Oct. 16, 1945. F. J. O'BRIEN ET AL 2,386,813

METHOD OF PRESERVING STEEL PLATE FROM CORROSION AND PREPARING ELEMENTS OF CONTAINER BODIES THEREFROM

Filed July 21, 1942

Fig. 1.

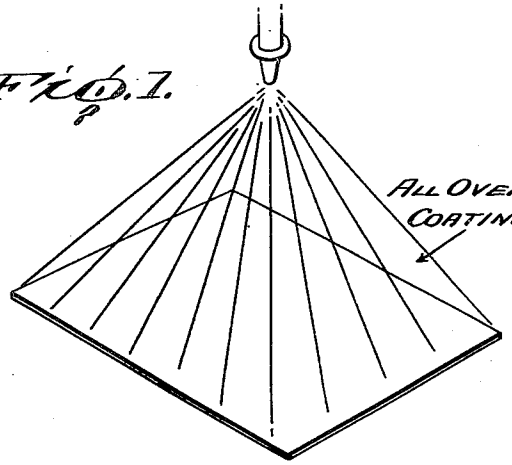


Fig. 3.

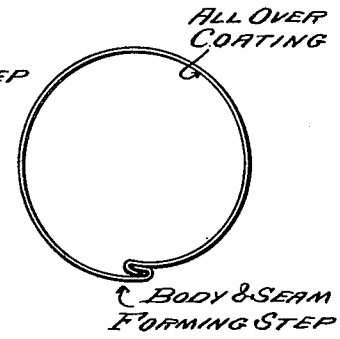


Fig. 2.

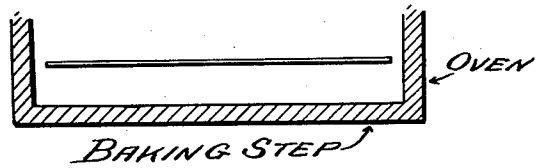
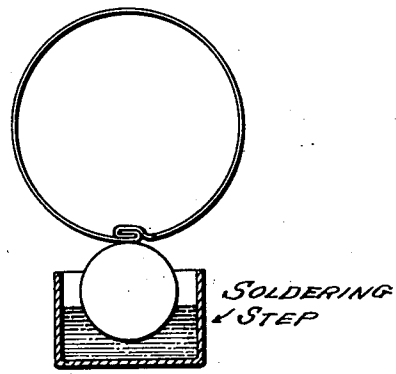


Fig. 4.



Inventors:
Frank J. O'Brien,
and
Curtis E. Maier,

By

Mason, Porter & Diller,
Attorneys

Patented Oct. 16, 1945 2,386,813

UNITED STATES PATENT OFFICE

2,386,813

METHOD OF PRESERVING STEEL PLATE FROM CORROSION AND PREPARING ELEMENTS OF CONTAINER BODIES THEREFROM

Frank J. O'Brien, Pelham, N. Y., and Curtis E. Maier, Elmhurst, Ill., assignors to Continental Can Company, Inc., New York, N. Y., a corporation of New York

Application July 21, 1942, Serial No. 451,756

1 Claim. (Cl. 117—37)

The invention generally concerns the preparation of container elements from steel plate and having a protective coating which will permit efficient solder-bonding of seams.

Tin and terne plate container elements have been employed for packaging food products and other substances such as oils, powders, etc.; and such plates have been lacquered internally and externally. When steel plate (black plate) is employed, to avoid use of tin and other protective metals, difficulty is encountered in preserving the sheet against corrosion prior to fabrication into the container element, and preserving the element prior to and after filling with the packaged material. For many such employments, as the element is not heated in contact with the product, a protective coating over the steel plate will be satisfactory if it is cheap, easily applied, and permits the fabrication to be conducted without special operations. The employment of the usual lacquers or enamels, however, gives difficulty because such protective coatings when applied over areas to be soldered during the fabrication, have interfered with efficient solder-bonding of the container seams. In order to overcome this difficulty, it has been necessary heretofore to exercise great care in avoiding application of the protective coatings at the edge portions intended to be formed into seams and solder-bonded, or to provide all-over protective coatings and then resort to means for removing the coatings from the edge portions intended to be formed into seams and solder-bonded. These edge-preparing steps naturally consume a considerable amount of time and labor and are objectionable because they are wasteful. It is, therefore, a purpose of the present invention to provide a novel method of preparing coated container elements which will avoid the objections noted by the provision of all-over protective coatings capable of providing the desired protection against direct contact of the packaged products with the metallic walls of the can bodies and yet permitting solder-bonding of the seams without resort to the wasteful edge-preparation steps hereinabove mentioned.

Another object of the invention is to provide can blanks which include all-over protective coatings which will protect the blanks against oxidation by the atmosphere and insulate products packaged in cans made from the blanks against direct contact with the metallic walls of the cans and which coatings have a flux directly incorporated therein which will aid in effecting an efficient solder-bonding, that is, permit solder-bonding without use of a flux other than that directly embodied in the coating.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more fully understood by following the detailed description, the appended claim, and the several views illustrated in the accompanying drawing.

In the drawing:

Figure 1 is a perspective view diagrammatically illustrating the step of coating the blanks or sheets.

Figure 2 is a sectional view diagrammatically illustrating the step of baking the coated blanks or sheets.

Figure 3 is a sectional view somewhat diagrammatically illustrating the step of forming can bodies and the side seams thereof from the all-over coated blanks.

Figure 4 is a sectional view diagrammatically illustrating the step of solder-bonding the side seams.

In the practice of the invention, a can element or blank is prepared from steel plate, by coating the original sheet or the blanks formed therefrom with a protective coating which permits direct solder-bonding without prior removal of the coating, and which is effective in assisting the solder-bonding operation.

Such coatings are composed of two basic ingredients for providing the film residue, being (1) a lacquer which provides a non-heat-hardening film that is thermo-fusible at soldering temperature and has the characteristic of being dry, hard, tough, cohesive, impermeable, and adherent, (2) a fluxing agent which is liquid and effective upon the metal at the soldering temperature and is preferably a solid at the ordinary temperature, and is capable of intimate incorporation into the lacquer base so that with its presence the coating film has the desired characteristics and so that, upon thermofusion and later cooling, the coating is reconstituted to cover the plate. These ingredients are applied in the form of a conjoint solution.

As one example of practice of the invention, such a coating film is prepared from a solution of a vinylal resin. 22½ parts by weight of vinyl butyral polymer resin of the type commercially known as YSG is blended with 7½ parts of WW rosin in a solvent for these substances, which may be an ester or ketone with or without a hydrocarbon diluent solvent; 70 parts of butyl cellosolve are satisfactory for the purpose. This lacquer solution is applied as an all-over protective coat-

ing on the blank plate, and is then baked at 325 degrees F. These coating and baking steps are diagrammatically illustrated in Figures 1 and 2 of the drawing. While Figure 1 illustrates a spray coating step, it is to be understood that this is illustrative of the application and that the coating may be applied by rollers, dipping, flooding, or other method. The coating may be applied to the can elements which have already been cut for size, but preferably the application is made to the large sheets of steel plate as manufactured and thus serves to prevent corrosion thereof prior to fabrication. The lacquer sheets are later cut into the required size for the blanks, and in the case of can bodies may be formed on the usual body maker as indicated by Figure 3 of the drawing, and the solder applied for the solder-bonding operation at the side seam of the can body as diagrammatically illustrated on Figure 4.

In a further example of practice, the can body blanks are given an all-over protective coating comprising 22½ parts, by weight, of vinyl acetate VYAA resin and 7½ parts, by weight, of WW rosin dissolved in 70 parts, by weight, of methyl iso-butyl ketone (hexone). This protective coating is applied to the individual blanks, or to the sheets, and is then baked at 325 degrees F. These coating and baking steps are diagrammatically illustrated in Figures 1 and 2 of the drawing as hereinbefore explained. When the lacquer has been applied to the sheets, the sheets may be stored without danger of corrosion. The sheets are subsequently cut into individual blank sizes and the blanks, thus cut or individually formed, can be shaped into bodies and have their side seams efficiently solder-bonded without the use of additional flux. This formation of the can bodies and the side seams thereon is diagrammatically illustrated in Figure 3 of the drawing, as hereinbefore explained, and it is to be understood that the solder-bonding of the side seam is accomplished in the manner diagrammatically indicated in Figure 4 without the necessity of including a fluxing step.

The "all-over" protecting coating herein mentioned is not to be considered in the most limited sense so as to cover only coatings which are applied all-over on both faces of a blank or sheet. This term is used in the broader sense so as to include coatings which may be applied to a part of the area of the face of a can body blank which is to be exposed internally or externally of a can or to corresponding surfaces of larger sheets from which such blanks may be cut, or in general to coatings which extend over areas which later are to be provided with surfacing metal by a heating operation requiring the action of a flux to assure proper adhesion.

By practicing the invention as hereinabove outlined, it is possible to provide can elements or blanks having protective coatings which do not interfere with solder-bonding, and will permit solder-bonding without the use of a flux other than that which is embodied in the protective coating.

We claim:

The method of preserving steel plate from corrosion and preparing elements of container bodies therefrom, which comprises applying to the area of the plate which is to be protected against corrosion an adherent protective coating which is essentially stable at soldering temperature and comprising an intimate uniform mixture of a thermo-fusible and non-heat-hardening lacquer resin and a thermo-fusible solder fluxing resin, heating a part of the said area to a temperature effective to liquefy the lacquer coating on said area and to melt solder, applying solder to the heated partial area wherewith the liquid lacquer is displaced from the metal for effecting a bonding of the melted solder to the metal in the presence of and with a fluxing by the action of the said solder flux resin and in the absence of added solder flux and cooling the said partial area wherewith the lacquer reestablishes a hard protective film extending over all unsoldered parts of said area.

CURTIS E. MAIER.
FRANK J. O'BRIEN.