Aug. 12, 1952 D. W. CLIFFORD 2,606,548

SELF-HEATED STOCK WATERING TANK

Filed July 17, 1948 3 Sheets-Sheet 1

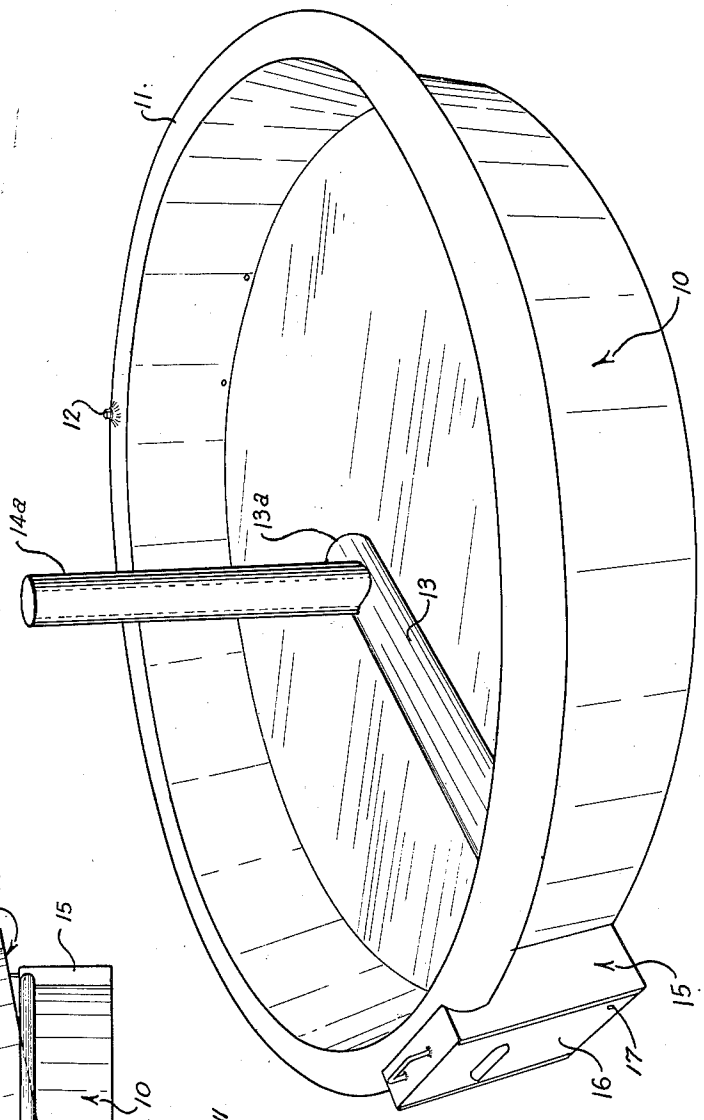


FIG.—1

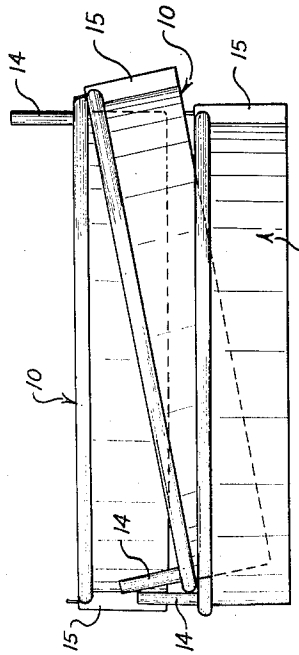


FIG.—2

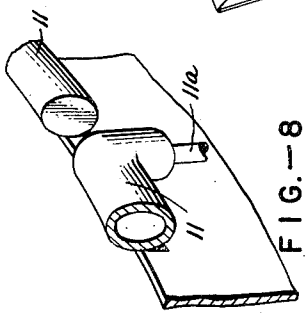


FIG.—8

INVENTOR.
Douglas W. Clifford

BY

H. A. McGraw

ATTORNEY

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SELF-HEATED STOCK WATERING TANK

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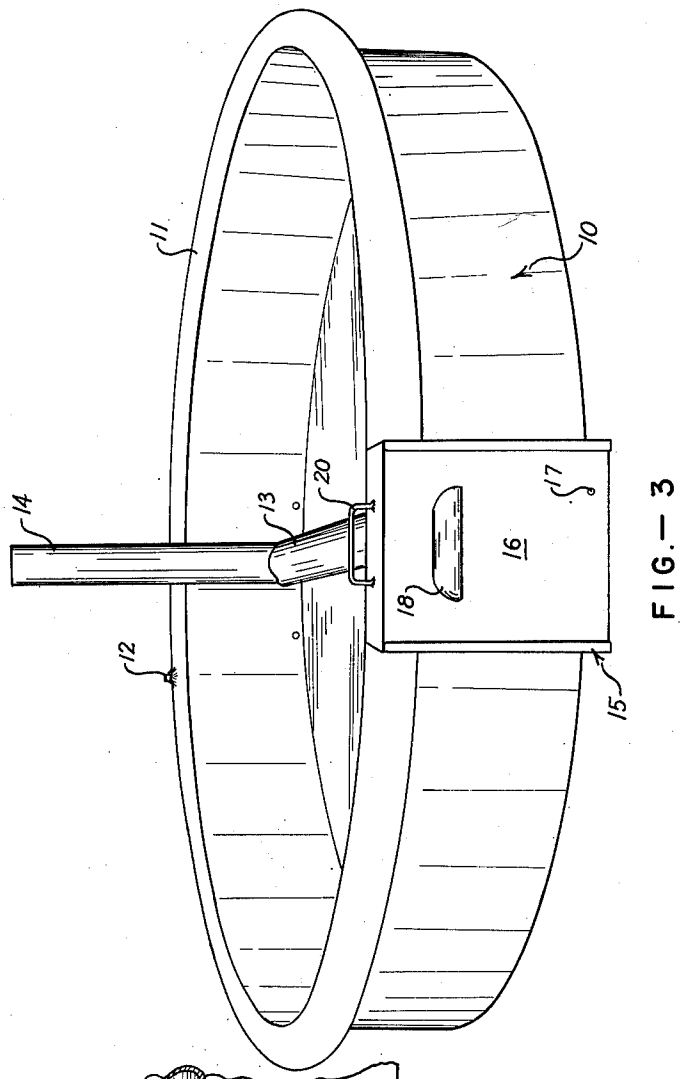


FIG. — 3

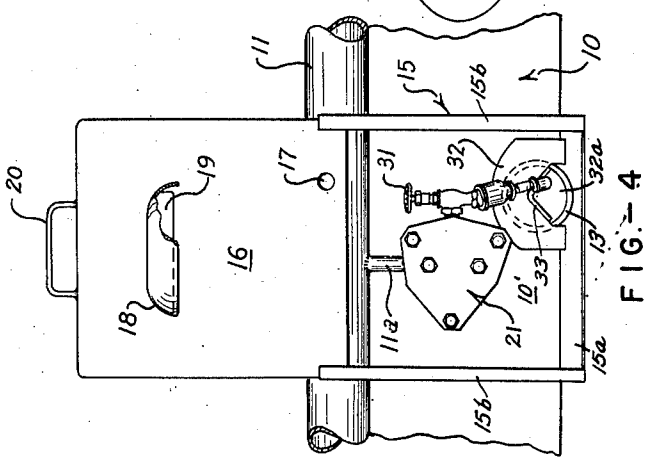


FIG. — 4

INVENTOR.
Douglas W. Clifford

BY

H. A. McGrew

ATTORNEY

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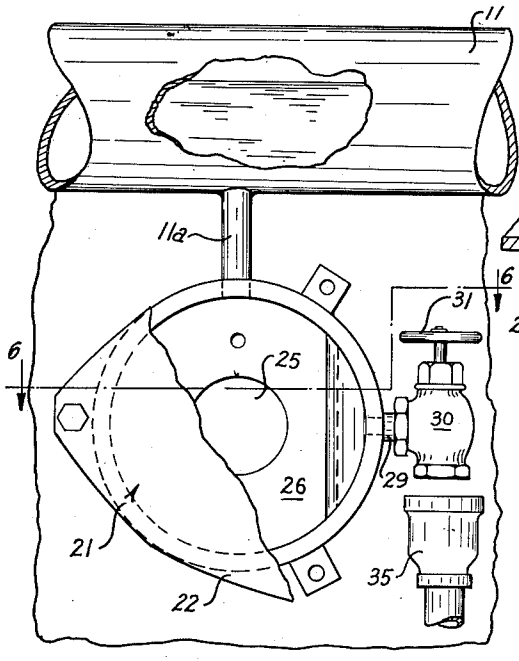


FIG.- 5

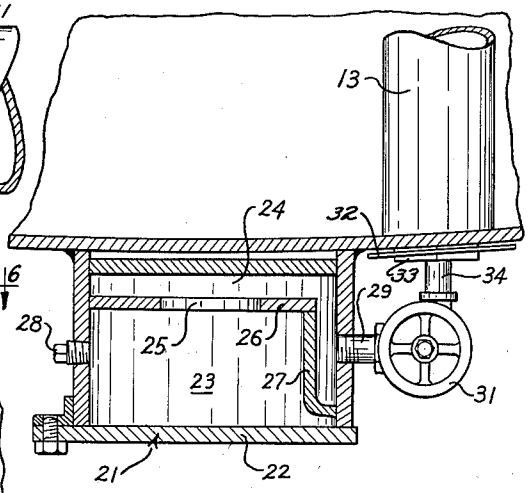


FIG.- 6

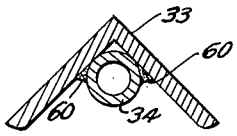


FIG.- 7a

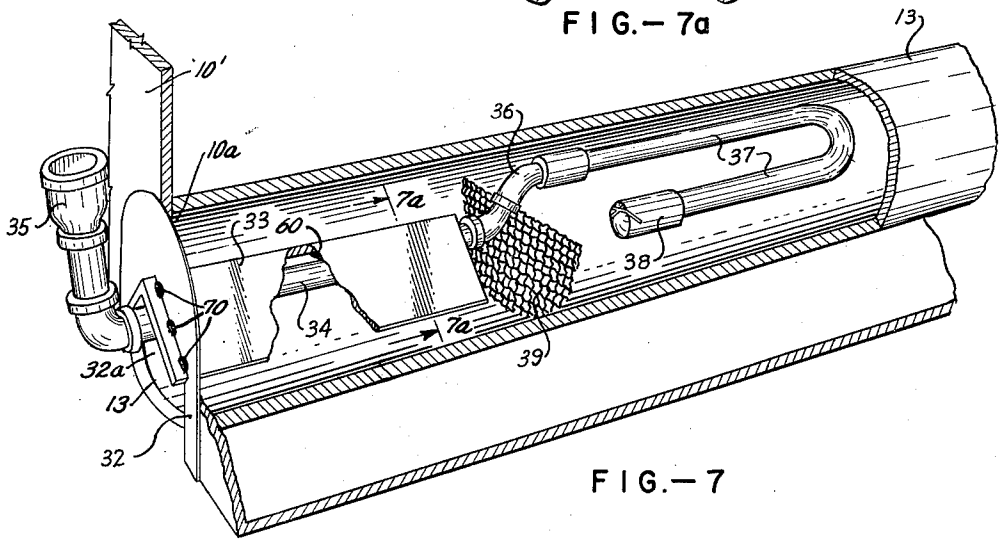


FIG.- 7

INVENTOR.
Douglas W. Clifford
BY
W. A. McGreen
ATTORNEY

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SELF-HEATED STOCK WATERING TANK

Douglas W. Clifford, Denver, Colo.

Application July 17, 1948, Serial No. 39,365

4 Claims. (Cl. 126—360)

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This invention relates to new and useful improvements in animal husbandry, and more particularly to stock watering troughs, tanks, or receptacles of the self-heating type, to prevent the drinking water from freezing.

An important object of the invention is to provide a durable compact, self-contained drinking receptacle which requires a minimum of fuel and parts to keep the water temperate, with the parts arranged so that interference of the stock with the operation of the device or injury to or burning of the stock by contact with the device is impossible.

Another object of the invention is to provide novel means for providing a fuel reservoir of ample capacity from the rim of the water receptacle, and to arrange the heating means so that it receives fuel by gravitational feed therefrom.

A further object of the invention is to provide a fuel filtering, mixing and feeding apparatus at the side of the receptacle with an enclosure which effectively prevents stock from interfering with the operation thereof, yet permits unobstructed entrance of air thereto for fuel mixing purposes.

Another object of the invention is to provide a device of the above characteristics having its parts constructed and arranged so as not to be broken in handling and which are so disposed as to permit stacking of several of the devices for economy in transportation.

Other objects and advantages of the device will become apparent during the course of the following description.

In the accompanying drawings forming part of the description and wherein like numerals are employed to designate like parts throughout the several views.

Fig. 1 is a perspective view of the invention showing the exhaust flue in substantially the center of the tank.

Fig. 2 is a side elevation illustrating three of the modified receptacles stacked for transportation, with their exhaust flues adjacent the inside walls of the receptacles.

Fig. 3 is another perspective view of one of the receptacles of Fig. 2 taken from the side thereof where the fuel feeding compartment is located.

Fig. 4 is an enlarged elevation of part of the receptacle and part of the fuel feeding compartment with its closure raised.

Fig. 5 is a further enlargement of the fuel feeding arrangement.

Fig. 6 is a horizontal section through the fuel filter taken substantially along line 6—6 of Fig. 5 in the direction of the arrows.

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Fig. 7 is an enlarged perspective view of the heating compartment and heating apparatus arranged in operative position therein.

Fig. 7*a* is a somewhat enlarged detail sectional view taken substantially along the line 7*a*—7*a* of Fig. 7, looking in the direction of the arrows; and

Fig. 8 is a fragmentary detail perspective view showing a modified fuel reservoir in the form of a separate ring of tubular cross-section which is preferably welded to the upper circular edge of the tank.

In localities where stock drinking water freezes when dispensed in troughs or receptacles, it becomes necessary to provide ample preventatives against this condition occurring with the most economical source of heat available in such locality. Low grade fuel oil is probably the most generally used fuel due to its low cost and availability, so that the present invention is designed to employ this type of fuel, although others and more volatile fuels may be used with the invention, if desired.

Referring now more specifically to the drawings, the numeral 10 designates an open top, circular, comparatively shallow tank or receptacle with upwardly flared side walls 10' for stacking purposes. For the watering of stock such as sheep, this tank may be about six feet in diameter and ten or twelve inches high. For other stock, it may assume different shapes and dimensions as will be obvious. The open top of the tank is provided with an integral turned down hollow rim 11, circular in cross section welded at its free margin to the sides of the tank to provide a liquid tight joint with said sides, thereby providing a circular ring-shaped reservoir for the storage of fuel oil for the heater to be presently described. The top of this rim is provided with a filler plug 12 whereby the rim can be conveniently filled with fuel oil. This reservoir or rim may, if desired, be made from a separate ring tubular in cross-section welded to the upper circular edge of the tank, with one end of the ring closed and the other end open and bent down at a right angle, see Fig. 8, to provide a feed tube, such as tube 11*a* to a filter unit 21. The tube 11*a*, if desired, may be a short separate tube of smaller cross sectional area than the rim as shown in Fig. 5, suitably secured to the rim and filter unit.

Means for heating the water in the receptacle 10 includes an elongated heating compartment in the form of an open-ended elongated metal tube 13 extending diametrically or radially across the bottom of the receptacle 10 and secured upon

said bottom and to the side walls of the receptacle in water-tight manner by welding or otherwise so that no water can gain admission to the inside of the tube. When submerged in the water in the receptacle, this heating tube or compartment transmits its heat to the body of water by conduction. One end 14 of the tube 13 may be bent upwardly thereof at a right angle either along the inside wall of the receptacle to extend a substantial distance above the rim 11 to exhaust products of combustion from the heater in the heating compartment above the stock drinking from the receptacle, as shown in Figs. 2 and 3, or at the center of the receptacle, as shown at 14a in Fig. 1. When this exhaust flue or stack 14a is arranged at the center of the receptacle, the heating tube 13 terminates at 13a adjacent the center of the tank and most danger of stock animals becoming burned by bodily contact therewith, is removed, since they are kept away from it by the water forming a moat between it and the side walls of the receptacle. The other end of this heating tube 13 is open and welded to the edges of a circular opening 10a in the side wall 10' of the receptacle. This provides an opening through said side wall into which, and into the heating compartment 13, a heater unit can readily be inserted or withdrawn.

Built to enclose this opening, is a box-like sheet metal filtering and air mixing chamber or compartment 15 provided with a bottom 15a and a pair of side walls 15b to fit about the rim 11 and side walls of the receptacle to be welded or otherwise secured in an air-tight relation thereto. This provides a chamber having an open front and top which are normally closed with a sliding closure 16 of right angular formation and having a vent aperture 17 near its base and a pull drawer handle 18 arranged over an air inlet slot 19 near the top, as best seen in Fig. 4. The two vertical side edges of this closure 16, slide in vertical grooves bent in the free margins of the two sides of the chamber 15, and to facilitate sliding, a bail-like handle 20 is secured to the horizontal top of the closure, whereby it may be raised to the position shown in Fig. 4, or closed as shown in Figs. 1 and 3.

Within the chamber 15 and secured to the side wall of the receptacle 10 is a fuel filtering unit 21 having communication through tube 11a with the fuel reservoir 11. This unit 21 is composed of a circular casing welded or otherwise secured to a side wall of the receptacle 10 and has a removable cover 22. A partition 26 with a right angular extension 27 divides this casing into a large primary settling chamber 23 from which sediment may be removed through drain plug 28 and a smaller secondary chamber 24. A central opening 25 is provided in the partition 26 to permit fuel oil to pass from the sediment chamber 23 into the rear chamber 24 and to its lateral extension provided by the right angular partition 27. A short pipe 29 enters the side of the circular filter casing and communicates with the lateral extension of secondary chamber 24. This pipe 29 supports a vertical tap 30 controlled by a hand-operated valve 31, so that such a predetermined drip or flow of fuel oil may be emitted from the tap as to maintain the flame of the heater now to be described.

This heater unit is adapted to extend into the heating compartment or tube 13 lengthwise thereof a substantial distance as best seen in Fig. 7, and being designed as a removal unit for starting, lighting and cleaning purposes, is

mounted upon and supported at its forward end portion by a U-shaped upright closure plate 32, which normally closes, except for opening 32a formed in the plate 32, the end of the heating tube 13. Said unit extends through an opening 10a provided in the side wall of the receptacle 10, see Figure 7, and said plate 32 rests upon the bottom 15a on its flat lower edge, see Figure 4. An inverted V-shaped super heating plate 33 has one end fixed to the closure 32 and extends inwardly thereof a substantial distance as illustrated. A fuel feeding and vaporizing pipe 34 extends through the enlarged inverted substantially V-shaped air admission opening 32a in the closure plate 32 and is arranged beneath the apex of plate 33 lengthwise thereof in good heat conducting relation therewith, with its outer end turned upwardly to support an upwardly opening coupling or drip cup 35, which is normally disposed axially beneath the tap 30 to constantly receive a regulated quantity of fuel oil therefrom. The inner end of the fuel vaporizing pipe 34 is inclined upwardly by the use of a suitable angled nipple 36 to connect with one end of a horizontal U-shaped vaporizing burner pipe 37, which has its U-bent to dispose its free end with a slotted burner tip 38 of a well known construction adjacent the nipples 36 and toward the super heating plate 33 and closure 32. A substantially U-shaped mesh screen 39 is attached, as shown, to the nipples or upwardly inclined portion 36 of the pipe and serves to diffuse the flame from the burner tip 38 and cause it to envelope the pipe 34 and super heating plate 33. It will be noted that the arcuate edge of this screen 39 rests upon the bottom of the heating tube 13 and supports part of the weight of the removable heating unit, while the outer end of the pipe 34 is supported by the closure plate 32.

One manner of supporting the outer end portion of pipe 34 is illustrated in Figs. 7 and 7a. Spot welds 60 serve to connect the pipe 34 and heating plate 33, whereas similar spot welds 70 serve to attach the forward end portion of the heating plate 33 to the upright closure plate 32. Any other suitable means may, however, be employed to support the forward end portion of the pipe 34.

The inclined portion of the heater pipe constituted by the nipples 36 prevents the passage of any accidental flow of liquid fuel into the burner tube and assures only the existence of vaporized fuel therein. The upturned outer end of the vaporizing tube 34 forms a handle by which the entire removable heating unit can be inserted into or withdrawn from the heating compartment 13. This is especially useful as a handle when starting the burner 38 by placing a piece of oil soaked waste in front of the burner nozzle 38 and igniting it before the unit is slid back into operating position into the compartment 13. When this has been done, the valve 31 is opened to allow a predetermined amount of liquid fuel oil to constantly flow or drip into the cup 35 and pass into the vaporizing tube 34 where the heat from the burner and superheating plate 33 causes the liquid fuel entering the same to become vaporized and pass through the nipples 36 into the burner tip where combustion occurs to heat the walls of the heating tube 13 submerged in the water in the receptacle 10. Thus, this water is maintained at the desired temperature below freezing and the stock cannot interfere with the operation of the device, due to the arrangement and enclosure of parts, or become injured or burned thereby. When the

outlet flue 14 is arranged at one side of the tank 10, several of the tanks or receptacles may be stacked as shown in Fig. 2 for transportation purposes. It will be understood that the various changes in the shape and relation of various parts of the device may be resorted to without departing from the scope of the invention defined in the following claims.

I claim:

1. A self-heating stock watering device comprising a water receptacle having a closed hollow rim for containing liquid fuel, heating means arranged in the bottom of said receptacle and including a vertical fuel receiving pipe, a fuel filter beneath and in communication with said rim and having drip means for feeding fuel into said vertical pipe, and a gravity feed connection between said rim and filter.

2. A self-heating stock watering device comprising a water receptacle having a closed hollow rim for containing liquid fuel, a normally closed compartment on the side of said receptacle having air circulating apertures, heating means in the bottom of said receptacle and including a burner, a vertical fuel receiving pipe arranged within said compartment, a fuel filter mounted in said compartment and in communication with the hollow rim for receiving fuel from said rim, and adjustable fuel feed means for feeding fuel from said filter to said vertical fuel receiving pipe.

3. A self-heating stock watering device comprising a water receptacle having a liquid fuel reservoir, a heating compartment in the bottom of said receptacle, a mixing compartment secured to the side of said receptacle, a fuel filter within said mixing compartment connected to said reservoir and having a regulatable valve-controlled tap for dropping fuel in regulated amounts, and a removable heating unit in said heating compartment having an angular outer end portion extending upright into said mixing compartment and terminating in an open-ended liquid fuel cup disposed beneath said valve-controlled tap for receiving fuel therefrom and air from the mixing compartment, said angular outer

end portion providing handle means by which said heating unit may be moved into and out of said heating compartment.

4. In a self-heating stock watering device comprising a water receptacle having a closed hollow rim serving as a liquid fuel reservoir and also having a box-like compartment secured to the side of said receptacle adjacent to and engaging said rim, in which said compartment has an open top and front closed by a slidable closure with air circulating apertures; means for heating water in the receptacle and comprising a heating tube disposed in the bottom portion of the receptacle and having an exhaust flue, a fuel receiving tube having a portion located within said heating tube and also having a vertical extension within said box-like compartment terminating in a fuel and air receiving cup, and means for feeding liquid fuel in predetermined amounts from said reservoir into said cup within said box-like compartment.

DOUGLAS W. CLIFFORD.

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