting thereof, to close the damper 27 at the top of the fire chamber 1 and to open the damper 28 at the top of the air duct 6. This causes a downdraft of air through said duct 6 which air will travel about the burning fuel contained within the grate member 16, part of the same entering through the air inlets 18, and thus up directly through the fire and on out through the hollow radiating arm 8 to the smoke pipe 11, where the draft may be controlled by the damper 12, as desired. When the fire has gained sufficient headway, the damper 28 in the air duct 6 may be closed or partly closed, and the damper 27 opened sufficiently to cause a downdraft of air directly upon the fire, which will be checked thereby, and the heat confined to the lower portion of the fire chamber 1 and to the radiating arm 8.

In the latter use of the device, the fuel after the fire has been started may be piled into the fire chamber 1 to the top thereof, when the same will be fed to the fire as it is consumed thereby.

From the foregoing, it will be seen that a stock tank heater formed of a single casting has been devised, which is capable of manufacture at a very low cost, and which, being free from rivets or bolts or other parts liable to rust and destruction, is well adapted for use within a stock tank where it is necessary to submerge nearly the entire heating device. By means of the dampers 27 and 28, an operator is enabled to control the fire within the heater without the necessity for frequent attention thereto and with an economical use of fuel. It will also be seen that the device may be readily set up for use elsewhere than in a tank.

Another use that the device is capable of is that the same may be of service for cooking, as the hollow radiating arm 8 is formed with a flat top so that food stuff or the like can be placed uopn this arm and the heat circulating therethrough will radiate through the top, for the cooking of such food stuff. It will be noted that the arm is of a width substantially equal to the width of the fire chamber, thereby giving the maximum heating surface at its top, while the tubes 13 are vertically disposed to provide passages for the circulation of air therethrough when the device is used for cooking purposes. Additionally, the device may be used as a heating stove for rooms or the like, and such use will be clearly obvious.

What is claimed is:—

1. A stock tank heater comprising an upright fire chamber, an upright smoke stack spaced laterally therefrom, and a hollow radiating arm connecting the fire chamber and smoke stack to conduct the products of combustion from the fire chamber to the smoke stack and provided with upright tubes through it, the arm being located intermediate of the height of the fire chamber so as to be below the water level when the heater is placed in a stock tank, and substantially equal in width to the diameter of the fire chamber, said arm being flat on top for the purpose set forth.

2. A stock tank heater comprising an upright fire chamber, an upright smoke stack spaced laterally therefrom, and a hollow radiating arm connecting the fire chamber and smoke stack to conduct the products of combustion from the fire chamber to the smoke stack and provided with upright tubes

through it, the arm being located intermediate of the height of the fire chamber to be located below the water level when the heater is placed in a stock tank, the fire chamber, radiating arm and smoke stack being all made in one piece.

3. A stock tank heater comprising an upright fire chamber, an upright smoke stack spaced laterally therefrom, and a hollow radiating arm connecting the fire chamber and smoke stack to conduct the products of combustion from the fire chamber to the smoke stack, said arm being flat on top and provided with a plurality of vertical tubes formed integrally therewith, which are open at the top and bottom and are less in diameter than the width of the arm, said arm being located intermediate of the height of the fire chamber, so as to be disposed below the water level when the heater is placed in a stock tank, and also being substantially equal in width to the diameter of the fire chamber, said arm being closed at all sides and having the stack opening into the top thereof at the outer end.

4. A stock tank heater comprising an upright fire chamber, an upright smoke stack spaced laterally therefrom, and a hollow radiating arm connecting the fire chamber and smoke stack to conduct the products of combustion from the fire chamber to the smoke stack, said arm being flat on top and provided with a plurality of vertical tubes formed integrally therewith, which are open at the top and bottom and are less in diameter than the width of the arm, said arm being located intermediate of the height of the fire chamber, so as to be disposed below the water level when the heater is placed in a stock tank, and also being substantially equal in width to the diameter of the fire chamber, supporting means at the outer end of said arm, said arm being closed at all sides and having the stack opening into the top thereof at the outer end, said fire chamber, and said stack and said hollow arm being all cast in one piece.

5. A stock tank heater comprising a casing forming a fire chamber open at its top and having an air duct leading from the open top for communication with the chamber near its bottom, a lug formed on the casing near the top, a lid fitting upon the top for closing the chamber and air duct and having a post removably and rotatably engaged in the lug, said lid being formed with an aperture for communication with the chamber, an oil tank having supporting legs and a post, the legs resting on the lid and the post detachably engaged with the aforesaid post, and valved outlet means extending from the tank over the aperture for supplying oil from the tank through said aperture to the interior of the chamber.

6. A stock tank heater comprising a casing forming a fire chamber open at its top and having an air duct leading from the open top for communication with the chamber near its bottom, a lug formed on the casing near the top and provided with a vertical passage, a lid fitted upon the top for closing the chamber and the air duct and having a post removably and rotatably engaged in the passage in said lug, slidable dampers carried by the lid for controlling the air from the chamber and air duct, said lid being formed with a walled aperture for communication with the chamber, an oil tank having spaced legs and a post engaged with the lid and first named post, respectively, and valved outlet means extending from the tank to the walled aperture for supplying oil through said aperture to the interior of the chamber.

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

OSCAR SUBBY.

Witnesses:

NORMAN E. PETERSON,

ELMA LIEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D.C."