May 12, 1942. R. C. INGERSOLL 2,283,066

CLOSED RECEPTACLE

Filed April 28, 1939

Fig. 1

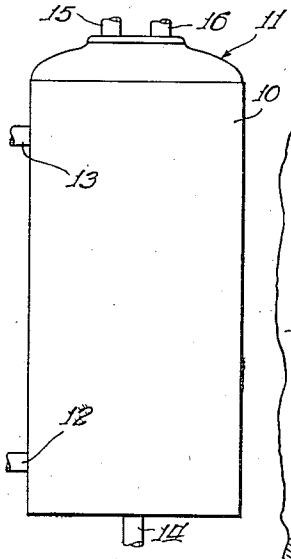


Fig. 2

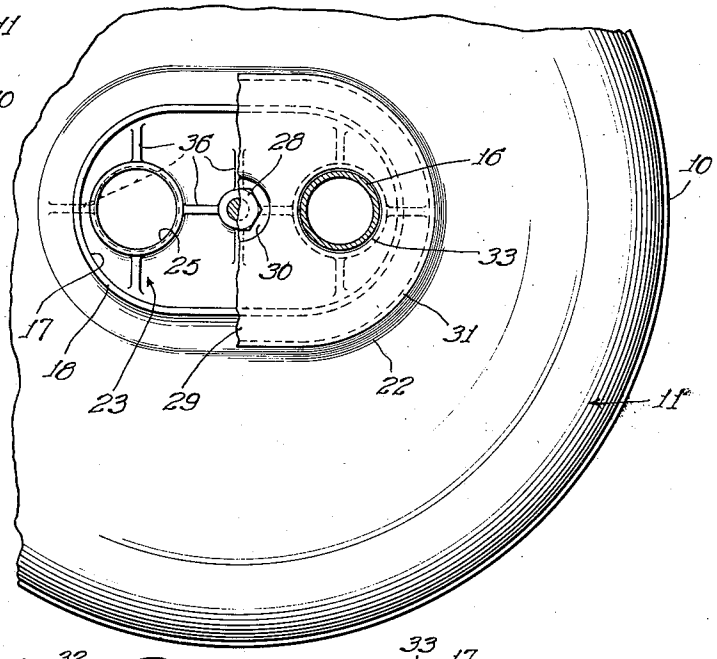


Fig. 3

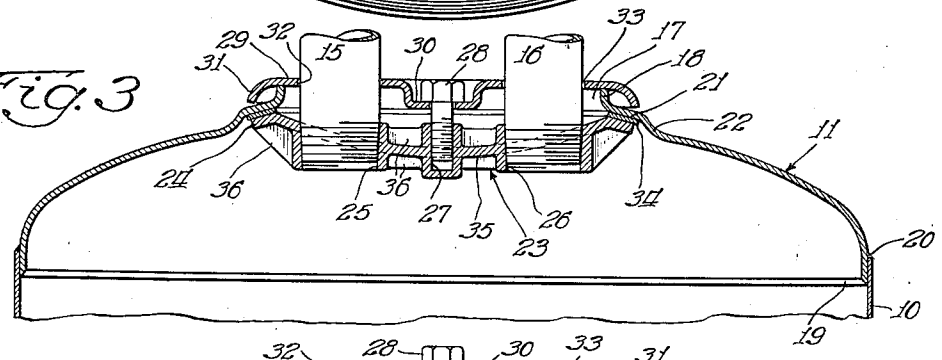
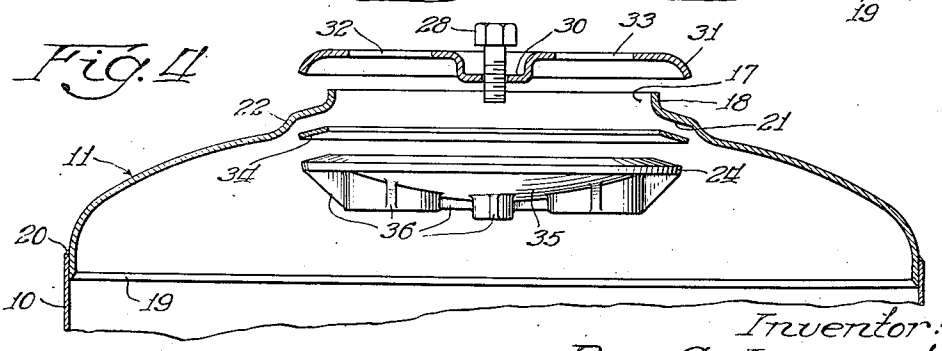


Fig. 4



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UNITED STATES PATENT OFFICE

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CLOSED RECEPTACLE

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Application April 28, 1939, Serial No. 270,529

1 Claim. (Cl. 220—25)

This invention relates to receptacles of the closed type, such as hot water tanks and the like.

Although this invention is applicable to any closed tank, it will be described with particular reference to a type of tank commonly known as a range boiler.

As constructed at the present time, range boilers are comprised of a galvanized iron cylindrical shell to the ends of which are welded heads made of similar material. The top of the boiler is provided with a pair of openings formed by threaded castings welded to the upper head, one of which openings comprises the cold water inlet, and the other serves as an outlet for the boiler. The bottom of the boiler is likewise provided with a similar opening for draining purposes. To one side and near the bottom is an opening through which the contents of the boiler can be conducted to a heating unit such as a coil located in a stove, furnace, etc., and the heated water is then returned to the boiler through another side opening located near the top of the boiler.

These range boilers are used extensively throughout the country, and accordingly are subjected to the action of water having widely differing chemical composition. The action of the heat and mineral or other elements in the water upon the boiler causes the interior of the boiler to become corroded. The amount of corrosion varies with the chemical composition of the water so that the average life of a boiler may vary from two or three years upward.

Numerous proposals have been made in the past for increasing the life of a range boiler. Thus, it has been proposed to make the range boiler from stainless metals which have a high resistance to corrosion. Such tanks or boilers are very expensive. It has also been proposed to line the interior of the boiler with various materials, one of which is a stainless steel. These lined boilers are less expensive than the solid stainless type previously mentioned, but are still considerably more expensive than the ordinary galvanized iron variety.

Possibly the least expensive lining yet proposed for range boilers is vitreous enamel. This material may be readily applied to the interior of a boiler, and if it is of proper composition and is properly applied, it will last about as long as a stainless steel lining. It is imperative, however, that the enamel coating be absolutely uniform over the entire inner surface of the boiler, otherwise corrosion will take place over the points where the enamel is imperfectly applied and the boiler, consequently, will be no better than one which has no coating at all. In order to obtain an absolutely uniform vitreous enamel coating on the interior of the boiler it is necessary to apply the enamel uniformly and to remove all excess enamel. Since range boilers must be made fluid-tight, and furthermore, must be able to withstand a pressure up to 200 pounds per square inch, they are preferably assembled first and then enamelled. In the design heretofore used, the boiler when assembled contained no openings other than those provided by the pipe-receiving castings or sputs, and hence it has been impossible to drain all excess enamel from the inside of such boilers, particularly in view of the fact that the sputs have flanges which protrude from the inner surface of the boiler and obstruct the flow through the sput. It has likewise been virtually impossible to inspect the interior of such boilers after the enamel has been applied in order to determine whether the coating is as uniform as required. Enameled boilers, therefore, although generally conceded to be highly desirable, have nevertheless been commercially impractical.

The object of this invention is to provide a closed receptacle of a design which will readily permit the application of a uniform corrosion-resistant coating to the interior surface thereof.

Another object of this invention is to provide a closed receptacle which will permit of an inspection of the interior thereof.

Yet another object of this invention is to provide a range boiler which is inexpensive to manufacture, but which nevertheless can be given an absolutely uniform interior coating of vitreous enamel.

These and other objects of this invention will become apparent as the description proceeds.

In its preferred form, this invention comprises a steel tank having upper and lower heads welded thereon, and having the usual side and bottom openings for the water. The upper head of the tank, however, is continuously outwardly tapered and is formed with an oval-shaped opening, the edges of which are defined by an outwardly turned flange. When inverted, no horizontal or recessed surfaces are presented to the enamel by reason of the continuous outward taper of the upper head so that all excess enamel may be readily removed from within the tank.

The oval-shaped opening is closed off by a brass or other non-corrodible casting having a pair of threaded openings therein to receive the inlet and outlet pipes. The casting is held in

place by means of a single attaching bolt and a stamping, the latter fitting over the outside of the opening and bearing against the outwardly turned flange. A gasket is inserted between the casting and the head to insure a fluid-tight seal thereat.

The preferred form is shown in the accompanying drawing which forms a part of this specification, and in which—

Fig. 1 is an elevation of a complete range boiler incorporating the novel design of head;

Fig. 2 is a partial enlarged plan view of the head;

Fig. 3 is a side elevation in section through the head; and

Fig. 4 is an exploded view of the side elevation of Fig. 3 showing the arrangement of the parts.

Referring now to the drawing for a detailed description of the invention, 10 represents the main body of a sheet steel range boiler to which is welded or otherwise secured a head 11 of similar material. A lower side outlet 12 is provided through which the water may be conducted to a heating element (not shown), and the return from the heating element is shown as an upper side outlet 13. A drain pipe 14 is secured to the bottom head of the boiler (not shown) and a cold water inlet pipe 15 and a hot water outlet pipe 16 are provided at the top of the boiler. In the form shown, the cold water inlet pipe 15 terminates at the same level as the hot water outlet pipe 16. Since pipes 15 and 16 are at the same level, it is understood that either one may serve as the inlet or outlet pipe.

Head 11 is formed with a substantially oval opening 17, the edges 18 of which are turned upwardly to form a vertical flange. The lower edge 19 of head 11 is received within the sides of boiler 10, and is bevelled as shown. The head is welded at 20 to the edge of tank 10.

Near opening 17 in head 11 is formed a seat 21, which slopes generally upwardly at all points. Said seat 21 is extruded slightly from head 11 to provide a well-defined curved surface 22 adjacent said seat.

Within head 11 and in proximity to opening 17 is a casting 23 having a flange 24 of substantially the same contour and shape as seat 21. Casting 23 may be made of brass or other corrosion-resistant material and alternatively it may be made from cast-iron and enamelled. Spaced tapped holes 25 and 26 are provided in casting 23 to receive the threaded ends of pipes 15 and 16. A tapped hole 27 is centrally disposed in casting 23 and receives the threaded portion of an attaching bolt 28.

A stamped metal cover 29 is provided for the outside of opening 17, said cover 29 serving to support casting 23 upon head 11. The supporting action is secured by bolt 28, the head of which is received in a depressed portion 30 of cover 29. Said depressed portion 30 of the cover renders the center of the cover more rigid and also serves to conceal the head of the bolt. The outer edge 31 of cover 29 is bent downwardly to provide rigidity for this portion of the cover and additionally to conceal the upwardly turned edge 18 of head 11 to give a streamlined appearance. Cover 29 is provided with openings 32 and 33 through which pipes 15 and 16 respectively pass.

If the exterior of the boiler is enamelled, cover 29 is likewise enamelled to present a uniform appearance to the eye.

Between flange 24 of casting 23 and seat 21 in head 11 is a gasket 34 of suitable corrosion-resistant material such as copper or the like.

Since the boiler is intended to withstand high pressures, casting 23 is made to present a convex surface 35 to the water within the boiler so that it will always be in compression rather than in tension. Reinforcing ribs such as 36 are provided still further to strengthen the casting.

It will be observed that cover 29 rests upon the upturned edge 18 of head 11, and that said upturned edge 18 is well able to resist undue flexing and axial pressure.

It is apparent that casting 23 may be readily inserted into the tank because of the oval shape of opening 17. To assemble the various portions of the head, therefore, casting 23 is inserted edgewise into opening 17 and then turned so that flange 24 is brought upward in proximity to seat 21. To facilitate the assembly of the gasket 34 with respect to seat 21 and casting 23, said gasket 34 is preferably glued by means of a suitable adhesive such as shellac to flange 24 of casting 23 prior to the insertion of the casting into opening 17. With casting 23 held in proximity to seat 21, cover 29 is placed over casting 23 with depressed portion 30 substantially coaxial with tapped hole 27, whereupon bolt 28 may be started into the hole. Cover 29 is then positioned over opening 17 in approximately the location it will assume when the assembly is completed, and bolt 28 is tightened in place. If casting 23 initially is not accurately located with respect to seat 21, the curved portion 22 of head 11 will guide the casting upon seat 21. Since seat 21 slopes uniformly outward, casting 23 will automatically center itself thereon. Gasket 34 is glued to casting 23 and will likewise center itself on the seat.

After casting 23 and cover 29 are firmly secured in place, pipes 15 and 16 may be threaded into the openings 25 and 26 provided therefor in casting 23.

It will be observed that opening 17 is quite large, and it is therefore a very simple matter to properly clean the interior of the boiler prior to the application of the enamel coating. It is likewise a very simple matter to insert the enamel, rotate boiler 10 to insure a proper spreading of the enamel over the interior of the tank, and then to invert the boiler so as to permit the excess enamel to flow out of opening 17. No ledges, protuberances, or other obstructions to the outward flow of the enamel are presented by the inner surface of head 11. After the enamel coating has been applied, the quality and uniformity of the coating can be easily determined by lowering a lamp into the boiler through opening 17 and visually inspecting every portion of the inner surface of the boiler. If it is found that some portion of the surface has not received a proper coating, that portion may be readily patched. Thus, by providing a large opening 17, and by removing all obstructions to the flow of excess enamel out of the tank in the manner hereinabove described, the problems of securing a uniform coating, providing a means for visually inspecting the coating, and patching defective portions are solved.

When the closure member is assembled with respect to the head the gasket is readily retained in place, and the greater the internal pressure exerted upon the closure member, the tighter will be the seal formed by the gasket.

It is understood that the foregoing descrip-

tion is merely illustrative of a preferred embodiment of the invention, and that the scope of the invention, therefore, is not to be limited thereto, but is to be determined by the appended claim.

I claim:

A tank comprising a cylindrical sheet metal shell, sheet metal heads permanently secured to the shell to close the ends thereof, one of said heads being continuously tapered and terminating in a large opening symmetrically disposed about the axis of the tank and defined by a stiffening flange formed from the sheet metal of the head, said opening having an axially outward extending edge, a cast metal closure member insertable into the opening and having an edge region adapted to seat against the tapered head at the base of the flange, a pressed metal cover abutting the axially extending edge of the flange on the head, a stiffening flange on the cover embracing the flange on the head, and means for drawing the closure member and cover together to compress the head flange therebetween to form a fluid tight seal.

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