No. 801,796. PATENTED OCT. 10, 1905.

A. A. KRAMER & J. W. HALEY.

METHOD OF ATTACHING EARS TO TIN PAILS.

APPLICATION FILED NOV. 7, 1904.

2 SHEETS—SHEET 1.

Fig. 5.

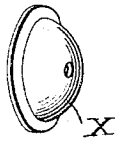


Fig. 6.

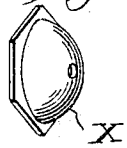


Fig. 7.

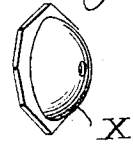


Fig. 1.

Fig. 4.

Fig. 8.

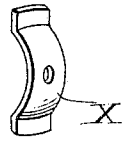


Fig. 2.

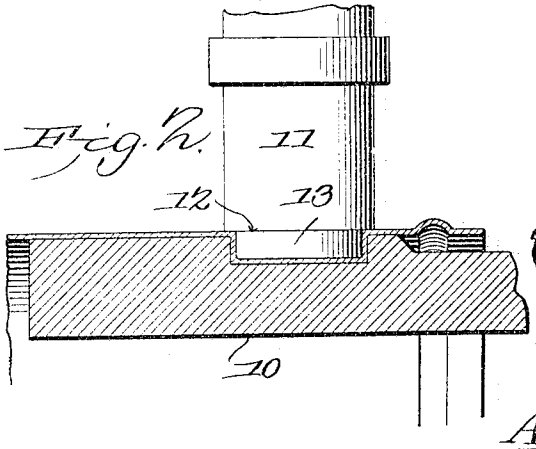


Fig. 3.

Witnesses

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METHOD OF ATTACHING EARS TO TIN PAILS.

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2 SHEETS—SHEET 2.

Fig. 9.

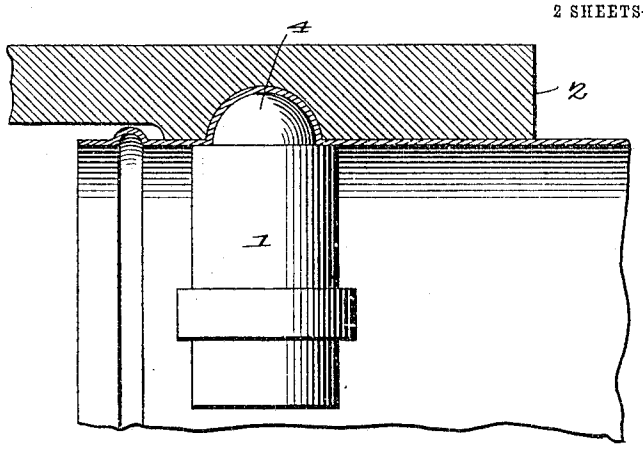


Fig. 10.

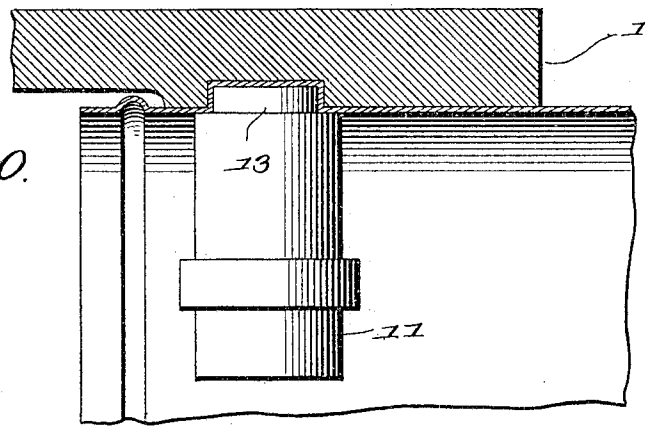


Fig. 12.

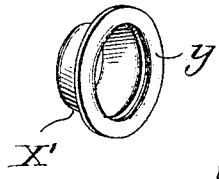
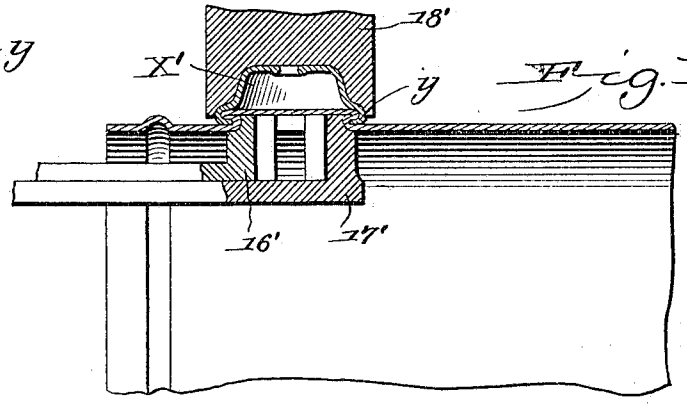


Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

ANDREW A. KRAMER AND JOHN W. HALEY, OF KANSAS CITY, MISSOURI.

METHOD OF ATTACHING EARS TO TIN PAILS.

No. 801,796. Specification of Letters Patent. Patented Oct. 10, 1905.

Application filed November 7, 1904. Serial No. 231,816.

To all whom it may concern:

Be it known that we, ANDREW A. KRAMER and JOHN W. HALEY, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Method of Attaching Ears to Tin Pails, of which the following is a specification.

The object of the present invention is to attach bail-ears to metallic vessels, such as tin pails and the like, without perforating the walls of the vessel and without the employment of solder, cement, or other auxiliary securing material.

A further object of the invention is to carry out the method in such manner that the bail-ears may be securely attached to pails or other vessels formed of common tinware which is not sufficiently ductile to be successfully manipulated by ordinary die-forming operations.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in the novel method hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes may be made in the apparatus shown and described without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a sectional view illustrating a pail provided with indentations or depressions at diametrically opposite points and showing the dies for forming said depressions. Fig. 2 is a similar view illustrating the second step of the process. Fig. 3 illustrates the carrying out of the final step of the process. Fig. 4 is a perspective view of a portion of a pail having a bail-ear thereto attached. Fig. 5 is a similar view of one of the bail-ears employed. Figs. 6, 7, and 8 are similar views showing slightly-modified constructions of bail-ears. Fig. 9 is a sectional plan view similar to Fig. 1, illustrating a slight modification of the invention. Figs. 10 and 11 illustrate further steps in the manufacture of the device in its modified form. Fig. 12 is a detail perspective view of the bail-ear employed in the modified form.

Similar characters of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In small vessels, especially those formed of tin-coated iron, it is usual to solder or otherwise secure the separate bail-ears to the opposite sides of the pail, or in some cases the wall of the pail is perforated and the bail-ear inserted therein, this latter method being objectionable, owing to the danger of leakage of the contents and the deterioration of the contents of the can when exposed to the action of air.

In carrying out the present invention the can is first subjected to the action of two dies 1 and 2, the die 2 having an upper surface shaped to correspond to the curvature of the can and being provided with a convex depression 3, into which enters the semispherical or convex end 4 of the male die 1, and on said male die is a flange or shoulder 5, which limits inward movement of said die, and thus avoids any danger of rupture of the metal of the can. The action of these two dies is such that the metal is gradually stretched, and the depression or pocket thus formed supplies an excess of swageable metal, which is subsequently shaped for the reception of the bail-ear.

The second step of the process is illustrated in Fig. 2, wherein two dies 10 and 11 are employed, the die 10 having a circular recess with a flat bottom and straight vertical walls arranged at a right angle or approximately at a right angle to the plane of the bottom. The upper male die 11 is provided with a shoulder or flange 12, from which projects a cylindrical portion 13 of a contour corresponding to that of the recess of the female die, but of a volume sufficiently less to permit the entrance of the sheet of metal between them. These two dies, which may be termed "flat-wall" dies, act upon the metal, forming the walls of the convex indentation into a circular recess having a flat bottom.

Into the recess resulting from the operation of the dies shown in Fig. 2 is placed a bail-ear x, comprising a central dome-shaped body portion having a central perforation and provided with a marginal flange, the diameter of the flange being about equal to the diameter of the flat wall of the recess.

The next step of the operation is shown in Fig. 2, wherein the pail is placed on two dies 16 and 17, while the bail-ear is held down in position by a vertically-movable holder 18, having its end recessed for the reception of the dome-shaped portion of the bail-ear. The two dies 16 and 17 are provided with inwardly-projecting flanges at their upper edges, and when these dies, or one of them, are moved, the metal of the cylindrical wall of the recess is forced inward over or partly over the periph-

eral flange of the bail-ear, thus firmly confining said bail-ear in place. During this operation distortion of the pail is prevented by the contact of the lower end of the holder 18 with the wall of the pail at a point surrounding the dome-shaped portion of the bail-ear.

The operation is now completed, and the bails are inserted through the openings in the ears in the usual manner.

The bail-ears may be substantially circular in form, as shown in Fig. 5, or the flanges may be non-circular, as shown in Figs. 6 and 7, or, as shown in Fig. 8, a portion of the metal may be cut away.

It is obvious that the apparatus may be modified in some respects—as, for instance, by using more than two compression-dies 16 and 17, so that the vertical wall of the recess will be attacked at more than two points, thus effecting the compression operation with less risk of injury to the metal.

A further modification of the invention is illustrated in Figs. 9, 10, 11, and 12. The processes of forming the square-shoulder recesses are precisely the same as that shown in Figs. 1 and 2, with the exception that the metal is bulged outward from the wall of the pail and not inward.

In the final step of the modified process a bail-ear x' of the character shown in Fig. 12 is employed, said bail-ear having an inturned flange y. In the final step of the process two dies 16′ and 17′ are inserted in the recess resulting from the operation shown in Fig. 10, and then the bail-ear x is placed on the outside of the pail and is forced downward by a die 18′. At the same time the two dies 16′ and 17′ are moved in opposite directions, respectively, and the metal of the walls of the recess is crowded outward to a position within the flange y, as clearly shown in Fig. 11.

Having thus described the invention, what is claimed is—

1. The herein-described method of securing bail-ears to sheet-metal vessels, said method consisting in first displacing and gradually stretching a portion of the metal to form a depression therein, the metal displaced being equal to or greater than that necessary to form a bail-ear-receiving recess; second, reshaping the metal so displaced to form a recess having an approximately straight wall; third, placing the bail-ear with its flanged edge in a position in contact with or adjacent to said straight wall, and finally, contracting the metal of such straight wall in a direction substantially at a right angle thereto to lock the bail-ear in place.

2. The herein-described method of securing bail-ears to sheet-metal vessels, said method consisting in first displacing a portion of the metal by gradually stretching the same to form a swageable portion in excess of that necessary to form a bail-receiving recess; second, reshaping such depressed portion for the purpose of forming a recess having a flat bottom and a straight side wall; third, placing a flanged bail-ear in contact with such side wall, and finally forcing the metal of the side wall laterally over the flange of the bail-ear.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

ANDREW A. KRAMER.
JOHN W. HALEY.

Witnesses:
LORANA TRASK,
J. C. JAMIESON.