C. W. GRAHAM.

CAN FORMING APPARATUS.

APPLICATION FILED JAN. 25, 1908.

958,741. Patented May 24, 1910.

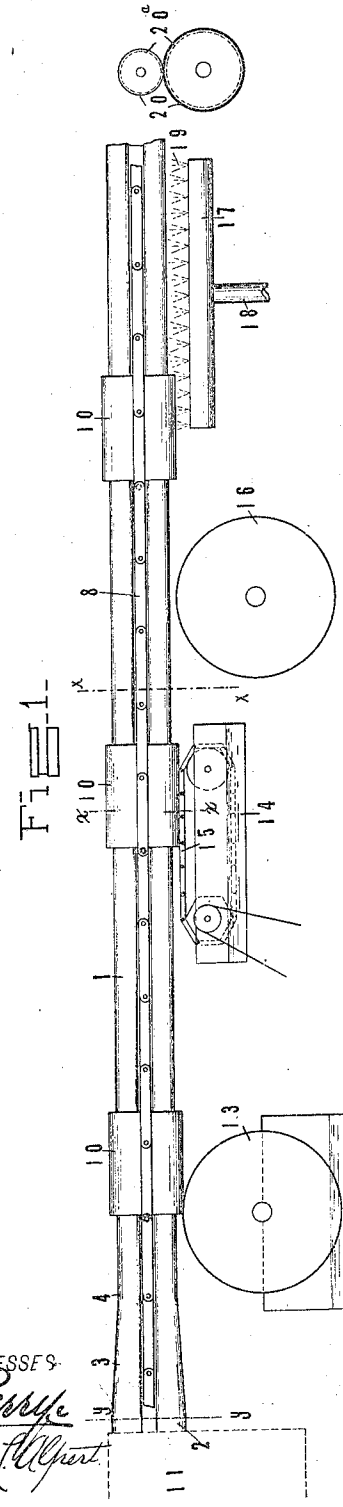

FIG. 1.

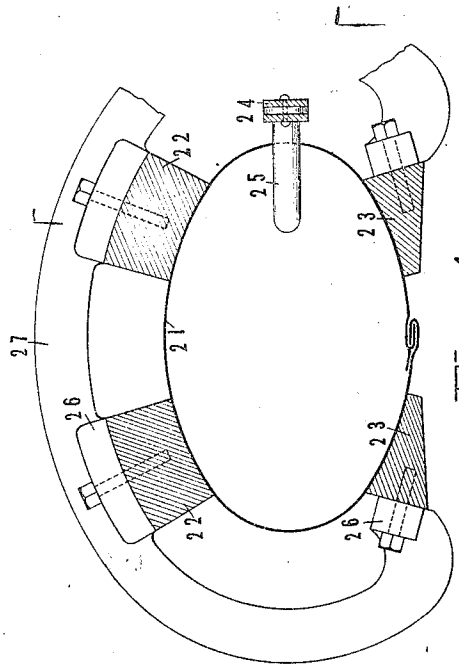

FIG. 4.

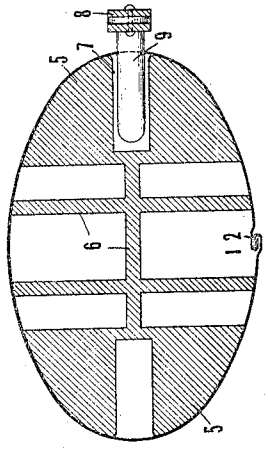

FIG. 2.

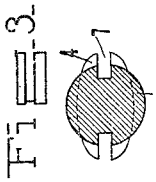

FIG. 3.

WITNESSES:

Norris Perry

Samuel L. Allport

INVENTOR

C. W. Graham

Duell, Warfield & Duell

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES W. GRAHAM, OF ROME, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN CAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

CAN-FORMING APPARATUS.

958,741. Specification of Letters Patent. Patented May 24, 1910.

Application filed January 25, 1908. Serial No. 412,566.

To all whom it may concern:

Be it known that I, CHARLES W. GRAHAM, a citizen of the United States, residing at Rome, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Can-Forming Apparatus, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to can forming apparatus.

One of the objects thereof is to provide simple, practical and efficient means for sealing a can seam.

Another object is to provide means of the above type, peculiarly adapted for use in connection with cans in which the seam is positioned in a normally rounded or convex portion of the can.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, wherein is shown one or more of various possible embodiments of the several features of this invention, Figure 1 is a diagrammatic side elevation of one of the same. Fig. 2 is a sectional view, on an enlarged scale, taken substantially on the line X—X of Fig. 1. Fig. 3 is a sectional view taken on the line of Y—Y of Fig. 1. Fig. 4 is a sectional view of a slightly different form of apparatus.

Similar reference characters refer to similar parts throughout the several views of the drawing.

In order to render more readily and fully understood certain features of this invention, it may here be noted that in a can seam which is positioned in a convex portion of the can there is often a tendency of the same to spring open at the edges, and form an open crevice at this point. Such an opening tends to result in an uneconomical and inefficient use of flux and solder, and in an unsightly seam. The thickness of the seam, moreover, is materially increased, and the tightness of the joint with the can head correspondingly diminished. The above and other defects are remedied, and many positive advantages attained by the use of apparatus of the nature of that hereinafter described.

Referring now to the accompanying drawing, there is shown in Fig. 1 a support or horn 1, which may be of a general circular outer contour at 2, and gradually merge as at 3 into the elliptic form 4. The horn 1 throughout the elliptic portion thereof is preferably formed as indicated in Fig. 2 of the drawing, and comprises the portions 5, having therebetween webs 6, and slotted as at 7 throughout its length. A propelling chain 8, provided with pins 9, adapted to engage the rear edges of the can bodies 10, is mounted adjacent the horn 4, and driven from any desired source of power. This chain, or its equivalent, draws the bodies from the forming apparatus indicated at 11, and as they pass from the circular to the elliptic portion of the horn they are forced into the flattened form shown in Fig. 2. It may here be noted that the term "flattened" is used throughout in a broad sense, to denote any tendency to bring the parts into a plane, irrespective of how far this tendency is carried; or, in other words, it may denote merely a reduction in convexity of the parts to which the term refers. It may also be noted that the term "elliptic" is used in a broad, and perhaps loose, sense, to cover any approximation to elliptic form, irrespective of the precise curve which the parts assume.

As the cans are propelled along the horn 1, their seams 12 are brought first into operative relation to fluxing mechanism 13, which is diagrammatically shown as comprising a roller, journaled in the walls of a vessel or tank containing the flux. The cans, which are suitably spaced along the horn, are then brought into operative relation to the soldering mechanism, which is diagrammatically shown as comprising a tank 14 containing molten solder, and a belt or chain formed of a plurality of pivotally connected blocks 15, the latter part being mounted upon suitable pulleys and driven as indicated. It may here be noted that throughout the following claims the term "solder" is used in a broad sense, to com-

prehend any substance used in sealing a joint, whether it be the adhesive itself or a preparatory agent, as the flux. The cans next pass over and are acted upon by a wiping wheel 16, which removes all surplus solder, and leaves a clean joint. After this device has performed its functions the cans are cooled in their flattened form, either by holding them until they give up their excess heat, or, preferably, by bringing them into operative relation to a positive cooling agent, here shown as a long nozzle 17, supplied by a conduit 18, and adapted to throw a flat jet of cold air 19 against the can seam. They may then pass from the horn between the rollers 20, which are preferably grooved as at 20ª to provide a passage for the seam, and are then in the case of round cans permitted to return to their normal cylindrical form.

The operation of the above described embodiment of my invention is substantially as follows: The cans are drawn from the forming mechanism 11, and forced into the elliptical shape represented, with the seam 12 at the lowermost point. This seam is preferably of the lock-and-lap type shown in my co-pending application, Serial Number 348,532, filed December 19th, 1906, and thus is adapted to resist the tension placed thereon. Fig. 2 includes a section through the lock portion of such a seam. As the seam passes over the successive mechanisms shown it is first thoroughly fluxed, then solder is applied to the joint, next excessive solder is removed and the joint wiped clean, and finally the seam is cooled and the solder hardened. The latter is preferably done in a positive manner, as shown, but it is to be understood that the term "cooling," as used in certain of the claims, is intended to comprehend a mere passive action in this respect in permitting the solder to cool. The body is then released and springs back to its normal form. It is to be understood that certain of the portions of the apparatus herein shown are diagrammatic in nature, and other types of apparatus could be employed which would embody certain features of this invention, although that above described is preferable. For example, there is shown in Fig. 4 of the drawings a can body 21, which is held in an elliptical form by the outer guides 22 and 23, permitting the chain 24 and pin 25 to act as indicated. The guides 22 and 23 are preferably removably mounted upon the ears or lugs 26 of supporting members 27. The action of these parts is substantially identical with that of the first described embodiment, and it will not be necessary to set forth the same in detail.

It will thus be seen that there is provided apparatus in which the objects of this invention are accomplished, and the above described advantages are, among others, present. Single portions of this apparatus, as, for example, the means for holding the can in flattened form while the solder is hardened, are of independent value, irrespective of the remainder of the apparatus; but I have found that the best results appear to be afforded by flattening the can during the operation of two or more of the above mechanisms.

The entire apparatus is simple, cheap, and durable in construction, and its action is efficient, reliable, and economical. The joint is not only thoroughly sealed at all points, with a minimum expenditure of solder, but presents a finished appearance, and the highly desirable thin cross section afforded by the thicknesses of the metal lying smoothly one upon another.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description, or shown in the accompanying drawings, shall be interpreted as illustrative, and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

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

1. In apparatus of the class described, in combination, means adapted to force the portion of a can body in which the seam is positioned into temporarily flattened condition, solder applying means, and means adapted to bring the said solder applying means and said can seam into operative relation one to another with said can in said condition.

2. In apparatus of the class described, in combination, means adapted to apply solder to a can seam, means adapted to hold the can with the portion thereof in which the seam is positioned in temporarily flattened condition, and means adapted to wipe said seam while held in said condition.

3. In apparatus of the class described, in combination, means adapted to apply solder to a can seam, and means adapted to hold the can with the portion in which the seam is positioned in temporarily flattened condition during the cooling thereof.

4. In apparatus of the class described, in combination, means adapted to force the portion of a can body in which the seam is positioned into temporarily flattened condition, solder applying means, wiping means, and means adapted to bring said can

body while in said condition into successive relation to said solder applying means and said wiping means.

5. In apparatus of the class described, in combination, means adapted to force the portion of a can body in which the seam is positioned into temporarily flattened condition, solder applying means, and means adapted to bring said can body and said solder applying means into operative relation one to another and to permit the cooling of said seam with said can in said condition.

6. In apparatus of the class described, in combination, means adapted to apply solder to a can seam, wiping means, and means adapted to hold said can with the portion in which the seam is positioned in temporarily flattened condition, and bring the same in said condition into operative relation to said solder applying and wiping means and hold the same in the said condition during the cooling of the seam.

7. In apparatus of the class described, in combination, means adapted to force the portion of a can body in which the seam is positioned into temporarily flattened condition, solder applying means, cooling means, and means adapted to bring said can body in said condition successively into operative relation to said solder applying means and to said cooling means.

8. In apparatus of the class described, in combination, means adapted to force the portion of a can body in which the seam is positioned into temporarily flattened condition, solder applying means, wiping means, and means adapted to bring said can body in said condition successively into operative relation to said solder applying means and said wiping means and to hold the same in the said condition during the cooling thereof.

9. In apparatus of the class described, in combination, means adapted to force a round can body temporarily into elliptic form with the seam in a portion of reduced convexity, solder applying means, and means adapted to bring said solder applying means and said can into operative relation one to another with said can in said condition.

10. In apparatus of the class described, in combination, means adapted to force a round can body temporarily into elliptic form with the seam in a portion of reduced convexity, solder applying means, and means adapted to bring said can in said condition into operative relation to said solder applying means and hold the same in said condition during the cooling thereof.

11. In apparatus of the class described, in combination, means adapted to force a round can temporarily into elliptic form, with the seam in a position of reduced convexity, solder applying means, wiping means, and means adapted to bring said can in said condition successively into operative relation to said solder applying means and said wiping means, and hold the same in the said condition during the cooling thereof.

12. In apparatus of the class described, in combination, means adapted to hold a normally round can body with the portion in which the seam is positioned in a temporary condition of reduced convexity against its tendency to resume round form, solder applying means, and means adapted to bring said can body in said condition into operative relation to said solder applying means, and hold the same in the said condition during the cooling thereof.

13. In apparatus of the class described, in combination, means adapted to hold a normally round can body with the portion in which the seam is positioned in a temporary condition of reduced convexity against its tendency to resume round condition, solder applying means, wiping means, and means adapted to bring said can body successively into operative relation to said solder applying means and said wiping means, and hold the same in the said condition during the cooling thereof.

14. In apparatus of the class described, in combination, a supporting member having a cross section of substantially elliptical contour, means adapted to force a normally round can body upon said member, solder applying means, wiping means, and means adapted to force said can body along said member successively into operative relation to said solder applying means and said wiping means.

15. In apparatus of the class described, in combination, a supporting member having a cross section of substantially elliptical contour, means adapted to force a normally round can body upon said member, solder applying means, wiping means, and means adapted to force said can body along said member successively into operative relation to said solder applying means and said wiping means and maintain the same upon said member during the cooling thereof.

16. In apparatus of the class described, in combination, a guiding member adapted to hold a can in substantially elliptical form, solder applying means, and a chain provided with a projection adapted to engage said can and propel the same along said guiding member into operative relation to said solder applying means and maintain the same upon said member during the cooling thereof.

17. In apparatus of the class described, in combination, a member having a cross section of substantially elliptical contour and provided with a longitudinal opening, solder applying means, and a chain having a projection adapted to enter said opening in

said member and propel a can body along the same in operative relation to said solder applying means and maintain the same thereon during the cooling thereof.

18. In apparatus of the class described, in combination, a member having a cross section of substantially elliptical contour and provided with a longitudinal recess, solder applying means, wiping means, cooling means, and means provided with a member adapted to enter said recess in said first member and engage the rear surface of a can body thereon and propel the same successively into operative relation to said solder applying means, wiping means, and cooling means.

19. In apparatus of the class described, in combination, a can supporting member having a cross section of substantially elliptical contour, solder applying means, wiping means, both of said last mentioned means being positioned to coact with that portion of said supporting member which has a reduced convexity, and means adapted to move said can along said supporting member successively into operative relation to said solder applying means and said wiping means.

20. In apparatus of the class described, in combination, a can supporting member comprising a portion having a cross section of substantially circular contour and adapted to receive a can thereon, another portion having a cross section of substantially elliptical contour and an intermediate portion, the cross section of which merges from a substantially circular contour to a substantially elliptical contour, and means adapted to move said can successively over said first-mentioned portion and said intermediate portion and said second-mentioned portion, whereby said can will be forced to assume a flattened form.

In testimony whereof I affix my signature, in the presence of two witnesses.

CHARLES W. GRAHAM.

Witnesses:
B. M. ANDERSON,
F. B. BEERS.