

G. W. WEBER.

METHOD OF HERMETICALLY SECURING COVERS ON DRAWN OR SEAMLESS SARDINE CANS.
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918,619.

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Fig. 1

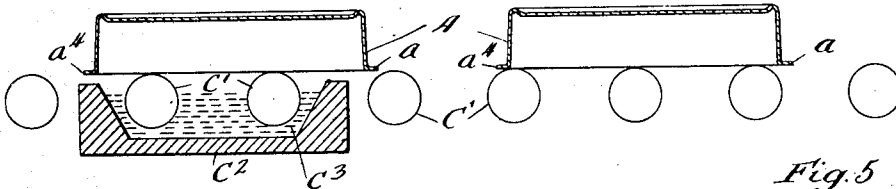


Fig. 2

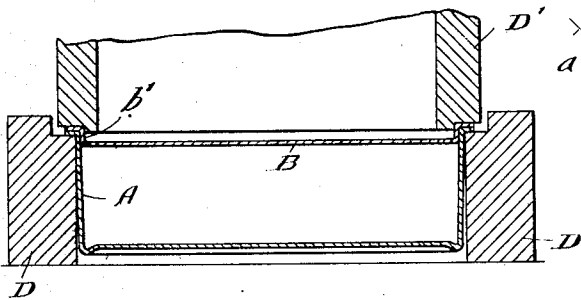


Fig. 3

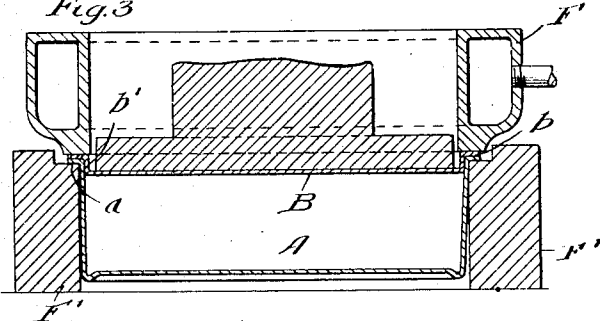


Fig. 4

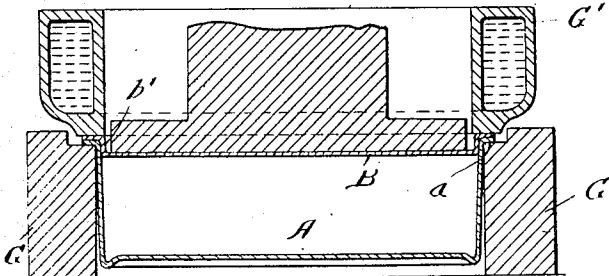


Fig. 5

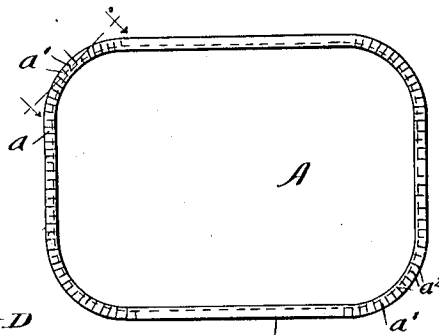


Fig. 6

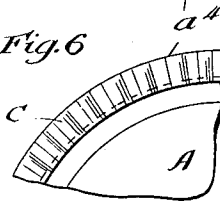


Fig. 7

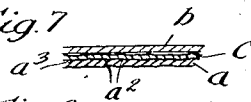


Fig. 8

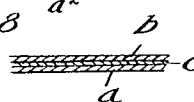
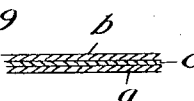


Fig. 9



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE W. WEBER, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN CAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

METHOD OF HERMETICALLY SECURING COVERS ON DRAWN OR SEAMLESS SARDINE-CANS.

No. 918,619.

Specification of Letters Patent.

Patented April 20, 1909.

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To all whom it may concern:

Be it known that I, GEORGE W. WEBER, a citizen of the United States, residing in New York, in the county of New York and State of New York, have invented a new and useful Improvement in Methods or Processes of Hermetically Securing Covers on Drawn or Seamless Sardine-Cans, of which the following is a specification.

My invention relates to improvements in the method or process of hermetically securing covers on sardine cans having drawn or seamless bodies.

Heretofore in the practical use of sardine cans having drawn or seamless bodies, great trouble and difficulty are experienced in closing the cover on the can with the requisite hermetic tightness, whether this is attempted to be done by double seaming or by soldering, owing to the fact that the drawing operation necessarily puckers and roughens the surface of the externally projecting flange on the can body and also leaves the flange more or less wavy, warped, or at variance from an exact and true plane, and especially at the rounded corners of the rectangular can, and thins and disturbs the tin coating as well as hardens the tin plate of such flange; and because the subsequent trimming operation of said flange on the can body leaves its outer edge with more or less of a bur; these several conditions preventing that close, smooth, metal to metal contact between the flange of the body and the flange of the cover necessary for the production of hermetically tight joints or seams either by soldering the flanges together or by seaming or folding them into a double or other seam; and the imperfections or inequalities in the externally projecting seaming or soldering flange of the body are also present in a less degree in the marginal or flange portion of the cover, thus increasing the difficulties in making a hermetic closure, as the waves, crevices, or roughnesses in the cover flange of course have no tendency to register or nest with those in the body flange. And the difficulties are materially added to where the flange of the cover is provided with an integral projecting tongue, or other key opening provision.

The object of my invention is to provide a simple and efficient process or method by means of which the cover may be rapidly and cheaply secured on the drawn or seamless bodies of sardine cans after they are filled, and by which the difficulties or objections heretofore experienced may be practically overcome or obviated.

I have discovered and demonstrated by experiments and practical use that this object or result may be practically accomplished by the following steps, and herein my invention consists: first, in forcibly swaging the soldering flanges of the cover and body together between dies under great pressure, the soldering flange of the body having an interposed film or coating of solder fusibly united thereto; second, subjecting the soldering flanges of the body and cover to a hot die swaging or combined compressing or compacting and fusing operation; third, to a cooling die swaging or riveting operation.

To enable my invention to be more clearly understood by those skilled in the art, I have in the accompanying drawing illustrated tools suitable for use in practicing my invention, and have also shown the can body and cover in successive steps or stages of the complete process.

In said drawing, Figure 1 is a diagrammatic view representing the instrumentalities that may be used in applying a solder film or coating to the soldering flange of the drawn or seamless body. Fig. 2 is a sectional view showing the can and swaging dies suitable for use in swaging the soldering flanges of the body and cover into shape. Fig. 3 is a similar view showing a heated swaging die suitable for use in the hot swaging die step. Fig. 4 is a similar view showing a cooling swaging die suitable for use in the final step of the process. Fig. 5 is a plan view of the drawn can body showing its soldering flange before being solder coated. Fig. 6 is a plan view showing a portion of the can body soldering flange after being solder coated and die swaged. Fig. 7 is an enlarged detail sectional view through the soldering flanges of the body and cover before being die swaged. Fig. 8

is a similar view showing the superimposed soldering flanges of the can body and cover after being die swaged into close smooth metal to metal contact and embedded and in a measure cold welded together. Fig. 9 is a similar view after the flanges have been hot die swaged and pressed or compacted and fused together to effect a hermetic closure and secure union of the parts.

In the drawing, A represents a one piece seamless or drawn body of a sardine can, the same being provided at its upper end with an externally projecting soldering flange a . This soldering flange a before being operated upon by my process has the customary minute, fine, irregularities, creases or puckers a^1 which are incident to the drawing operation, especially at the rounded corner portions of the can body, and also more or less wave-like or warping irregularities a^2 which prevent a true close metal to metal contact between the upper surface of the body flange a and the corresponding soldering flange b of the cover B. The cover B in addition to its soldering flange b is also furnished with a countersink wall b^1 fitting snugly and tightly within the upper end or mouth of the body A in tight frictional engagement therewith so as to exert a material gripping action tending to hold the cover in place when the cover is forcibly driven into the mouth of the body.

C is a solder coating or film applied to the upper surface of the soldering flange a of the body A and fusibly united therewith, this being preferably done by passing the can body over and in contact with rollers C^1 rotating in a receptacle C^2 containing molten solder C^3 .

After the can body A is pressed or drawn from a flat blank into the required seamless form and its externally projecting soldering flange a trimmed by suitable cutting dies to give a uniform width, it is next coated with the film of solder C, this being all preferably done at the can factory where the cans are manufactured.

The application of the solder coating C to the seaming flange of the body serves in a measure to remedy the thinning of the tin coating a^3 on the soldering flange of the body produced by the drawing operation and also to partially obliterate or lessen the smaller creases, crevices, cracks, puckers and irregularities a^1 produced in the soldering flange of the body by the drawing operation, but the solder coating has little effect in filling up or removing the larger or coarser puckers or surface irregularities a^1 , and none in removing or correcting the warping or wavelike variations or distortions a^2 resulting from the drawing operation in the cover flange and which distort it in places out of the true and regular surfaces or plane and which prevent its snug, flat, close, direct and

metal to metal contact with the corresponding flange b^1 of the cover throughout the entire extent or circumference of the seam as is required in order to produce perfect or hermetically tight solder joints. The solder coating C also has no appreciable action in removing, smoothing or covering the bur a^4 at the extreme edges of the body and cover flanges produced by the cutting and trimming operations, and which also tend to prevent the snug, flat, close metal to metal contact of the soldered flanges of the body and cover, which is necessary to the production of perfect and hermetically tight solder joints. In order to remove or obliterate these "drawing" puckers, creases and other irregularities, and also the warping or wavelike variations or distortions in the soldering flanges of the body and cover and insure that close and perfect metal to metal contact between the cover flanges necessary to the production of tight solder joints, I next, after the cover has been applied to the body, forcibly swage together between suitable dies under great pressure the soldering flanges of the body and cover, the blow or pressure being sufficient to take the spring out of the metal of the two flanges and bring them both into a true plane and entirely smooth-out or obliterate the creases, crevices, puckers, burs, solder lumps, waves, warpings or other irregularities in the contacting surfaces of the soldering flanges of the cover and body. Such puckers, burs or other irregularities that may remain in one member or the other are embedded in the soft solder film or coating C between the two. The pressure or swaging operation to which the soldering flanges of the body or cover are thus subjected also serves in a measure to cold weld the tin coating on the cover flange to the solder coating on the body flange, thus causing the cover to very firmly adhere to the body in connection with the coöperative action of the tight frictional engagement of the seamless countersink wall of the cover with the seamless body in which it fits. The pressure or blow of the swaging dies upon the soldering flanges of the body and cover should also be sufficient to take the spring or life entirely out of the metal so that the two soldering flanges will have no tendency to spring apart or separate, or so little tendency thereto that the quasi-welding of the solder and tin coatings on the body flange and cover flange in connection with the tight frictional gripping action of the countersink wall of the cover to the corresponding wall of the can body mouth will effectually resist any such separation tendency as may remain. This swaging operation or step is preferably performed by suitable swaging dies D and D^1 , the lower one D of which engages only the body flange and the upper D^1 of which en-

gages only the cover flange and between which the two flanges are compressed under great pressure.

The die swaged and springless soldering flanges of cover and body are next subjected to a hot swaging or combined welding and fusing action between the heated upper die F and the opposing lower die F¹. The hot swaging of these two dies serves to fuse or partially fuse the solder film or coating C between the two soldering flanges and to fusibly unite or compact and adhere the same securely together.

To further tighten or close the superposed flanges of body and cover together and remove any possible crevices that may remain, due to pieces of fish or scale or other foreign substance between the flanges of body and cover, (somewhat after the manner of tightening of rivets to bring boiler surfaces into steam tight contact between the rivets,) I subject the soldering flanges of the body and cover to a cooling and swaging action between the pair of dies G G¹, the upper one of which is preferably hollow and supplied with water or other cooling fluid. In this way by subjecting the soldering flanges of the body and cover to three successive strokes of suitable dies in a press, I am enabled to hermetically secure the cover to the body of a drawn or seamless sardine can with great firmness and perfect hermetic tightness and very rapidly and cheaply.

I claim:—

1. The process of hermetically and tightly securing covers on drawn sardine cans consisting in first subjecting the superposed flanges, one of which is solder coated, to a swaging operation, then to a swaging and heating operation and then to a swaging and cooling operation, substantially as specified.

2. The process of tightly and hermetically securing covers on drawn sardine cans having laterally and externally projecting soldering flanges, consisting in supporting the can body by its flange and then in first swaging the soldering flanges of the body and cover together and then subjecting them to a swaging and heating action, substantially as specified.

3. The process of tightly and hermetically securing covers on drawn sardine cans having laterally and externally projecting soldering flanges, consisting in supporting the can body by its flange and then in subjecting the superposed soldering flanges of body and cover, one of which is solder coated to a heating and swaging operation between dies, substantially as specified.

4. The process of firmly and hermetically securing covers on drawn sardine cans having laterally and externally projecting soldering flanges, consisting in supporting the can body by its flange and then in first forcing the countersink wall of the

cover tightly within the mouth of the body and swaging out the "drawing" puckers and irregularities in the body flange and bringing the cover and body flanges into intimate and direct metal to metal contact, the body flange being solder coated and thus tightly securing the parts together, and then subjecting the body and cover flanges to a hot swaging operation and fusing the parts together, substantially as specified.

5. The process of firmly and hermetically securing covers on drawn sardine cans consisting in first forcing the countersink wall of the cover tightly within the mouth of the body and swaging out the "drawing" puckers and irregularities in the body flange and bringing the cover and body flanges into intimate and direct metal to metal contact, the body flange being solder coated, and thus tightly securing the parts together, and then subjecting the body and cover flanges to a hot swaging operation and fusing the parts together, and then subjecting the body and cover flanges to a swaging and cooling operation to further close any interstices, substantially as specified.

6. The process of firmly and hermetically securing covers on drawn cans having laterally and externally projecting soldering flanges, consisting in supporting the can body by its flange and then in first subjecting the superposed flanges of body and cover, the body flange being solder coated, to a swaging operation between dies, then to a combined swaging and fusing operation, substantially as specified.

7. The process of firmly and hermetically securing covers on drawn cans, consisting in first subjecting the superposed flanges of body and cover, the body flange being solder coated, to a swaging operation between dies, then to a combined swaging and fusing operation and then to a combined cooling and swaging operation, substantially as specified.

8. The process of hermetically securing covers on can bodies having laterally and externally projecting soldering flanges, consisting in supporting the can body by its soldering flange and subjecting the superposed flanges of can body and cover, one of which is solder coated, to heat and pressure between dies, substantially as specified.

9. The process of hermetically securing covers on can bodies having laterally and externally projecting soldering flanges, consisting in supporting the can body by its soldering flange and subjecting the superposed soldering flanges of body and cover, one of which is solder coated, to a swaging operation, then to a heating and swaging operation, substantially as specified.

10. The process of hermetically securing covers on can bodies consisting in first subjecting the superposed soldering flanges of body and cover, one of which is solder coat-

- ed, to a swaging operation, then to a heating and swaging operation and then to a cooling and swaging operation, substantially as specified.
- 5 11. The process of hermetically securing together can body and cover flanges having laterally and externally projecting soldering flanges, consisting in supporting the can body by its soldering flange and subjecting the superposed flanges, one of which is solder coated, to a hot swaging operation, substantially as specified. 10

GEORGE W. WEBER.

Witnesses:

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