UNITED STATES PATENT OFFICE.

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JOINT FOR SHEET-METAL VESSELS.


To all whom it may concern:

Be it known that I, LOUIS LIBBMAN, a citizen of the United States, residing at Everett, in the county of Suffolk and State of Massachusetts, have invented an improvement in Joints for Sheet-Metal Vessels, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to the joint or seam of sheet metal vessels.

As at present made, the leak seam at the top and bottom of the body of large milk cans and at the bottom of wash boilers, tubs, etc., when constructed out of tin and the like, are very weak. For instance, a large milk can is subjected continually to more or less rough lateral blows at the edges, especially at the bottom, which is ill-adapted to withstand. Accordingly I have invented a seam construction or joint at the seam for articles of this nature, which is at once exceedingly strong, neat and inexpensive. My joint improves the external appearance of the article, and does not materially add to the labor of manufacture or cost.

In the drawings, in which I have shown my invention applied in a variety of ways,

Figure 1 is a central vertical sectional view of a large milk can constructed according to my invention; Fig. 2 is an enlarged sectional detail of the joint; Figs. 3, 4 and 5 are sectional details showing the process of forming a slightly different kind of joint from that shown in Fig. 1; Fig. 6 is a similar sectional view of a wash boiler; Fig. 7 is an enlarged sectional detail of the kind of joint shown in Fig. 6; Fig. 8 is a central vertical sectional view of a sheet metal tub; Fig. 9 is an enlarged sectional view of the joint thereof; and Figs. 10 and 11 are sectional views of a further modification of my joint, Fig. 11 showing the same partially made and Fig. 10 showing said joint completed.

It will be understood that my invention is applicable to practically all kinds of sheet metal vessels, being herein shown as applied to usual heavy tinware, such as milk cans and the like.

In Fig. 1 I have shown a milk can 1 having a curved top or breast 2 verging into a usual cylindrical neck 3 and flaring mouth 4 and provided with handles 5. The seam which I have shown at the top and bottom of the body 6 is of the usual kind, and therefore needs no description, consisting simply of the two edges of the adjacent sheets turned and interlocked and then tightly pressed together, as shown at 7. This is the ordinary kind of seam, and it is evident that standing alone, as shown for instance at the right-hand side of Fig. 1, a lateral blow on the seam would very readily bend and dent the same. Accordingly, to give great strength as well as simplicity of construction and neatness of external appearance, I have formed a metal groove at the back of the seam 7 and approximately the same depth as the width of the seam, said groove having a vertical wall 8 from the upper end of which it curves inwardly and downwardly at 9, and in this groove I place a metal supporting back, herewith shown and preferably consisting of a bar or heavy wire 10, although I wish it understood that the groove may simply be filled with solder or other metal and externally molded to the shape of a bar or wire 10 or to other fanciful shape if desired. As shown in Fig. 1, this supporting back projects beyond the plane of the bottom, to constitute a foot or support for the can, as indicated at 11, and also preferably projects at the top above the seam 7, as indicated at 12. As shown in the upper end of the can, the cavity is filled beneath the bar or wire 10 at 13, so as entirely to fill the cavity with the supporting back of metal, whereas at the bottom the wire or bar 10 is simply forced tightly into the groove and is secured in place by the process of galvanizing or dipping in solder or agate or the like, thereby closing the cavity and securing the seam 7 and its reinforcing back completely and fully by the one finishing process of dipping in the usual manner.

In Figs. 3, 4 and 5 I have shown a construction which is better adapted to somewhat lighter articles than shown in Fig. 1. In Fig. 3 a seam 14 of usual construction is shown, behind which is a cavity 15 which in cross section is deep and slender, having its inner wall 16 parallel to the seam and verging at 17 in a curve above the top of the seam, the lower end of the wall 16 curving directly against the vertical wall 18 of the vessel at 19, thereby producing a back support cavity substantially the same as before described excepting that it is narrow. In this cavity I place a band or flattened rod 20, as shown in Fig. 4, which has a curved upper end 21 and...
is corrugated at its front side 22, and then apply pressure to the seam, which is thereby interlocked with the corrugations 22 of the band or rod 20. This secures the supporting back and seam together and slightly offsets the seam, which I consider preferable. The construction is subsequently dipped in agate or other finishing composition, in usual manner, thereby filling in and uniting the parts still more intimately.

In Fig. 6 I have shown a wash boiler 23 having a seam 24 of any usual construction, herein shown as the same as the seams 7 and 14 previously mentioned, and immediately behind this seam I form a groove 25 substantially the same as before, and secure therein a supporting back, which may likewise be in the form of a rod 26, the cavity being shown as entirely filled with solder 27, and in this case the rod 26 comes flush with the bottom 28 of the boiler, thereby making a perfectly flat bottom, which strongly resists pressure, either vertically or laterally, because of the supporting back to the seam.

Because of its perfectly flat construction it transmits heat in a superior manner. I wish to make the point clear that my construction affords a good heat-transmitting flat bottom, which is strong, whereas the ordinary flat bottom in which the metal 28 of the bottom extends directly out flat to the steam which forms with the sides of the vessel, is exceedingly weak. When the wash boiler is dipped, the slight cavities about the supporting back 26 are filled in flat, or instead of dipping, hard solder may be run around in any other manner.

In Fig. 8 I have shown a tub 29 having a cavity 30 formed back of the seam 31, very much like the cavity 15 shown in Fig. 3, excepting that it extends upwardly a longer distance on the inside of the tub. In this cavity I place a supporting back 32, which is corrugated at its upper end at 33 and has an outwardly-bent embracing edge 34 at its lower end, which projects below the bottom 35 of the tub, as shown at 36, to constitute a foot or wear surface for supporting the tub. This lower rolled edge of the hoop or rod 32 may be formed in the process of making the tub. When the parts are put in place the seam and wall of the tub are pressed inwardly so as to fit tightly against the supporting back and fill the corrugated curves thereof, the article then being dipped, soldered or otherwise treated, if desired, and the article will then be found to present an exceedingly neat appearance as well as being smooth on the inside and having great strength of resistance to strains in all directions.

In Figs. 10 and 11 I have shown a still further modification, Fig. 11 indicating at 37 the vertical wall adjacent the bottom or horizontal wall of a vessel. The bottom is provided with a reentrant bend to form a pocket 38, the lower flange extending at 39 to cooperate with a flange 40 on the part 37 in forming the seam 41 of the finished article, as shown in Fig. 10. In the pocket 38 I insert a supporting back 42 of hard metal or the like, and then pinch the lower edge of the seam and adjacent parts of the sheet metal tightly over the lower end of the supporting back metal 42 as indicated at 43. It is practicable to roll this pinched edge substantially in the form shown in Fig. 10, which leaves a small opening between the flat portion of the bottom and said pinched edge, which is filled in when the article is dipped in agate solution or is galvanized or the like. The same dipping process serves to join and fill in the contiguous surfaces of the inside of the vessel, so that the finished appearance presented is substantially that shown in Fig. 10.

It will be understood that I have not attempted to present all the variations of my invention, but have merely shown a sufficient variety of embodiments thereof to make the general construction clear.

My invention is adapted to a wide variety of uses, and arrangements, and as already intimated, the supporting back of solid metal or equivalent strong, rigid material may be molded into the groove by casting or it may be previously formed and inserted or it may be a combination of the two, especially when an external ornamental appearance is desired, as shown in Fig. 1, in which case the upper surface of the wire gives a head-like effect more readily and to better advantage than could be secured by attempting to mold the supporting back from molded solder or the like.

Another distinct advantage of my invention is that the shoulder of the groove or pocket forms a good edge to enable the workman to form the solder to a true line so as to make a symmetrical, neat appearance. Heretofore it has been extremely difficult to secure this result.

My invention is distinguished in employing an external groove or receiving cavity immediately adjacent and behind the seam which is to be supported and then filling in this cavity with suitable resistant material for giving the steam and practically solid extension of the seam. The weakness which it is my aim to overcome is due to the presence of the seam at these places where said seam is necessarily subjected to a great deal of rough usage.

By having the external pocket or groove at the back of the seam, the manufacture of the can or article is greatly facilitated, inasmuch as this groove can be sealed off for supporting the seam-making tools and affording resistance to pressure as the seam is being formed, and then when the perfectly formed seam is completed the supporting back is inserted and secured, not only serving to fill up the groove which would otherwise become foul,
but supporting the seam at the critical points
where it needs support, said supporting back
being so located and arranged and so braced
by the groove and the contained solder or
other uniting material as to add a minimum of
weight while at the same time giving a
maximum of strength. It materially adds
also to the beauty and external finish of the
article when the form shown in Figs. 1—5 is
used.

By having the supporting back or metal
bar or wire at the bottom arranged to extend
into the vessel above the plane of the bottom,
or in other words, by having the bottom ex-
tend from said bar or wire below the top edge
of the bar or wire and preferably at or below
the middle thereof, I secure great strength
and bracing effect to withstand the rough
lateral blows at the edges of the bottom here-
toabove referred to. This is especially true
when the bottom occupies the intermediate
position between the top edge and the bot-
tom edge of the strength-giving supporting
back as shown particularly in Figs. 1, 2 and 9,
and I intend my claims to cover the same ir-
respective of whether the pocket or groove is
an outwardly opening one or not. This is
especially true for the bottom, my invention
including a bottom sheet extending integrally
across the bottom to the adjacent upright
side, where it is crimped therewith into an ex-
ternal seam, adjacent which the laterally or not, is so located as to embrace one edge
only of the supporting back whose opposite
edge extends laterally from the adjacent
plane of the bottom beyond said pocket and
lies bodily between the flat bottom portion of
said bottom sheet and the opposite side of
the vessel.

Having described my invention, what I
claim as new and desire to secure by Letters
Patent, is,

1. A sheet-metal vessel, having two of its
component sheets united by an external
seam, one of said sheets being bent laterally
against the other sheet behind said seam and
therein outwardly deflected to form a pocket
immediately behind said seam, said pocket
opening externally, and a rigid supporting
back held in said pocket for supporting said
seam.

2. In a sheet-metal vessel, the combina-
tion with an external seam, of a pocket or
groove formed in said vessel behind said
seam and opening outwardly, and a metal
supporting back held in said pocket and pro-
jecting slightly externally of the vessel.

3. In a sheet-metal vessel, the combina-
tion with an external seam, of a pocket or
groove formed in said vessel behind said
seam and opening outwardly, and a metal
supporting back held in said pocket and pro-
jecting slightly externally of the vessel, said
supporting back being relatively deep and
narrow in cross-section and interlocking with
the adjacent metal on its outer surface.

4. A sheet metal vessel, having its upright
side and its bottom united in an external
seam, combined with a peripheral support-
ing back for said seam, said bottom being
bent angularly flat against said supporting
back and thence extending throughout the
entire area of the bottom of the vessel in-
grally from said back at a point below the
top edge of said back.

5. A sheet metal vessel, having its bottom
extending integrally flatwise across the entire
to the adjacent upright
side, where it is crimped therewith into an ex-
ternal seam, adjacent which the laterally or not, is so located as to embrace one edge
only of the supporting back whose opposite
edge extends laterally from the adjacent
plane of the bottom beyond said pocket and
lies bodily between the flat bottom portion of
said bottom sheet and the opposite side of
the vessel.

6. A sheet metal vessel, having its bottom
and the adjacent side united by an external
seam, an outwardly opening pocket or groove
being formed in said bottom behind said
seam, and a metal supporting back held in
said pocket and projecting below the bottom, 95
the lower projecting edge of said back being
outwardly bent beneath said seam.

In testimony whereof, I have signed my
to this specification, in the presence of
two subscribing witnesses.

LOUIS LIBBMAN.

Witnesses:
Geo. H. Maxwell.
M. J. Spalding.