(No Model.)

2 Sheets—Sheet 1.

J. ZIMMERMAN.

KEY OPENING CAN.

No. 486,521. Patented Nov. 22, 1892.

Fig. 1.

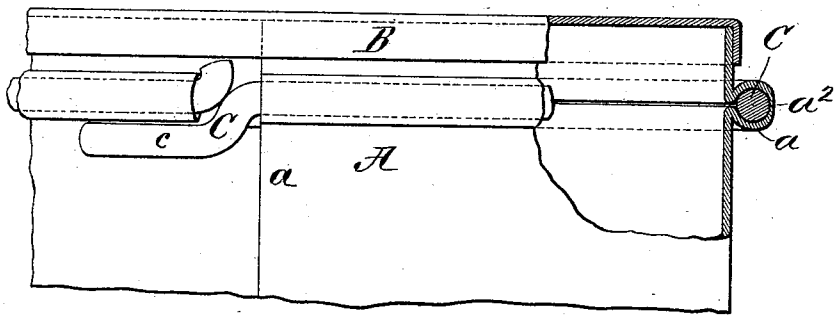


Fig. 2.

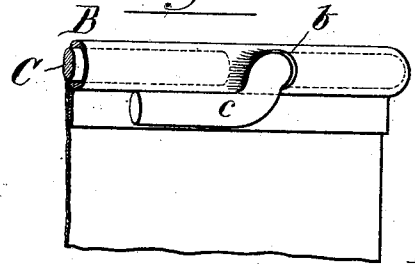


Fig. 3.

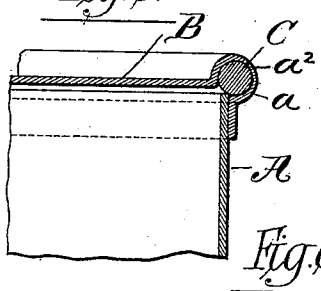
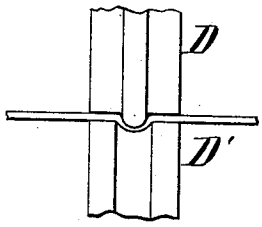
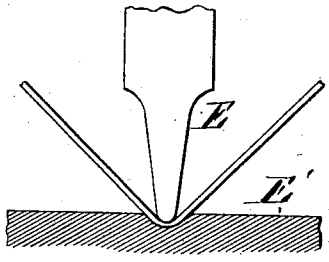


Fig. 5.

Fig. 6.

Fig. 4.





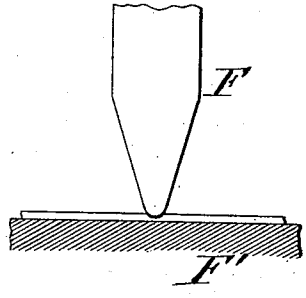
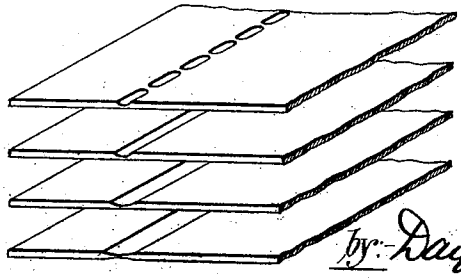


Fig. 7.



Witnesses:-

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Samuel Kid

Inventor:-

John Zimmerman.

by: Dayton, Poole & Brown

his Attorneys.

(No Model.) 2 Sheets—Sheet 2.

J. ZIMMERMAN.

KEY OPENING CAN.

No. 486,521. Patented Nov. 22, 1892.

Fig. 8.

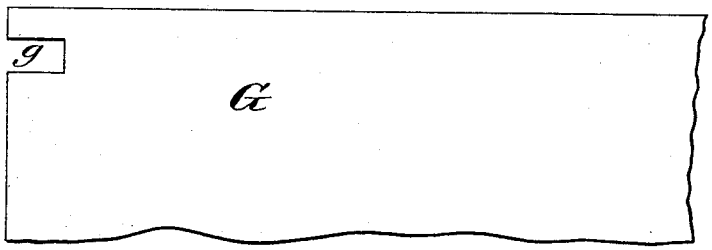


Fig. 9.

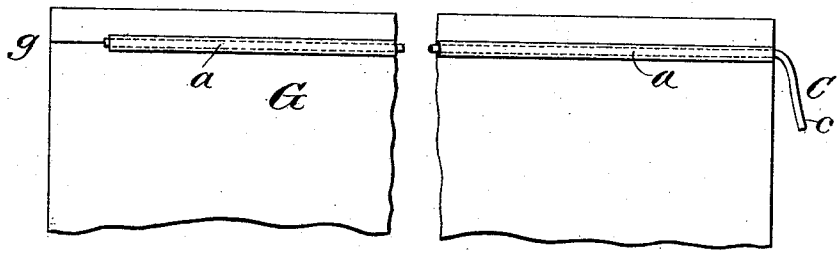
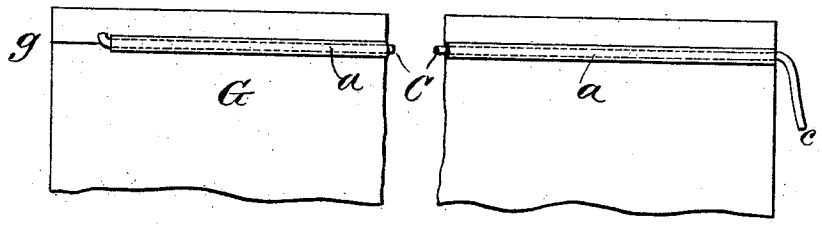


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN ZIMMERMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE NATIONAL KEY-OPENING CAN COMPANY, OF SAME PLACE.

KEY-OPENING CAN.

SPECIFICATION forming part of Letters Patent No. 486,521, dated November 22, 1892.

Application filed February 18, 1892. Serial No. 421,941. (No model.)

To all whom it may concern:

Be it known that I, JOHN ZIMMERMAN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Key-Opening Cans; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to key-opening coated sheet-metal cans or vessels of the class in which a ripping-wire is located beneath the sheet metal forming the body or cover of the vessel and has one of its ends protruding outside of the vessel, whereby said wire may be seized and drawn radially outward for the purpose of severing the sheet-metal exterior thereto.

The invention is in the nature of an improvement upon the construction in which the sheet metal is weakened along a line exterior to the wire to facilitate its separation by such withdrawal of the wire. In the prior art three forms of a weakened line exterior to a wire have been proposed, one in which the sheet metal is sharply bent, resulting in its partial fracture, another in which a series of punctures is formed through the sheet metal and closed by solder, which also holds the wire in place, and the third in which the sheet metal is thinned by plowing a groove in one surface thereof, opposite which groove the ripping-wire is placed. All these constructions have been found to be impracticable. It is an objection to the first of them that the extent to which the sheet metal is weakened by sharp bending is variable, according to its quality or condition, such weakening being usually insufficient to afford any appreciable aid to the operation of severing it by the wire, though sometimes it amounts to complete rupture. By reason of the usual insufficiency of the weakening it has been proposed in this construction to use a form of knife behind the fold to cut along the line of deflection or partial fracture. The second construction is open to several objections, some of which are, first, the fact that it involves the presence of solder upon the interior of the can, which is to be avoided, because it has been found to exert a harmful effect upon the contents of the vessel after long contact therewith; second, that solder being employed to close the numerous holes some of such holes are liable to be imperfectly closed, so that a large percentage of the cans are found to be defective upon "processing" or after long standing; third, that such construction requires an increased quantity of solder, and therefore enhances the cost of the can. The third construction above mentioned is open to the serious objection that by plowing to thin the metal opposite the ripping-wire the tin coating is removed from the base metal, which latter is therefore exposed to corrosive action and as a consequence rusts in time, so as to allow the can to break open and its contents to spoil.

The present invention completely obviates all these objections and presents features of construction which answer every requirement of cheapness in manufacture, certainty of opening, uniformity of resistance to force applied to the ripping-wire, and reliability as against rupture from lapse of time or tendency to corrosion.

To this end the invention consists in a can of metal-coated sheet metal having the wire inclosed in and held by an outwardly-projecting fold formed in the can, the metal forming the fold being integral with the body or cover but thinner than the remainder of the sheet of which it forms part, while at the same time it is covered at such thinner portion with a continuation of the same coating of tin or other material, which covers adjacent portions of the sheet.

The invention also consists in the method of forming a can of this construction, said method involving the steps of reducing the thickness of the metal-coated sheet along the line of proposed separation by pressure, the formation of a fold along such line of reduced thickness and the compression of a ripping-wire within such fold.

The invention also consists in certain details of construction, which will be hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, Figures 1,

2, and 3 are enlarged fragmentary views of cans containing my invention. Fig. 1 is a side elevation of a can having the ripping-wire placed in a fold in the body of the can, a portion of the can-body being broken away to illustrate a section of the wire in the groove. Fig. 2 illustrates the wire embraced in a fold in the angle of a flanged slip-cover and protruding at one end through a hole or notch provided in the cover for that purpose. Fig. 3 is a vertical section of Fig. 2. Figs. 4, 5, and 6 illustrate some different forms of means by which the sheet metal may be thinned along a line of proposed separation without rupture of its coating. Fig. 7 illustrates fragments of sheets having several forms of the thinned line over which the coating is continuous with that on the body of the sheet. Fig. 8 illustrates a form of blank for the body of a can having a lapped side seam and adapted for the application of the separating-wire in accordance with my invention. Fig. 9 illustrates the blank of Fig. 8 after the fold is formed therein to embrace the ripping-wire. Fig. 10 shows a desirable additional feature in which the ripping-wire, at what may be called its "inner" end, is bent or hooked over the end of the fold as formed in the notched blank of Fig. 8.

First describing Figs. 1 to 3, A represents a tinned can-body; B, a slip-cover applied externally to the body, and C a ripping-wire secured in a fold of the can, which fold has been thinned externally to the wire by pressure, so that the tin coating is unbroken at such thinned portion.

As illustrated in Fig. 1, the wire C is embraced in a fold *a*, formed in the body A of the can, and has its end *c* projecting outside the can beyond the lapped seam *a'*. The fold *a* of the sheet metal embracing the wire C has a thinned portion a^2, exterior to the wire, to facilitate the rupture of the metal when force is applied to the free or exposed end *c* of said wire for that purpose. This thinned portion a^2 of the fold *a* has the original coating of tin or other metal thereon and is without soldered punctures, the thinning having been accomplished by pressure—as, for example, by rollers D D' of Fig. 4, by dies E E' of Fig. 5, by a single die F, co-operating with an anvil F', as shown in Fig. 6, or by some other suitable compressing device or devices. The wire C is embraced fully or practically so in the fold *a*, and is compressed firmly within said fold in order to obviate the necessity for using solder to secure said wire in place. Mechanisms adapted to form such a fold and to closely embrace the wire within the fold are of familiar construction, and therefore do not require description here. Thus fully embraced and secured, the wire C is prevented from being drawn sidewise out of the fold into the position of a chord of a circle within a can or endwise out of the fold when force is applied to its exposed end. As a more perfect assurance against endwise withdrawal of the wire, however, especially when the cutting of the can has been nearly completed and but little of said wire still remains in the fold, a drop of solder may be applied to its extreme inner end to fasten it; or, the fold being made to terminate at a little distance from the lapped seam *a'*, the inner end of the wire may project beyond the fold and hook or bend outwardly somewhat, as indicated in Fig. 1.

In Figs. 2 and 3 the ripping-wire C is placed in a similar fold of the cover, said fold being located in the angle formed by the head or cover proper with its flange. In this construction the cover B is provided with a hole or notch *b*, through which the end of the wire C protrudes to admit of its being seized by a key or other implement for the purpose of applying ripping force thereto.

Next describing Figs. 8, 9, and 10, which show the ripping-wire applied to the can-body, it is obvious that the fold embracing the wire C must terminate outside the lap-seam *a'* of said body, so that the lap may be smooth and may take solder readily and with certainty. The fold may be made in the first place continuous across the entire width of a sheet or blank having unbroken edges, and the fold may be thereafter cut off for the width of the lap or for a greater width to allow room for the exposed end of the wire to be turned down; but I prefer to first form a notch or slit *g* in the blank G of the can-body, Fig. 8, said notch being of suitable width to insure its edges coming together when the fold *a* is made about the ripping-wire, as shown in Fig. 9. When this method is pursued, the end of the wire which is last to be withdrawn may be allowed to project slightly beyond the fold and may be bent to one side, as illustrated in Figs. 1 and 10, for the purpose of insuring positively against the withdrawal of the wire endwise before the complete severance of the sheet metal externally thereto.

The novel steps in the process of forming the can above described, whether the ripping-wire be located in the body or in the cover, are as follows: The coated blank or metal sheet is first compressed along a line which is to form part of a fold that will contain the ripping-wire. This may be done in forming a groove or before forming a groove which is to receive the wire. A groove having been formed in the sheet, the wire will be inserted in the groove and the walls of the groove will be closed about the wire, completely or practically so, by suitable pressure to hold it firmly. If the sheet be a blank for the can-body, the the body will thereafter be formed up from said blank and soldered at the side seam, after which the heads will be applied in the usual way.

When the wire is applied in the can-body, it will preferably be located adjacent to the edge of the cover-flange, as shown in Fig. 1, in order that the floating of solder upon the

joint uniting the cover with the body will result in applying solder to the extremity of the fold embracing the ripping-wire, and thus insure the perfect closure of the body at that point.

I claim as my invention—

1. A can or other vessel constructed of a metal-coated sheet having a fold which embraces a ripping-wire, the metal of the fold being reduced in thickness externally to the wire and the reduced or partially-separated portion having the metal coating continuous with that of the other parts of the sheet.

2. The described blank-body for a coated sheet-metal can, consisting of a sheet folded about a wire which terminates inside one edge and projects beyond the opposite edge of said sheet, the metal being slitted in the line of the fold from the first-mentioned end thereof to the adjacent edge of the sheet.

3. A can-body having a ripping-wire embraced within an outwardly-projecting fold which extends around the can and at that edge of the sheet which forms the under lap of the side seam and terminates outside said seam.

4. The can described, having a ripping-wire embraced in an outwardly-projecting fold which terminates externally to the lapped side seam, the metal of the fold having a line of less thickness than that outside said fold, such reduced portion being covered with a coating or coatings continuous with that of other portions of the sheet.

5. The method of constructing cans of tin-plate or similar coated sheet metal, which embraces the steps of reducing the thickness of the metal by pressure along a line of proposed separation, whereby the coating or coatings are unbroken, and forming a fold about a ripping-wire along the line of such reduced thickness.

6. The method of constructing the bodies of sheet-metal cans having a coating or coatings of tin or other metal, which embraces the steps of reducing the thickness of the sheet by pressure along the line of proposed separation, the forming of a groove having the thinned portion of metal in its wall, the placing of a ripping-wire in said groove, the compression of the walls of the groove about the wire, and thereafter forming up the body of the vessel from the sheet so prepared.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOHN ZIMMERMAN.

Witnesses:
M. E. DAYTON,
TAYLOR E. BROWN.