(No Model.)

F. A. WALSH.

METHOD OF FLANGING SHEET METAL VESSELS.

No. 421,212. Patented Feb. 11, 1890.

Fig. 1.

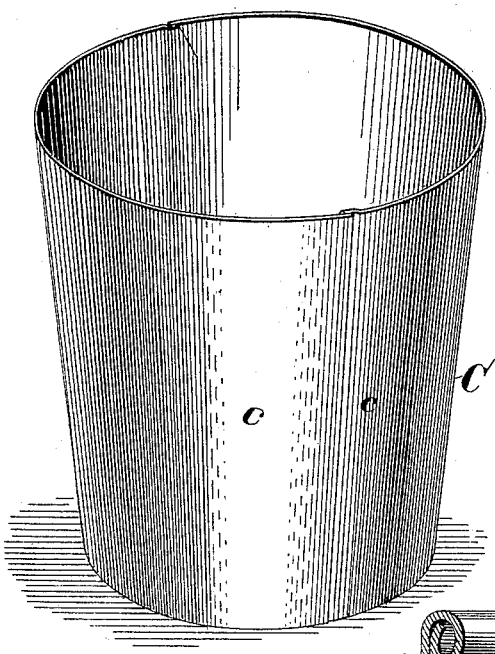
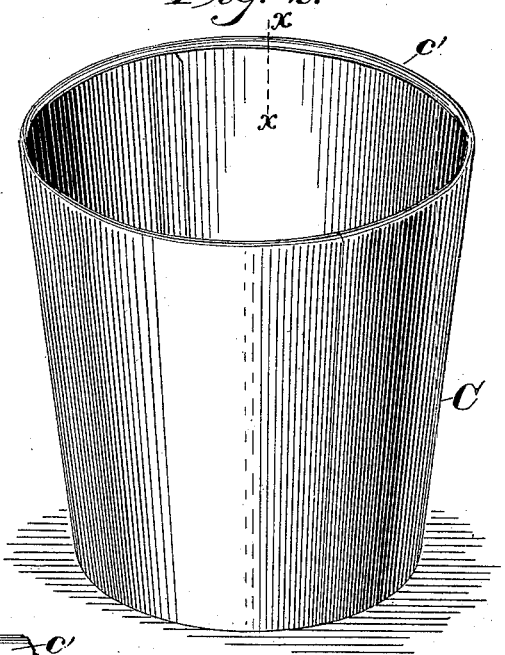


Fig. 2.



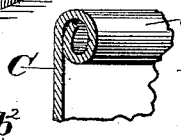


Fig. 4.

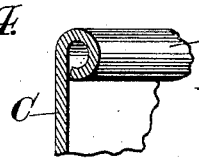


Fig. 3.

Fig. 5.

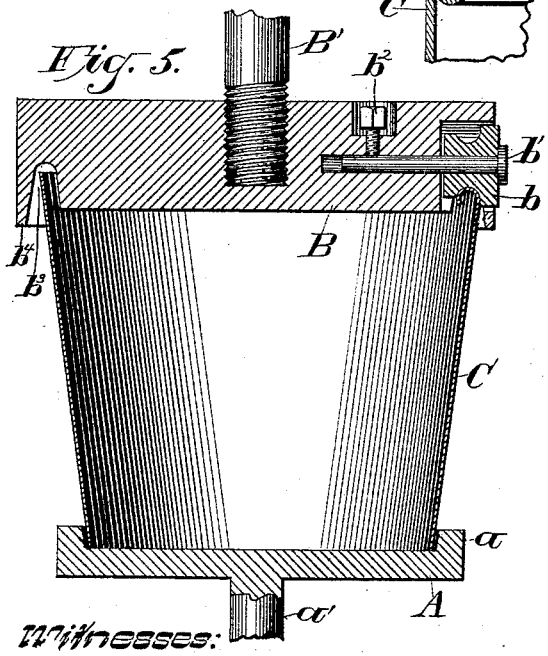
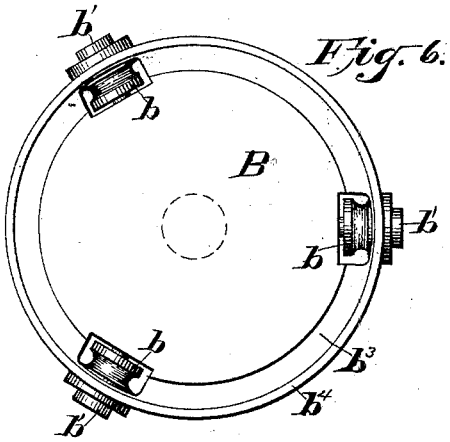


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRANCIS A. WALSH, OF MILWAUKEE, WISCONSIN.

METHOD OF FLANGING SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 421,212, dated February 11, 1890.

Application filed November 12, 1884. Serial No. 147,699. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS A. WALSH, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in the Method of Constructing Sheet-Metal Vessels; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to the construction of sheet-metal vessels, such as tin pails; and it consists in the process of making thereon continuous curled or beaded edges or rims, all as will be more fully set forth hereinafter.

In the drawings, Figure 1 is a representation of a sheet-metal vessel open at both ends. Fig. 2 is a perspective view of the same vessel after the upper edge or rim has been curled in, and Fig. 3 is an enlarged detail sectional view on the line *x x* of Fig. 2. Fig. 4 is a modification of Fig. 3, and Figs. 5 and 6 are views of portions of the machinery for forming said curled edges.

Heretofore pails and other sheet-metal vessels have been formed with their upper rims curled in or beaded in some instances; but so far as known to me this has only been done by bending the said rim over a wire or else by bending the rim while the sections of which the pails or other vessels are made are in a flat state, as in the manufacture of square or polysided packing-vessels. A pail the upper rim of which is curled in in the manner shown and described in this application is also shown and described in the application filed by me on the 18th day of February, 1884, Serial No. 121,072, and such pail forms the subject-matter of said application, (including also the construction of the bottom of said pail;) but this present application relates to the method of producing said curled edge continuously and at one operation on a sheet-metal vessel after the sections of which the body is composed have been brought to place and secured together.

The special or particular machinery whereby the desired result is accomplished forms no essential feature of my present invention; but for the sake of greater clearness I have illustrated in Figs. 5 and 6 devices by means of which my process can be successfully carried out, although other machinery (as hereinafter suggested) can be used for this purpose; but I will now describe the devices shown.

A is a stand or support, preferably formed with an upward-projecting circular rim or flange *a*, whereby it is adapted to receive the lower end or bottom of the sheet-metal body or vessel C, and which has also a central downwardly-extending projection *a'* to attach it to other portions of the machinery, (not shown,) whereby the said support A may be raised and lowered as well as revolved, if desired, although in the illustration given the part A is not intended to rotate.

B is the head or support of the formers *b b*, which in the instance shown are supported on the headed stems *b' b'*, fastened to the former-head B by set-screws b^2, the said head being suitably cut away at the proper points for the reception of these several parts, as clearly shown in the drawings.

B' is a shaft, by means of which the head B may be rotated, and this head is provided on its under surface with an annular groove b^3, and the outer wall of this groove is extended down all around to form the flange b^4.

In the drawings, the sheet-metal body C is shown as formed of two sections *c c*, suitably soldered together; but it is immaterial whether the body be formed of one piece (as in very small vessels whose end edges are united at a single point) or (as in much larger vessels) of two, three, or more sections similarly united, it being only requisite that the body shown in Fig. 1 shall be a complete or continuous one, irrespective of the prime condition of its constituent parts, and similarly it is quite immaterial whether it is open at both ends, as shown in the drawings, or whether the bottom has been previously added thereto.

In carrying my invention into effect I take one of these vessels and place it upon a suitable stand—such as A—and then by any ordinary mechanical means—such as a foot-lever—elevate the said stand, and with it the vessel C, until the top edge of the latter is within the described groove b^3 in the former-head B, which latter is in a state of revolution, and the action of the formers *b* on said head upon the edge of the sheet-metal body in the said continuous revolution will be such under the pressure exerted from below as to cause

the edge of the metal to bend over inward, as at c', forming the described curled edge or bead. If only moderate pressure is exerted, and that for a time commensurate with only a few revolutions of the former-head, the single fold (shown in Fig. 3) is formed; but if the pressure is continued or increased and the head permitted to make an increased number of revolutions, then the double fold (shown in Fig. 4) is formed, and so on, according to the pressure exerted and the length of time consumed or number of revolutions consequently made, as with each revolution the inward curl or curve is increased; but all is done gradually, and hence there is no breaking of the metal, but the curled edge is smooth and continuous, as shown. It will be noticed that the entire support of the body of the vessel is at its lower end or bottom, so that no mechanism comes in contact with the interior or exterior surface of the body at or even near the upper edge thereof which is to be inwardly rolled, whereby the force applied to produce the inward roll at the top is resisted only by the material of the body itself, and said force being applied in lines directed to a point within the body the edge is rolled inwardly. Furthermore, the force being applied at successive points along said edge, the latter is gradually brought (it may be even from an outwardly-flaring position) over, downwardly, and inwardly in cylindrical form. Now, if the material of the body be too rigidly held or supported interiorly or exteriorly near the upper edge, the manner of applying the force—that is, on a single circumferential line and successively at different points on that line—would have a tendency to and in fact does produce a breaking, cracking, or abrasion of the portion inwardly rolled in its exposed surface and circumferentially along the same. This cracking, abrasion, and breaking of the surface primarily occur from the stretch of the outside surface as compared to the compression of the inside surface at any point of the roll, and, secondarily, as well as very materially, this resulting effect is aided by supporting the body of the vessel near the roll against movement in a diametrical direction.

By removing all support from the body, especially from the interior thereof, any abnormal resistance at the point of inward rolling is absorbed by a yielding or springing of adjacent portions of the body, so that a perfectly smooth true inward roll is produced, and one which is cylindrical at all points in cross-section, and also truly cylindrical bodily—that is, as it forms the upper inrolled edge of the vessel.

It is not absolutely necessary that the sections of the body should be soldered together, as they might be united in any other manner, (as by rivets,) or even simply brought together and temporarily secured (as by being held in a chuck) during the operation, and it is, furthermore, immaterial whether the former-head revolves and the vessel is stationary, or whether the latter revolves and the former-head is stationary.

Although I have shown my formers in the shape of independently-revolving rollers or grooved sheaves, instead thereof they may be simply stationary formers, though I prefer the former construction, as thereby friction is reduced and the wear is transferred to the stems b'. If desired, I may have my formers wholly independent of the revolving head and independently supported, the particular construction of the mechanism by which my process is carried out forming no part of my present invention, and hence, instead of raising the support A and the vessel C up to the former-head, (in the form of device shown in the drawings,) my machine might be so constructed that the former-head would instead be depressed upon the vessel and the parts brought into operative conjunction in that way.

I have shown in the drawings a sheet-metal body or vessel of tapering form; but it will be understood that my process is equally applicable to a perfect cylinder, or even to a vessel of generally oval shape in transverse section, in which latter case, of course, only one former, and that one upon an independent support, would be used, and after the said curled rim or rounded edge has been formed it may be flattened, if desired; but all these things are matters not really affecting the essence of my invention, and hence call for no further description.

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

1. The method herein set forth of forming an inward roll on sheet-metal vessels, which consists in supporting the walls of said vessel solely at its bottom and applying force at successive points along and around the edge of the top of the body of the vessel in lines directed to a point within said body, whereby breaking, cracking, and abrasion of the metal along the roll are prevented, substantially as specified.

2. The herein-described method of forming an inward roll upon the upper edge of the vertical walls of a sheet-metal vessel, which consists in supporting the walls of said vessel at its bottom only, and applying force at successive points along and around the edge of the top of the body of the vessel in lines directed to a point within said body while the vessel is in revolution with respect to such force-applying mechanism, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

FRANCIS A. WALSH.

Witnesses:
H. G. UNDERWOOD,
H. J. FORSYTHE.