

Aug. 16, 1938.

W. R. ROBINSON

2,127,269

RANGE BOILER

Filed Aug. 7, 1936

2 Sheets-Sheet 1

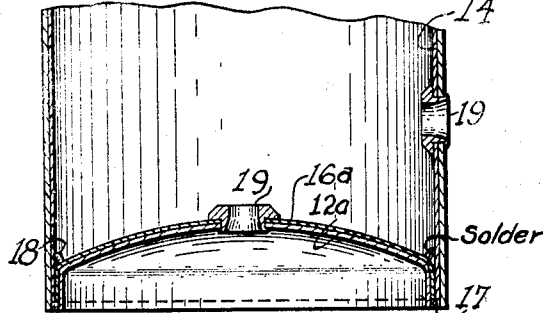
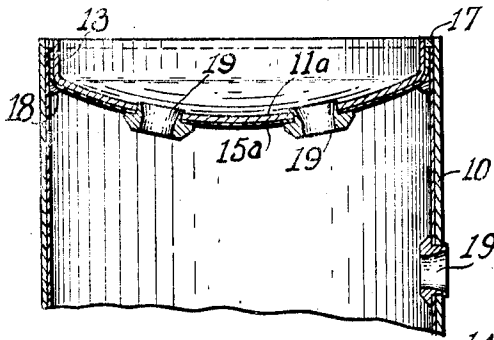
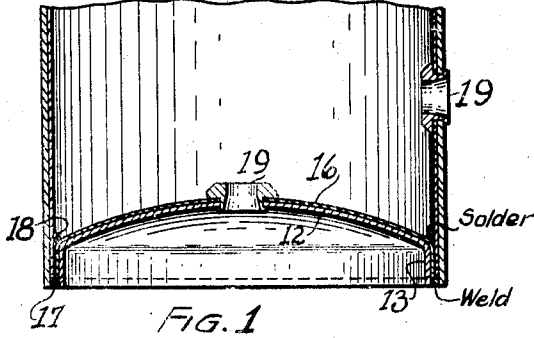
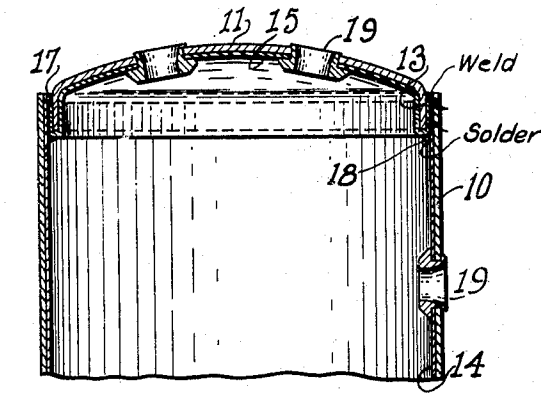


Fig. 5

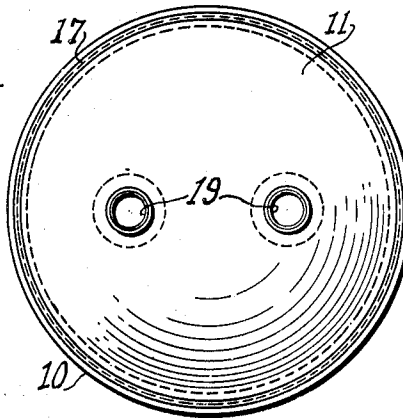


FIG. 2.

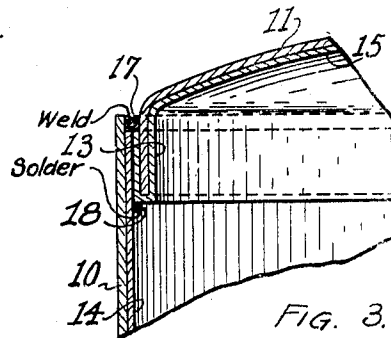


FIG. 3.

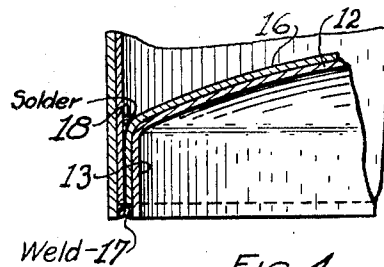


FIG. 4

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2 Sheets-Sheet 2

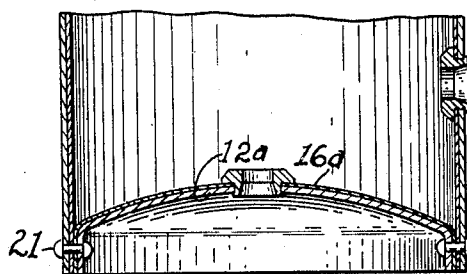
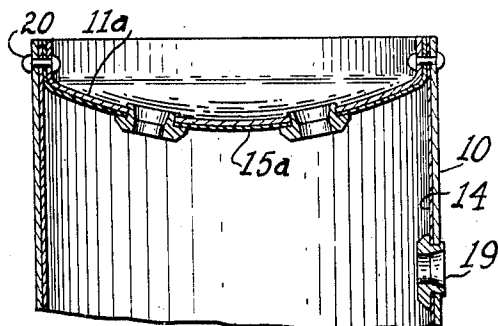
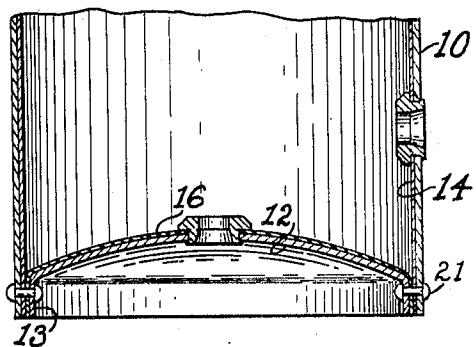
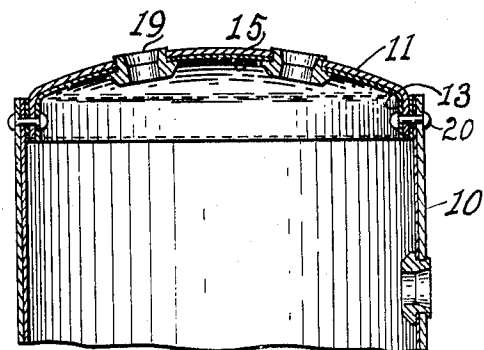


FIG. 7.

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2,127,269

RANGE BOILER

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Application August 7, 1936, Serial No. 94,802

4 Claims. (Cl. 220-63)

This invention relates to range boilers and to articles of generally similar nature.

The principal object of the present invention is to provide a range boiler which has a non-corrodible interior wall and which can at the same time be produced inexpensively.

Attempts have been made heretofore to produce range boilers which would not corrode, but the materials used and the methods of construction employed were too expensive to admit of the general use of the boilers, particularly for domestic purposes. This objection is overcome very effectively by the present invention which contemplates the use of preformed liners for the shell and upper and lower heads, the liners being formed of suitable non-corrodible material, such as copper, and being so formed and the parts being assembled, united, and sealed so that though the shell and heads are formed of steel or other strong but relatively corrodible material, the liner of relatively non-corrodible material forms a complete leakproof inner wall or container.

The invention may be further briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the accompanying sheets of drawings wherein I have shown the preferred construction and certain slight modifications,

Fig. 1 is a vertical sectional view of a range boiler constructed in accordance with the preferred form of my invention;

Fig. 2 is a top plan view of the same;

Figs. 3 and 4 are fragmentary sectional views on an enlarged scale showing respectively the joints between the shell and the upper and lower heads, and the preferred mode of sealing the engaging liner portions against leakage;

Figs. 5, 6, and 7 are views similar to Fig. 1 illustrating certain slight modifications; and

Fig. 8 is a fragmentary sectional view showing the top and bottom portions of a range boiler still further modified, the ends of the shell being in this instance telescopingly fitted into the flanges of the heads, whereas in the preceding views the flanges of the heads are telescopingly fitted into the ends of the shell.

Referring now to the drawings and first to Figs. 1 to 4, the range boiler here illustrated includes a cylindrical body portion or shell 10 formed of steel or other suitable inexpensive metal which has the requisite strength. Additionally, the boiler is provided with an upper head 11 and a lower head 12. As is generally the case with do-

mestic range boilers, these heads are spherically curved and are provided with marginal cylindrical flanges 13 which telescopingly fit inside the ends of the shell. The manner of securing the heads to the shell will be referred to presently. It is generally the case with domestic range boilers that the upper head is convex outwardly and the lower head is concave outwardly, and that arrangement is illustrated in Fig. 1. However, this arrangement is not essential to the invention for either head may be outwardly convex or outwardly concave, or both may be outwardly convex, in which case the lower head will be arranged like the upper head of Fig. 1, or both may be outwardly concave, as illustrated in Fig. 5 where the upper and lower heads are designated 11a and 12a respectively, and the liners therefor are designated 15a and 16a respectively. For convenience in drawing or shaping the heads and for other reasons, the heads of range boilers are generally if not always spherically curved inside the cylindrical marginal flange, but, so far as the present invention is concerned, the heads inside the flanges may be flat, but, for the reasons stated, the commonly shaped head such as illustrated would generally be employed.

The longitudinal seam of the shell 10 is preferably a welded joint although in some instances it may be a riveted joint.

My improved range boiler is wholly lined with non-corrodible metal, such as copper or other suitable non-corrodible metal or alloy. The liner is in three preformed parts, the shell 10 having a cylindrical liner 14 which is fitted closely in the shell and extends substantially the full length thereof and the heads having preformed liners 15 and 16 which completely cover and conform to the shape of the inner exposed portions of the heads including the flanges. The longitudinal seam of the cylindrical liner 14 may be formed by riveting, welding, or soldering. With the convex upper head shown in Fig. 1, the liner 15 extends over the inner curved surface thereof and down over the inner surface of the flange 13 of the head, then across the lower edge of the flange, and then upwardly along the outer surface of the flange for nearly its full length. In the case of the outwardly concave lower head, the liner 16 extends over the convex inner surface and down over the outer surface of the flange for substantially its full length. In both instances the liner of the head contacts with the liner of the shell for nearly the full depth of the flange. When either or both of the heads are convex outwardly, or, otherwise stated, when the flange of the head is

on the interior of the container, as at the upper part of Fig. 1, the liner of the head will be folded in U-shape around both surfaces of the flange, but when the flange of either or both heads is arranged exteriorly of the container or chamber, as shown at the bottom of Fig. 1 or in Fig. 5, obviously the inner annular surface of the flange need not be covered with a liner. However, in each instance the liner of the head covers the surface of the flange which is adjacent the shell so as to be in contacting relation with the liner of the shell.

The manner of fastening the heads in place and sealing the joints is an important part of the construction. In the preferred embodiment, the heads are fastened in place by welding the extreme ends of the shell to the heads, as indicated at 17 in Figs. 1, 3, 4, and 5. Preferably the contacting portions of the liners of the heads and shell terminate just short of the ends of the shell so as to leave at both the top and the bottom of the boiler an annular groove or pocket for the welding material, this being clearly illustrated in Figs. 3 and 4.

It is important to the invention that the composite liner covering the entire exposed inner surface of the boiler be sealed against leakage at all joints including the joints between the head and shell portions of the liner. This sealing is preferably done with solder or other material. The manner of accomplishing this has been a problem quite difficult of solution, but I find that it can be accomplished very effectively in the following manner:

One of the heads is placed in position in the shell and welded in place. Next the shell is placed in a position with the open end up, soldering material is placed around the circle where the liner portions contact, and then the solder is melted either by heating the lower end of the shell or by extending a soldering iron down from the open end of the shell, and when the solder melts it not only seals the joint at the corner on the interior of the container but runs down through capillarity or otherwise so as to solder together the contacting portions for their full depth. Then the other head is placed in position and welded in place and the soldering operation is repeated, but now, both ends of the shell being closed, the positioning of the solder where the sealed joint is to be made is accomplished by inserting the solder through one of the spud openings to be referred to presently, and the solder thus placed in position can be melted either by heating the end of the boiler in the manner previously mentioned or it can be melted by inserting and manipulating a soldering iron through one of the spud openings. Before placing the solder in position and melting it, the boiler will of course be placed upside down with respect to its position when the first soldering operation was done so that the melted solder will run down and completely seal the contacting portions of the liner for the full depth thereof as before. In Figs. 1, 3, 4, and 5 these soldered joints just described are designated 18.

The boiler is provided with the usual number of spuds 19 for making the necessary pipe connections. Generally there are two spuds in the upper head, two spuds in the body or shell, and one spud in the lower head. The spuds are, as usual, made of iron or steel and are preferably copper-coated. Generally they are fastened in position by pulling the inner flanges of the spuds tightly against the inner lined surface of the shell

or head and the outer ends welded to the shell or head. By pulling the spuds tightly against the liner before the spuds are fastened in place by welding, the joints between the inner ends of the spuds and the liner are automatically sealed, but, if desired, the joints may be further sealed by soldering so as to prevent any leakage between the flange or shoulder at the inner end of the spud and the portion of the liner which it contacts. The spuds are inserted through aligned openings provided in the liner and the body of the shell or head before the heads are fastened into the ends of the shell so that these parts can be placed in position without difficulty.

In Figs. 6 and 7 I have shown constructions which are similar to those illustrated in Figs. 1 and 5 except in the manner of securing the heads to the ends of the shell, both the shell and the heads being lined with copper as before. In some instances it may be found desirable to rivet the heads in place instead of securing them in position by welding, and in these figures the upper and lower heads are secured in position by riveting, as shown at 20 and 21. In each instance, the rivets pass through the shell and the flange of the head and through the overlapping and contacting portions of the liner of the shell and head, as clearly shown in Figs. 6 and 7. It is possible that the riveting will seal the contacting portions of the liners of the head and the shell, but to insure against leakage the joints between the contacting portions of the liners of the shell and heads may be sealed by solder or like material as before. In Fig. 6 the arrangement of the heads and liners is similar to the arrangement of Fig. 1 and in Fig. 6 the heads and the liners are given the same reference characters as in Fig. 1. In Fig. 7 the arrangement of the heads and liners is as shown in Fig. 5, and in Fig. 7 the heads and the liners for the heads have the same reference characters as the corresponding parts of Fig. 5.

In the figures described above, in all instances the flanges of the heads are telescopically fitted inside the end portions of the shell. This arrangement will generally be employed to conform with standard practice in this regard, but in some cases it may be desirable to have the flanges of the heads telescopically fitted over the ends of the shell, or, otherwise stated, to have the ends of the shell telescopically fitted into the flanges of the heads. This construction is shown in Fig. 8 wherein the shell is designated 10b, the upper head 11b, and the lower head 12b. Likewise, in this figure the liner for the shell is designated 14b and the liners for the upper and lower heads are designated 15b and 16b respectively. With this construction, the liners for the heads extend over the inner surfaces including the flanges which are here designated 13b, and both at the top and at the bottom the liner 14b of the shell extends over the extreme ends of the shell and is doubled back in U-form so as to contact with the portions of the head liners covering the flanges of the heads. The liners of the heads and the shell contact for substantially the full depth of the flanges as before. In other words, the part which is telescopically fitted into the other (in this instance the shell being telescopically fitted into the flange of the head) has its liner doubled back upon itself with a U-bend so as to contact for the proper distance with the liner of the other part. The joints may be welded and soldered as before, the welds being designated 17b and the soldered joints 18b. In some instances

the flange on one head may be telescopically fitted into the end of the shell and the flange of the other may be telescopically fitted onto the outer side of the shell, and, where the construction admits, the heads may be secured to the shell by riveting instead of by welding.

By this invention I have provided a non-corrodible boiler which can be produced inexpensively and which will last indefinitely. The cost of this improved boiler is only slightly greater than the cost of an ordinary boiler made of the usual galvanized iron, and it is far less expensive than one formed wholly of non-corrodible material, such as monel metal, solid copper, stainless steel, nickel, or other expensive non-corrodible material.

While I have shown the preferred construction with slight modifications, I do not desire to be confined to the precise details illustrated but aim in my claims to cover all modifications which do not involve a departure from the spirit and scope of the invention.

Having thus described my invention, I claim:

1. A range boiler or the like of the type having relatively small water ingress or egress openings comprising a cylindrical shell closed at one end and open at the other end, and a head telescopically fitted to the said open end, the shell and the head having provided thereon prior to assembly preformed liners of copper or equivalent relatively non-corrodible material, the liner of the shell and the liner of the head being in overlapping relation entirely around the same, the joint between the overlap of the liners of the shell and head being sealed interiorly of the boiler by fusible material and the shell being secured to the head exteriorly of the point of application of the fusible material.

2. A range boiler or the like of the type having relatively small water ingress or egress openings comprising a cylindrical shell with upper and lower heads telescopically fitted to the open ends

thereof, the shell and the heads having provided thereon prior to assembly preformed liners of copper or equivalent relatively non-corrodible material, the liner of the shell and the liners of the heads being in overlapping relation entirely around the same, the joints between the overlaps of the liners of the shell and heads being sealed interiorly of the boiler by fusible material and the shell being secured to the heads exteriorly of the points of application of the fusible material.

3. A range boiler or the like of the type having relatively small water ingress or egress openings comprising a cylindrical shell with upper and lower heads telescopically fitted to the ends thereof, the shell and the heads having provided thereon prior to assembly preformed liners of copper or equivalent relatively non-corrodible material, the liner of the shell and the liners of the heads being in overlapping relation entirely around the same, the joints between the overlaps of the liners of the shell and heads being sealed interiorly of the boiler by fusible material and the shell and heads being welded together exteriorly of the overlaps of the liners.

4. A range boiler or the like of the type having relatively small water ingress or egress openings comprising a cylindrical shell closed at one end and open at the other end, and a head telescopically fitted to the said open end, the shell and the head having provided thereon prior to assembly liners of copper or equivalent relatively non-corrodible material, the liner of the shell and the liner of the head being in contiguous relation entirely around the same, the joint between the contiguous portions of the liners of the shell and head being sealed interiorly of the boiler by fusible material and the shell being secured to the head exteriorly of the point of application of the fusible material.

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