Aug. 23, 1949. M. V. SCHUBERT 2,480,053

STOCK TANK WATER HEATER

Filed Dec. 4, 1948 2 Sheets-Sheet 1

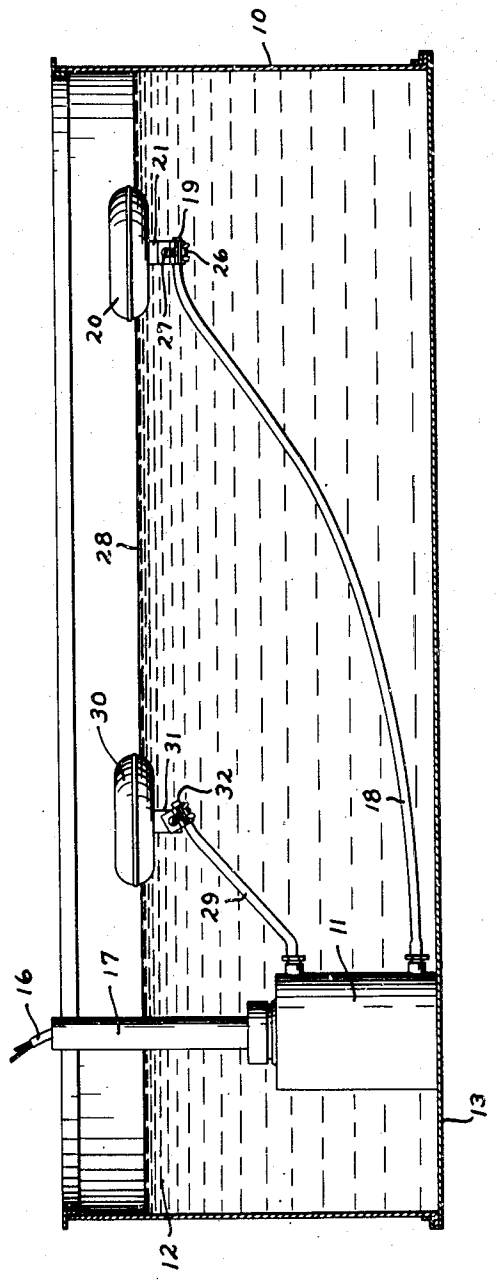


FIG. 2.

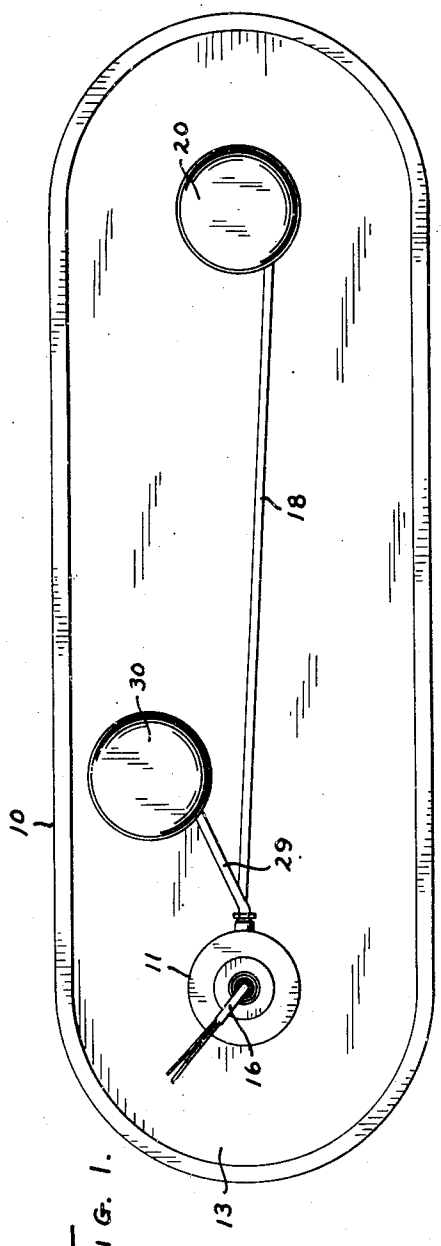


FIG. 1.

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STOCK TANK WATER HEATER

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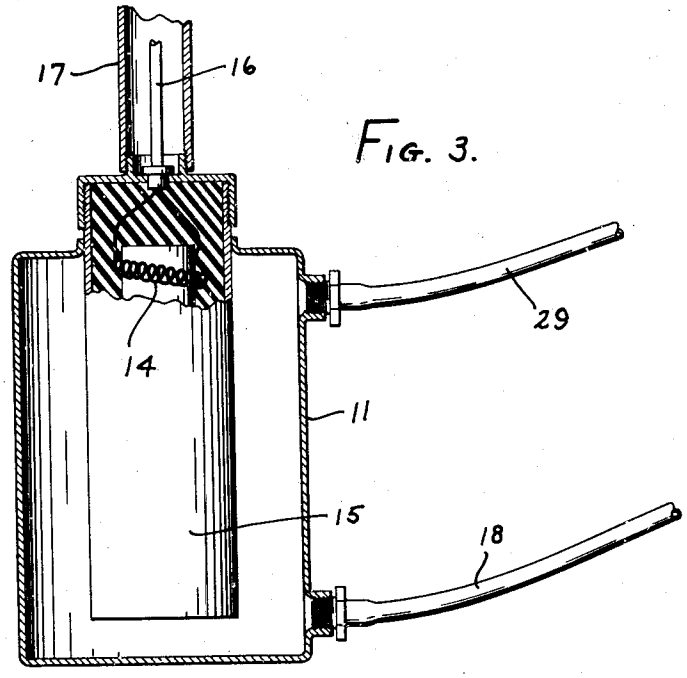


FIG. 3.

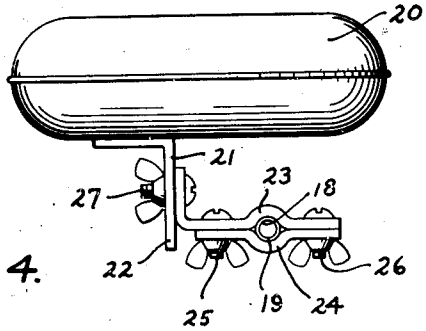


FIG. 4.

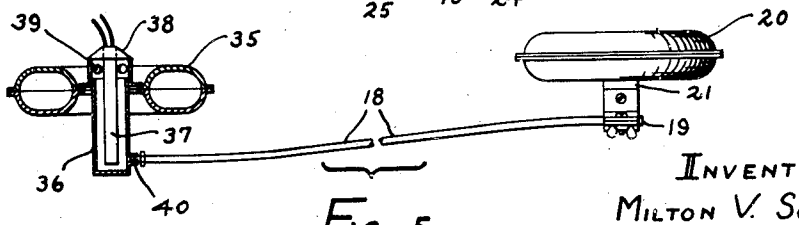


FIG. 5.

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STOCK TANK WATER HEATER

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8 Claims. (Cl. 219—38)

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This invention relates to means for heating water in a live stock water tank. A particular purpose of the invention is to provide means whereby the upper portion only of the water is heated so that the entire quantity of the water need not be heated and kept at an elevated temperature at all times. This is particularly important where the water tank is used out-of-doors and in the winter time when the tendency is to require sufficient heat to prevent freezing of the entire body of the water.

By use of my invention, the heat is applied primarily to the upper few inches of the water entirely across the tank so that a minimum amount of heat is required, and at the same time, the entire area, or substantially that entire area, is unfrozen and is open water for the benefit of the stock using the tank.

Heretofore, it has been the practice to follow one of two practices. One practice has been to use a heater in conjunction with the tank whereby the entire quantity of water had to be circulated in order to keep the upper portion sufficiently warmed to prevent freezing across that zone. This system of course requires an exceedingly large quantity of fuel to achieve that purpose. The other procedure has been to use a small heater locally in a particular zone of the tank, at the surface thereof, and this method means that only an immediate area around that heating element in that zone will be subject to the heat radiated from the element. In other words the larger portion of the surface of the water will freeze over at times as only a limited area is left open to be available to the stock using the tank.

In addition to the foregoing objects of the invention herein set forth, there is the additional advantage of the utilization of an extremely small amount of energy to supply the heat required. Also the device employed to carry out the invention is usable regardless of the height of the water in the tank, and there are no valves or piping arrangements which would tend to clog up or freeze.

These objects and advantages of the invention will become apparent to those versed in the art, in addition to many others, in the following description of one particular form of the invention as illustrated in the accompanying drawings, in which

Fig. 1 is a top plan view of a structure embodying the invention;

Fig. 2, a central, vertical, longitudinal section through a tank embodying the invention;

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Fig. 3, a view in vertical section on an enlarged scale of one form of a heater;

Fig. 4, a view in end elevation of a float employed in the invention; and

Fig. 5, a view in side elevation and in partial section of a modified form of a structure embodying the invention.

Referring to the drawings, in which like characters of reference indicate like parts in the several views, a water tank generally designated by the numeral 10 is shown as one typical type of tank which may be employed in conjunction with the invention. The tank 10 herein shown is of the usual elongated type generally elliptical in top plan view. It holds several barrels of water in the normal dimensions. A suitable heater 11 is preferably immersed within the water 12 within the tank 10, such as by placing the heater 11 within the tank and allowing it to rest on the floor 13 of the tank 10. The heater 11 in the present showing is of that type which derives its heat from an electrical resistance 14, Fig. 3, encased in a waterproof receptacle 15 inserted within the shell constituting the exterior of the heater 11.

The element 14 is placed in an electrical circuit with any suitable source of power by means of the cable 16 extending from the receptacle 15 from the element 14 and out through a conduit 17 protecting the cable 16 from live-stock interference and also protecting it against the action of water which would otherwise surround the cable 16.

From the lower end portion of the heater 11 there leads a flexible hose 18 to be of sufficient length to permit the free end 19 of that hose to be carried upwardly to the extreme permissible height of the water 12, and preferably at the far end of the tank 10 removed from the heater 11. In this regard, the heater 11 is preferably located toward one end of the tank 10 as illustrated in Figs. 1 and 2. The free end 19 is attached to a float 20 which will ride on the surface of the water 12 and carry a bracket 21 thereunder. This bracket in the present form consists of an angle having a downturned leg 22 to which is rockably secured a holder 23 against the underside of which is clamped the end portion of the hose 18 by means of the clamp bar 24 drawn up against the underside of the hose by use of the bolts 25 and 26 extending through the members 23 and 24, Fig. 4. By reason of the fact that the member 23 is rockably secured to the leg 22, herein shown as by means of the thumb screw 27, the angular

disposition of the end portion of the hose 18 may be made so as to permit the float 20 to be in its normal level position at the top of the water without tendency to cock it. In any event, the support of the end portion 19 of the hose 18 is made to be such that this end portion is located below the top level 28 of the water 12 a fixed distance.

From the upper portion of the heater 11 there leads a flexible hose 29 of a shorter length than that of the hose 18. As indicated in Figs. 1 and 2, this hose 29 is bent around to extend upwardly and be attached to the underside of a second float 30 by means of a bracket construction 31 having identically the same elements combined therein as is shown in Fig. 4 in relation to the members carried under the underside of the float 20. However in this case, since the hose 29 is shorter than the hose 18, the upper end portion 32 of the hose 29 will be directed upwardly as indicated in Fig. 2 rather than turned substantially horizontally as is indicated in reference to the end portion 19 of the other hose 18.

It is obvious that as the water level 28 drops within the tank 10, the floats 20 and 30 will be lowered accordingly, and conversely when the water level is raised, the floats will go up with that level. Therefore the ends 19 and 32 of the two hoses will always be maintained in the same originally placed spacings from the top level 28. Furthermore it is to be noted that the two floats 20 and 30 will remain at substantially the same distance apart at the different elevations of the water level 28 by reason of the differences in lengths of the hoses.

In operation, when the element 14 is energized, the water will start circulating from the inlet hose 18 to travel upwardly and out the discharge hose 29. This means that water will be taken in from the far end of the tank 10 through the hose end portion 19 and carried downwardly through the colder portion of the water in the tank to enter the heater 11. The short length 29 will direct the warmed water upwardly toward the surface 28 by reason of the angularity of the end portion 32 so that the warm water is also discharged within the upper few inches of the water 12 within the tank 10. The length of the hose 29 is such that the water does not become appreciably cooled as it travels to that upper zone of the water by reason of the cooler temperature of the water thereunder. In other words by reason of the disposition of the ends 19 and 32 of the two hoses, only the upper few inches of the water 12 is actually heated in the tank, and that warmed water serves as an insulating blanket for the remaining water underneath so that there is not the tendency for that water below to freeze. In other words the fact that only the upper portion of the water is heated serves not only to keep that portion heated, but also to keep the lower portion from freezing too readily.

Referring to Fig. 5, the heating element may be applied to one of the floats instead of having to rest on the bottom of the tank. As indicated in Fig. 5, a float 35 may be employed to be of a doughnut shape to carry centrally and vertically therethrough a heater shell 36 so that the shell 36 will extend downwardly from the underside of the float 35 a distance sufficient to permit carrying therein a heating element 37 electrically energized. This element 37 is supported from a top shield member 38 fixed over the top of the shell 36. The cap 38 extends downwardly to have side openings 39 from which water in the shell 36 may be expelled.

The hose 18 may have an end fixed to an outlet member 40 at the lower end portion of the shell 36 and have its other end carried up to the bracket 21 under the float 20 all as above described.

In operation, this form of the invention as illustrated in Fig. 5, will have the two floats 20 and 35 resting upon the water within the tank 10. By reason of the weight of the shell 36 and of the heating element 37 carried thereby, the float 35 will tend to be submerged to a greater extent than is the float 20. Of course this will be determined by the dimensional proportions of the float 35. In any event it is preferred that the float 35 ride rather low in the water. Now when the element 37 is energized, the water within the shell 36 will become heated tending to expand that water and by reason thereof water will be pulled in through the hose 18 to replace the water at the lower end of this shell 36 and the heated water will flow outwardly through the openings 39 and spill over the top of the float 35. Thus as long as the element 37 is energized, there will be a circulation of water maintained so that the upper surface portion of the water in the tank 10 will be heated without materially affecting the temperature of the water below that zone.

Therefore it is to be seen that I have produced a very simple means for heating water in a stock tank, and such a means as will permit use of a minimum of energy input. It is obvious of course that different types of heaters including oil and coal or wood burners can be used in place of the electrical element as the actual source of the heat, without departing from the spirit of the invention. Therefore I do not desire to be limited to that precise form as illustrated in the drawings and as described in the specification beyond the limitations which may be imposed by the following claims.

I claim:

1. For heating water in a tank, the combination of a heater having a lower water intake and an upper water outlet; a float formed to float freely upon the surface of the water; a flexible hose connecting by one end with said heater intake and, by its other end, attached to hang under said float in a submerged condition; a second float formed to float on the surface of said water; and a flexible hose connecting with said heater outlet and attached to hang by its other end in submerged condition to said second float.

2. For heating water in a tank, the combination of a heater having a lower water intake and an upper water outlet; a float formed to float freely upon the surface of the water; a flexible hose connecting by one end with said heater intake and, by its other end, attached to hang under said float in a submerged condition; a second float formed to float on the surface of said water; and a flexible hose connecting with said heater outlet and attached to hang by its other end in submerged condition to said second float; said second float being spaced from said first float by said second hose being shorter than said first hose.

3. For heating water in a tank, the combination of a heater having a lower water intake and an upper water outlet; a float formed to float freely upon the surface of the water; a flexible hose connecting by one end with said heater intake and, by its other end, attached to hang un-

der said float in a submerged condition; a second float formed to float on the surface of said water; and a flexible hose connecting with said heater outlet and attached to hang by its other end in submerged condition to said second float; a hose supporting bracket on each of said floats constituting said connections, said brackets being shiftable to vary selectively the axial direction of said hose other ends in respect to the level of said water and in respect to each other.

4. For heating water in a tank, the combination of a heater having a lower water intake and an upper water outlet; a float formed to float freely upon the surface of the water; a flexible hose connecting by one end with said heater intake and, by its other end, attached to hang under said float in a submerged condition; a second float formed to float on the surface of said water; and a flexible hose connecting with said heater outlet and attached to hang by its other end in submerged condition to said second float; said heater intake and outlet being positioned to direct both of said hoses to a common side thereof whereby the heater may be placed near one end of said tank, and said second float will be between said heater and said first float.

5. For heating the upper portion of water in a tank, a heater having a lower water inlet and an upper water outlet; a float; a hose flexibly extending from said water inlet to said float; and means carried by said float to support thereby the other end of the hose.

6. For heating the upper portion of water in a tank, a heater having a lower water inlet and an upper water outlet; a float; a hose flexibly extending from said water inlet to said float; and means carried by said float to support thereby the other end of the hose; means fixing said heater upper outlet discharge level into said upper water portion, and said hose other end being submerged by said means at a predetermined depth in said portion to fix the depth of that portion subjected primarily to circulation through said heater.

7. For heating the upper portion of water in a tank, a heater having a lower water inlet and an upper water outlet; a float; a hose flexibly extending from said water inlet to said float; and means carried by said float to support thereby the other end of the hose; means suspending said heater in said water to rise and fall with the level thereof.

8. For heating the upper portion of water in a tank, a heater having a lower water inlet and an upper water outlet; a float; a hose flexibly extending from said water inlet to said float; and means carried by said float to support thereby the other end of the hose; means suspending said heater in said water to rise and fall with the level thereof; said means comprising a float, and said upper outlet being fixed in position relative to said heater float.

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No references cited.