Feb. 4, 1969 T. E. JOHNSON 3,425,382

TAPERED, STACKING AND NESTING CAN

Filed Feb. 9, 1967

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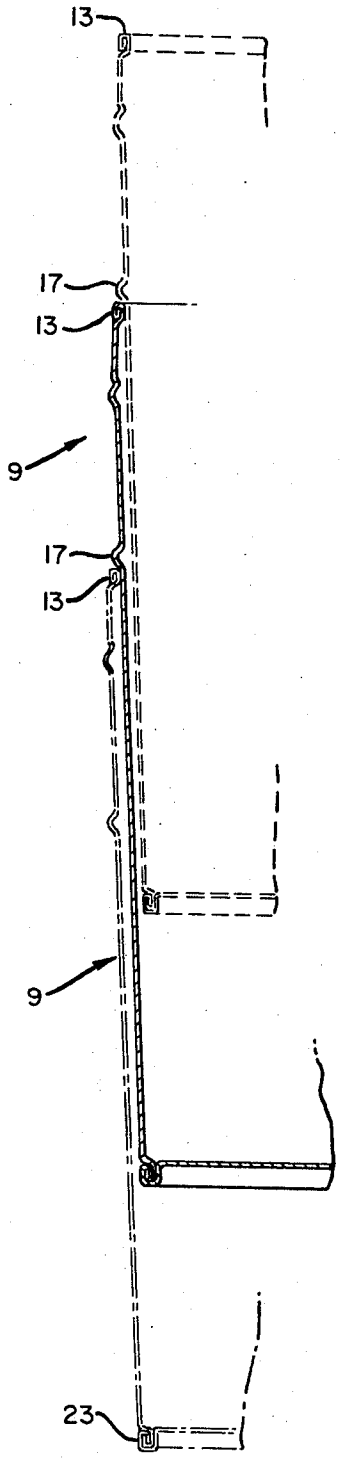


FIG. 2.

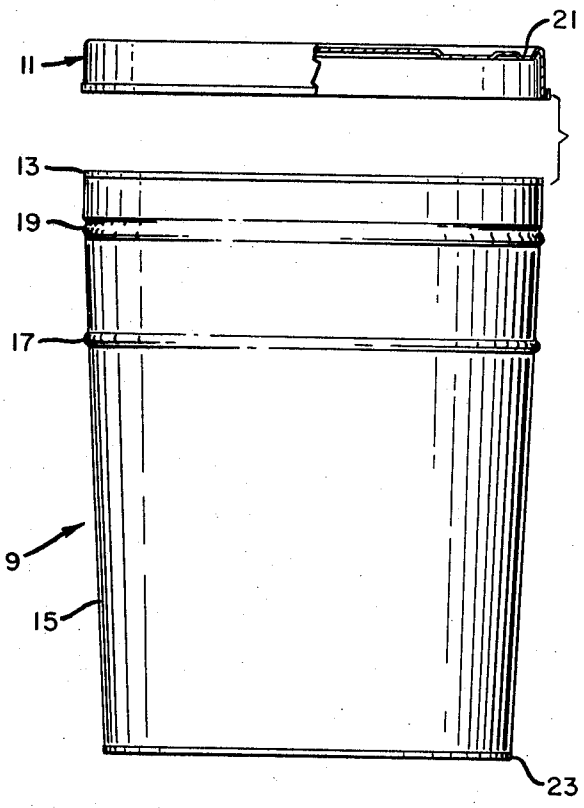


FIG. 1.

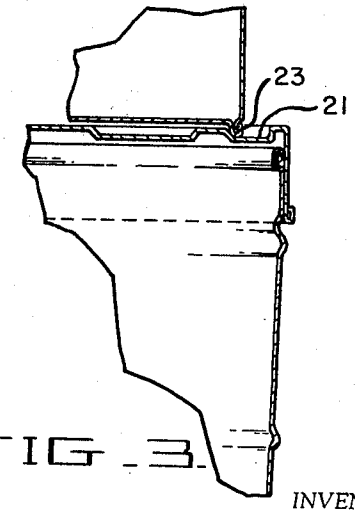


FIG. 3.

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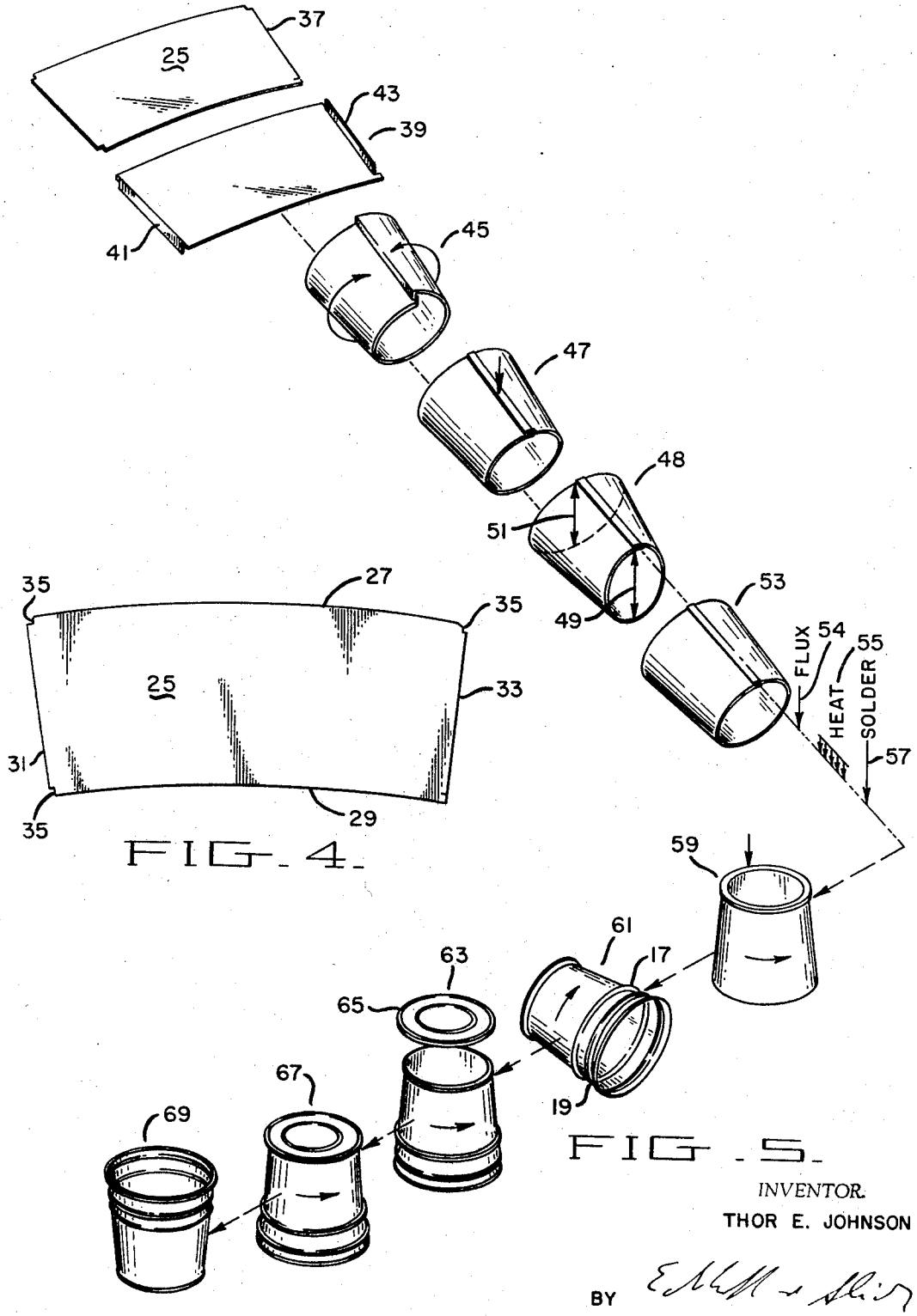


FIG. 4.

FIG. 5.

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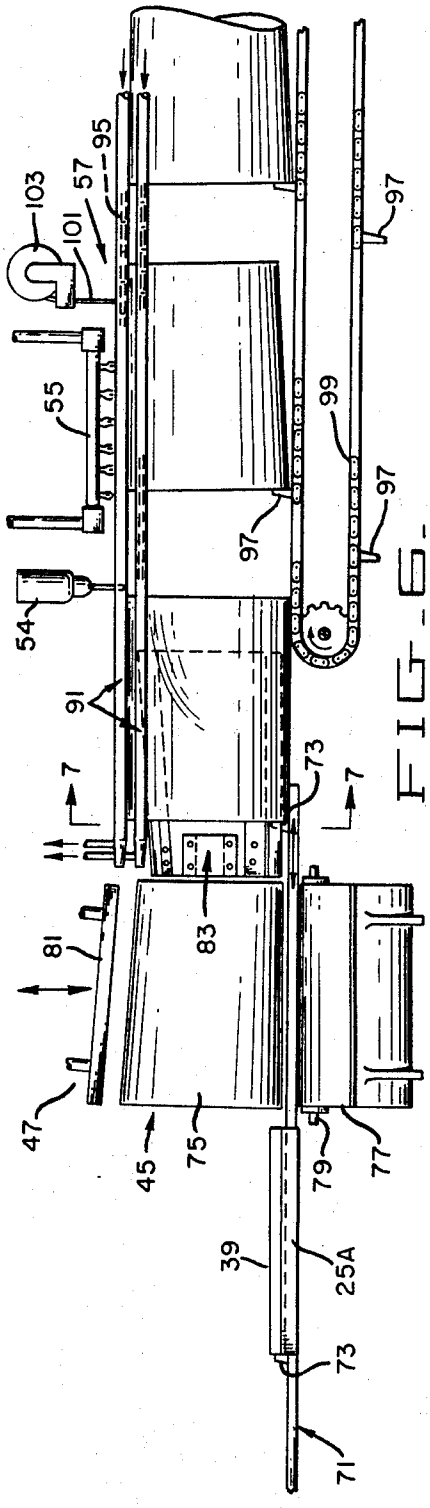


FIG. 6.

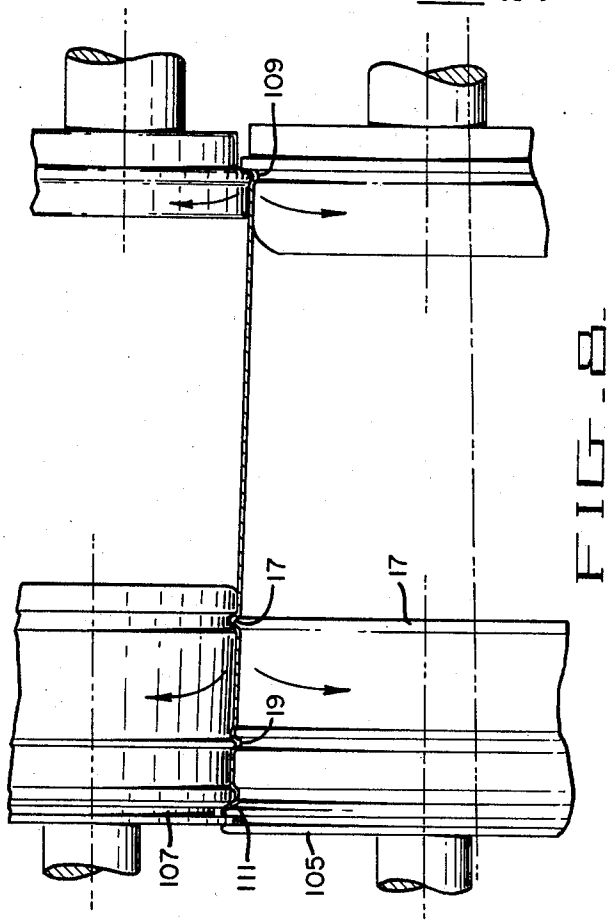


FIG. 8.

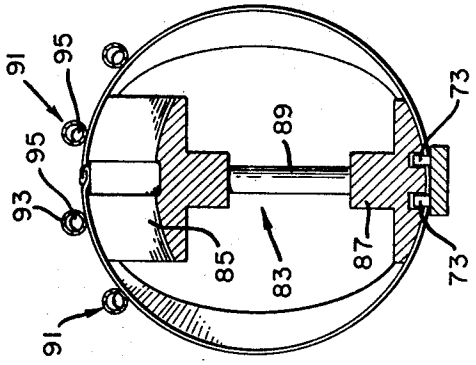


FIG. 7.

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United States Patent Office 3,425,382 Patented Feb. 4, 1969

3,425,382

TAPERED, STACKING AND NESTING CAN

Thor E. Johnson, San Francisco, Calif., assignor to M. J. B. Company, a corporation of Delaware

Filed Feb. 9, 1967, Ser. No. 614,905
U.S. Cl. 113—120 3 Claims
Int. Cl. B21d 51/10

ABSTRACT OF THE DISCLOSURE

A tapered can is provided which will nest without a lid and which can be stacked with a lid on, the lid having an annular groove to receive the bead of the bottom of the next adjacent can. A novel method of making the can is employed wherein the normally round section of the can is deformed into an oval shape to transfer the partially formed can body from a body forming station to a soldering station.

BACKGROUND OF THE INVENTION

Field of the invention

Manufacture of tin plated steel tapered cans having soldered seams.

Description of the prior art

Tapered cans pose special production problems and the present invention provides an easy means of transfering a conical section from one center line to another. Heretofore this has required complicated machinery.

SUMMARY OF THE INVENTION

In making cans, it is necessary to start out with a flat can body and convert this into a cylinder or a conical section. In the case of a conical section, a seam must be formed on one center line yet it is impractical to move the can on this center line for a subsequent soldering operation. In the past, this has required a complicated manipulation but the present invention provides an easy means of transferring the conical can body from one center line to another by deforming one end of the can into an oval or ellipse wherein the larger diameter of the oval is equal to the diameter of the cylindrical, larger end of the can.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a side view of a can embodying the present invention showing the lid detached therefrom.

FIGURE 2 is a section through a plurality of cans showing the method by which the cans nest yet do not wedge because of the beads thereon.

FIGURE 3 is an enlarged sectional view showing the method by which the cans stack when lids are on the cans.

FIGURE 4 is a plan view of a tapered body blank used in forming the can of the present invention.

FIGURE 5 is a diagrammatic view illustrating the sequence of operations of forming the can of the present invention.

FIGURE 6 is a side view of the body-forming operation showing by which the transfer from one center line to another is made.

FIGURE 7 is a large section on line 7—7 of FIGURE 6.

FIGURE 8 is a partial side view showing the method by which the beads are rolled on the can.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The can body and lid of the present invention are shown in FIGURE 1. The can has a body generally

designated **9** and a lid generally designated **11**, the lid snapping over a bead or false wire **13** formed on the top of the can body **9**. It will be observed that the walls **15** of the can body are tapered and that an outwardly formed bead **17** is provided near the top of the can body and a second bead **19** is formed just below the top of the can body.

The lid **11** has an annular indentation **21** therein which corresponds in diameter roughly to the diameter of the bead **23**. The method by which the cans stack is best shown in FIGURE 3 and it will be seen that the bottom bead **23** of one can fits snugly in the annular groove **21** of the next can below it so that the can stack in a very stable fashion.

In FIGURE 2, the nesting is shown and it will be seen that the outturned bead **17** of one can rests on the top bead **13** of the can immediately below it so that the cans nest and occupy a minimal amount of room yet, because of the novel bead arrangement, do not wedge together so that the cans are easy to separate.

In FIGURE 4, there is shown the blank from which the novel can of the present invention is made. The blank comprises a sheet generally designated **25** of a suitable can-making material such as tin-plated steel of 100 lb. weight. The body blank **25** has generally parallel but curved top and the bottom portions **27** and **29** respectively while the sides **31** and **33** are tapered at an angle to each other as is shown. Notches **35** are formed in the can body as is well known to those skilled in the art.

Referring now to FIGURE 5, the sequence of operations will be briefly described. The body blank **25** is inserted into the process at station **37**. The blank is then moved to station **39** whereupon hooks **41** and **43** are formed on the ends of the blank. The blank is then moved to station **45** whereupon the two ends are wrapped together with the hooks **41** and **43** in engagement to form a tapered can body. The blank is then subjected to operation **47** where a hammer moves down, as shown by the arrow, bumping the seam and locking it. At this point, as is later brought out in detail, the formed seam is not parallel to the body of the can-making machine, but is at an angle thereto and in order to solder the seam in a subsequent operation, it is necessary to tilt the can in some fashion so that the seam is parallel to the path of movement. This is shown diagrammatically at station **48**. At station **48**, the smaller end of the can body is deformed into an oval so that the longer diameter of the oval as at **49** is the same as the diameter of the cylinder at the large end **51**. Since dimensions **49** and **51** are the same, the seam is thus automatically brought into parallelism with the direction of movement through the can-making machinery so that when the can arrives at the station **53**, the seam is parallel to the direction of motion.

The thus formed can body then passes to station **54** where the seam is treated with a flux to station **55** where the seam is heated and to station **57** where the seam is soldered. All of these operations are described in detail hereinafter. At station **59** a flange is formed on the bottom of the can while at station **61** the beads **17** and **19** are formed on the can. At station **63** the bottom **65** is placed on the can body and at station **67** the bottom is rolled into place. The can is then inverted at station **69** and is now ready for shipment or filling.

FIGURES 6 and 7 illustrate the novel transport and tilting means for making the can of the present invention. The can is propelled along a production line generally designated **71** and in the early stages of the line, reciprocating fingers **73** are employed to push the can in a start, stop motion from one station to the next as is well known to those skilled in the art. At station **39** the hooks are formed at the edges of the can body as previ-

ously described. At the station generally designated **45**, a mandrel **75** of generally tapered configuration having approximately the shape of the finished can is employed. The body **25** is placed under this mandrel, whereupon the body forming members **77** move upwardly around the hinge **79**, forming the body into a tapered configuration and causing the hooks **41** and **43** to engage. Then the operation designated **47** is conducted which comprises having the hammer **81** descend, bumping the seam and locking the same.

At this point, it is apparent that the newly-formed seam is at an angle to the general path of movement of the can body through the machine and in order to solder and finish the seam, it is necessary that the seam be brought parallel to the path of movement. To accomplish this, the tapered horn **83** is employed, the horn having an upper member **85** and a lower member **87** having curved surfaces thereon and being held in spaced relationship by rod **89**. The maximum diameter of the horn **83** is essentially the same as the larger diameter of the can but the width of the horn is much less. Therefore, as the fingers **73** engage the end of the can body and push it over the horn **83**, the smaller end of the can is distorted from its previous circular configuration to an oval configuration wherein the larger diameter **49** of the oval is substantially the same as the diameter **51** of the circle formed by the large end of the can. In this manner, the seam is brought into parallelism with the path of movement of the can through the machine. As the can passes over the horn **83**, it comes into engagement with and is held by the magnetic guides or rails generally designated **91**. The magnetic rails **91** are comprised of stainless steel tubes **93** having small bar magnets **95** therein, the magnets being substantially smaller than the inner diameter of the tubes so that water can be circulated through the tubes **91** to keep them cool, the direction of water circulation being generally shown by arrows in FIGURE 6. Up to this point, the can bodies have been given a stop-start motion by means of the reciprocating fingers **73** but for the subsequent operations it is necessary that the can bodies move at a constant rate of speed through the machine for the soldering and associated operations rather than having the stop-start motion. Therefore, at this point, the can bodies are engaged by the fingers **97** carried at suitable intervals on the endless chain **99**. Chain **99** is driven by means well known by those skilled in the art, not illustrated. At this point, the can body which has now had the seam hammered down and which is supported on the magnetic rails **91** and propelled by the fingers **97** passes under the flux station **54** where a flux is added to the seam thence to the heating station **55** where the seam

is heated to the customary soldering temperature and then to the soldering station **57** where solder **101** is applied from roll **103**. If necessary, the freshly soldered seam can be brushed for a neat appearance but this operation is not shown since it is conventional in the art.

At this point, the can body is essentially formed and at the next station, **59**, a flange is formed on the bottom. Then the can body passes station **61** wherein the can body is supported on a mandrel **105** and brought into contact with roll **107** thereby forming the beads **17** and **19** as well as further forming the bottom flange **109**, and flanging the top as at **111** preparatory to forming a bead thereon. Bottom **65** is then put in place and then crimped. The bead **11** is then formed from the flange **111** at the station **67** and the can body is now complete.

It is believed apparent from the foregoing that a novel transfer means has been employed for making a tapered can.

I claim:

1. The method of making a tapered can body comprising:

(a) forming a tapered body blank having curved, parallel top and bottom edges and side edges tapering relative to each other;

(b) moving said body blank through a can forming machine;

(c) forming said tapered blank into the form of a truncated cone having a seam, said seam being at an angle to the path of travel;

(d) distorting the small end of the cone into an ellipse, said ellipse having a major axis equal to the axis of the large end of the cone, whereby

(e) said seam is brought into parallelism with the path of movement of the can body through the machine.

2. The method of claim **1** wherein the small end of the cone is the leading end and a horn distorts the small end into an ellipse as the can body is moved over a horn.

3. The method of claim **2** wherein the can body is grasped by magnetic rails as the seam is brought into parallelism with the path of movement.

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