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3,056,244

BEADED CAN METHOD OF VACUUM PACKAGING

Filed July 28, 1959

2 Sheets-Sheet 1

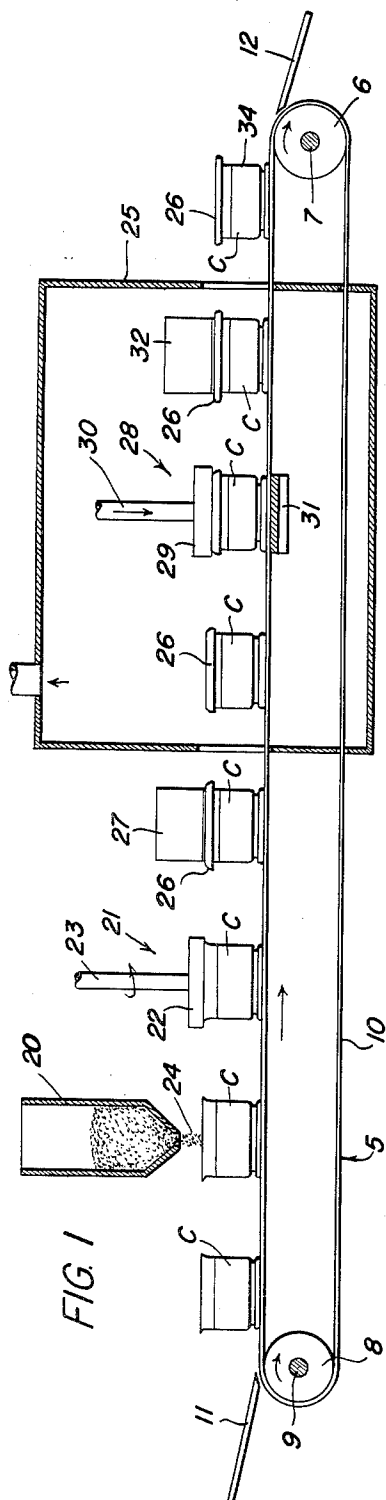


FIG. 5

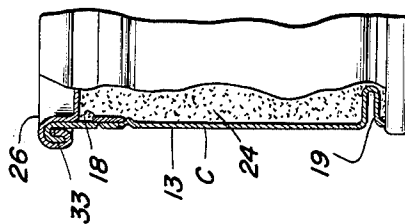


FIG. 4

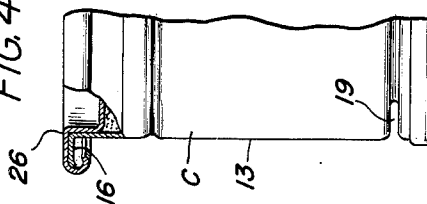


FIG. 3

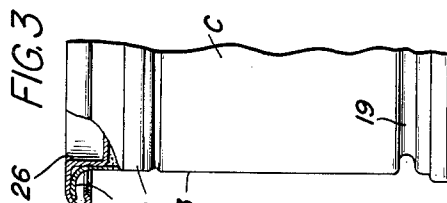
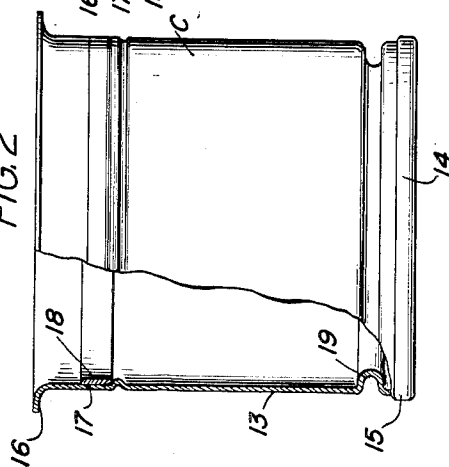


FIG. 2



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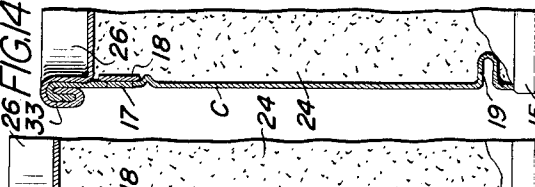
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BEADED CAN METHOD OF VACUUM PACKAGING

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2 Sheets-Sheet 2



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1

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BEADED CAN METHOD OF VACUUM PACKAGING

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15 Claims. (Cl. 53—24)

This invention relates generally to the art of packaging, and primarily seeks to provide a novel method of packaging products, particularly granular products, such as coffee.

At the present time, many granular products, including coffee, are packaged in sealed cans both by a vacuum process and a pressure process, with the vacuum process being the more conventional. Although the vacuum process is the more conventional of the present packaging processes, it has several inherent disadvantages. From a cost standpoint, one of the primary disadvantages of the vacuum packaging process is that in order to prevent collapsing of the can body due to atmospheric pressure on the exterior of the can, it is necessary to form the can of a heavier gauge metal, with the resultant undesired added expense.

In accordance with the invention, it is proposed to provide a novel package wherein a granular fill is packaged in a container, with the granular fill being forced into engagement with the ends and body of the container, and at the same time, being vacuum packed to remove air from the container, thus retaining the fill in the desired fresh state.

Accordingly, it is another object of the invention to provide a novel package which includes a container having a body and ends, a fill disposed within the container and being compressively engaged by the ends thereof, and the interior of the container being subjected to a sub-atmospheric pressure, whereby the fill aids in supporting the container in a vacuum packaging arrangement.

Still another object of the invention is to provide a novel package which includes a can having a fill which is granular in nature, the can including a can body provided with an annular bead, the fill being initially subjected to a sub-atmospheric pressure, after which it is compressively engaged by the ends of the can due to the foreshortening of the can under mechanical pressure exerted thereon to flatten or otherwise deform the bead, after which the can is sealed so that although the fill is compressed by the can ends and thus serves as a reinforcement for the can, the fill is vacuum packed within the can.

A further object of the invention is to provide a novel method of packaging products in a can wherein the product is placed in a can, after which a can end is loosely placed thereon, the can and fill then being placed in a sub-atmospheric chamber, after which the over-all height of the can body is reduced to urge the can ends into compressive engagement with the fill, and the can being finally sealed while remaining under sub-atmospheric pressure to effect a vacuum packaging of the fill within the can although the fill is compressed by engagement thereof with the can ends.

A still further object of the invention is to provide a novel method of packaging a granular fill within a can, wherein the fill, while disposed in the can, is simultaneously subjected to compressive forces and to a sub-atmospheric pressure, whereby the fill may be compressed within a can so as to aid in the supporting of the body of the can, and at the same time, the fill is vacuum packed within the can.

Another object of the invention is to provide a novel method of packaging a granular fill within a can wherein a commercially available can seamer is utilized both for

2

the purpose of seaming the can cover to the can body and for compressively engaging the ends of the can to foreshorten the can body.

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

In the drawing:

FIGURE 1 is a diagrammatic view showing sequentially the steps involved in a method of packaging a product.

FIGURES 2, 3, 4 and 5 are enlarged fragmentary views, with parts broken away and shown in section, of a can as it appears during the various stages of the filling and closing operations.

FIGURE 6 is another diagrammatic view showing sequentially the steps involved in a second method of packaging a product.

FIGURE 7 is an enlarged fragmentary schematic sectional view taken along the line 7—7 of FIGURE 6, and shows generally the details of the can cover seaming mechanism.

FIGURE 8 is an enlarged fragmentary vertical sectional view taken along the line 8—8 of FIGURE 7, and schematically shows the seaming mechanism at one station of the can seamer.

FIGURES 9, 10 and 11 are enlarged fragmentary elevational views, with parts broken away and shown in section, of a can as it appears during the closing operations.

FIGURES 12, 13 and 14 are enlarged fragmentary elevational views, with parts broken away and shown in section, of a can as it appears during a modified sequence of closing operations.

In one example embodiment of the apparatus for carrying forth the invention, an endless belt type conveyor, generally referred to by the numeral 5, is utilized for moving cans C throughout the can filling and sealing process. The endless belt conveyor 5 includes a drive roll 6 supported by a drive shaft 7, and an idler roll 8 supported by an idler shaft 9, the idler roll 8 being spaced from the drive roll 6. An endless conveyor belt 10 is entrained over the drive roll 6 and the idler roll 8.

Empty cans C are delivered to the left end of the endless belt conveyor 5 along a downwardly sloping chute 11 which generally overlies the left end of the endless belt conveyor 5. The filled and sealed cans exit from the conveyor 5 along a discharge chute 12 which slopes downwardly and away from the right end of the conveyor 5, as viewed in FIGURE 1.

Reference is now had to FIGURE 2, wherein the details of the can C are illustrated. The can C includes a can body 13, the lower end of which is closed by a can end or bottom 14 which is connected to the lower end of the can body 13 by a double seam 15. The upper end of the can body 13 is provided with an outwardly directed flange 16 for the reception of a can end which will form the closure for the can C.

The upper portion of the can C is provided with a tear strip 17 to facilitate the opening thereof. The can body 13 is provided with an internal collar 18 immediately rearwardly of the tear strip 17 to both form a new upper end on the can body 13 when the can C is opened, and to facilitate the closing of the open can C, by being telescoped within the upper can end thereof. The can body 13 is also provided intermediate the ends thereof with a bead 19, the bead preferably projecting inwardly, as is shown in FIGURE 2. The bead 19 is initially rounded, as is shown in FIGURE 2, and is subject to deformation to facilitate the foreshortening of the can body 13 in accordance with the invention.

3

Reference is again had to FIGURE 1, wherein it is shown that the apparatus for filling the can C includes a fill dispenser 20 disposed adjacent to the left end of the conveyor 5. Immediately to the right of the fill dispenser 20 is a fill levelling device, generally referred to by the numeral 21. The fill levelling device 21 includes a blade 22 which is supported by a vertical shaft 23, the shaft 23 being mounted for rotation so as to rotate the blade 22 across the top of the can body of the can C and thus level the fill 24 disposed therein.

After the fill 24 has been placed in the can C and the fill 24 levelled, a can end 26 is placed on the upper end of the can body 13 and is loosely connected thereto. The connection between the can end and the can body 13 is best illustrated in FIGURE 3, and is shown as having the seam between the can end 26 and the can body 13 partially formed. It is pointed out at this time that the can end 26 may be loosely secured to the can body 13 in any desired manner. A mechanism for accomplishing the placing and connecting of the can end 26 with respect to the can body 13 is referred to by the numeral 27 and is shown in block form in FIGURE 1.

A vacuum chamber 25 is disposed to the right of the mechanism 27. The cans C, together with the fill 24 thereof, pass into the vacuum chamber 25 and a large portion of the air disposed within the cans C will be removed therefrom due to the sub-atmospheric pressure within the vacuum chamber 25. The air remaining in the cans C will, of course, be at the sub-atmospheric pressure.

The fill 24 having been purged of a large portion of the air carried thereby, is then compressed by the deformation of the can C. This is accomplished by placing an endwise compressive pressure on the can end 26 by a ram, generally referred to by the numeral 28. The ram 28 includes an enlarged head 29 which fits on the can end 26, the head 29 being carried by a vertically reciprocable rod 30. A back-up plate 31 is disposed beneath the upper run of the conveyor belt 10 in alignment with the ram 28 to support the can C during the foreshortening thereof.

The ram 28 applies an endwise compressive force on the can body 13. Since the bead 19 is the weakest portion of the can body 13, the bead 19 will be deformed and may assume a shape, such as that illustrated in FIGURE 4. It is to be understood that the foreshortening of the can body 13 will be a limited one, and each can body 13 will be foreshortened approximately the same amount so that the completed cans C are of a uniform height. This is particularly required to facilitate the stacking of the cans.

It is to be understood that when the can body 13 is foreshortened by the compressive force on the can ends, the can ends 14 and 26 compressively engage the fill 24, which fill initially completely fills the can body 13. The compressive endwise engagement of the fill 24 results in the fill, which is preferably of a granular nature, moving outwardly into compressive engagement with the can body 13 and thus aids in the supporting of the can body 13 against collapse. At the same time, the sub-atmospheric pressure within the fill and the can C is maintained.

The can C, having been foreshortened, is then moved beneath a can closing machine 32 which is illustrated in block form. The can closing machine 32 forms a double seam 33 between the can end 26 and the can body 13 to thus seal the can C and the fill 24 disposed therein.

The can C, having been closed by the can closing machine 32, then passes out of the vacuum chamber 28 in the form of a completed package 34 ready for shipment. This completed package 34 is best illustrated in FIGURE 5. Due to the endwise compression and foreshortening action of the ram 28, the fill 24 will have been compressed and thus will be in pressure engagement with the can body 13 and the can ends 14 and 26. On the other hand, the voids within the fill 24, having

4

been reduced through a sub-atmospheric pressure, remain at this pressure, with the result that the fill 24 is actually vacuum packed although it is in compressive engagement with the interior surfaces of the can C. At this time, it is also pointed out that the fill 24, which has been compacted, substantially supports the can body 13 against collapse due to the differential in pressures between the exterior of the can C and the interior thereof.

Reference is now had to FIGURE 6, wherein a modified form of apparatus for carrying forth the invention is illustrated, the apparatus being generally referred to by the numeral 35. The apparatus includes an endless conveyor 36 to which empty cans C are delivered at the left end thereof along a downwardly sloping chute 37. The final package 34 is delivered from the endless conveyor 36 to a downwardly sloping discharge chute 38 which is disposed at the right end of the endless conveyor 36.

As in the embodiment of FIGURE 1, the empty can C first passes beneath a fill dispenser 39 where the desired fill 24 is placed therein. The filled can then passes beneath a fill leveling device, generally referred to by the numeral 40, which includes a rotating shaft 41 having a fill leveling blade 42 at the lower end thereof.

After the fill 24 has been placed in the can C and leveled, a can end 26 is placed on the upper end of the can body 13 and is loosely connected thereto in the manner illustrated in FIGURE 3. A mechanism for accomplishing the positioning of the can end 26 and the clinching thereof to the can body 13, when desired, is referred to by the numeral 43 and is shown in block form.

The partially closed can C then passes into a vacuum can closing machine, generally referred to by the numeral 44. The can closing machine 44 may be one of several commercially available types, of which the patent to Troyer, Patent No. 1,983,252, issued December 4, 1934, is an example. The completed package 34, as illustrated in FIGURE 5, exits from the can closing machine 44 and is discharged by the conveyor 36 down the discharge chute 38.

Reference is now had to FIGURE 7, wherein the can closing machine 44 is schematically illustrated as including a vacuum chamber defined by a housing 45 in which a turret 46 rotates. The turret 46 is provided with a plurality of pads 47 which are mounted on the turret 46 for both rotary and vertical movement relative to the turret 46. It is to be noted that the turret 46 is offset from the endless conveyor 36, with only a peripheral portion of the turret 46 underlying the upper run of the endless conveyor 36. The endless conveyor 36 has associated therewith a first can guide 48 which will engage the can C and urge it onto one of the pads 47, the can guide 48 having associated therewith a can supporting plate 49 for supporting the can C in its passage from the conveyor belt 36 onto one of the pads 47.

A second can guide 50 is also associated with the endless conveyor 36 for removing cans from the pads 47 and returning them to the endless conveyor 36. The can guide 50 has associated therewith a plate 51 for initially receiving the cans C from the pads 47 and guiding them onto the upper run of the endless conveyor belt 36.

Reference is now had to FIGURE 8, wherein a typical seaming mechanism is illustrated. An individual pad or base plate 47 is supported by a vertical shaft 52 which is freely journaled in the turret 46 for both vertical and rotary movement. At the station illustrated, there is mounted a seaming head, generally referred to by the numeral 53. The seaming head 53 is supported from a frame member 54 by a shaft 55 for rotation. The seaming head 53 includes a chuck 56 and a pair of seaming rolls 57. Aligned with the seaming head 53 and underlying the turret 46 is a cam 58 which is mounted on a shaft 59 for rotation therewith.

When the can C with the can cover 26 positioned

thereon is received at the station illustrated in FIGURE 8, the base plate or pad 47 is elevated by the engagement of the shaft 52 by the cam 58. The seaming chuck 56 is received in the recess in the can cover 26 and bears against the upstanding chuck wall thereof. The seaming rolls 57 are then moved inwardly against the peripheral portion of the flange of the can cover 26 to perform the seaming operation as the seaming head 53 rotates. After the seaming operation has been completed, the can C and the base plate 47 will be lowered by the rotation of the cam 58.

As is best shown in FIGURES 9, 10 and 11, in a first method of utilizing the can closing mechanism 44, the can C undergoes a first seaming operation wherein the seam 33 is partially formed. This occurs at station A in FIGURE 7. The can C is then rotated to station B in FIGURE 7, wherein the base plate 47 is moved upwardly relative to the seaming chuck 56 a distance sufficient to result in the endwise compressive engagement of the ends of the can C and the resultant foreshortening of the can body 13 by the deformation of the bead 19. After this has been accomplished, the seaming head 53 will be rotated to bring about the final seaming of the can cover 26 to the can body 13.

At this time, it is pointed out that the cam, which corresponds to the cam 58, will be of a different configuration at station B than the cam 58 for the mechanism of station A. Secondly, it is pointed out that the seaming rolls 57 at station B will be of a slightly different design for the final seaming operation than the seaming rolls 57.

Reference is now had to FIGURES 12, 13 and 14, wherein the results of a modified can closing operation are illustrated. It is to be noted that FIGURE 12 corresponds to FIGURE 9, the can undergoing a first seaming operation. The can then undergoes a second seaming operation wherein the seam 33 between the can cover 26 and the can body 13 is completed. Then, the base plate 47 is moved upwardly with respect to the seaming chuck 56 so as to compressively engage in an endwise direction the ends of the can C and thus deform the bead 19 to foreshorten the can body 13. It is to be understood that in order to accomplish this, the design of the cam, which corresponds to the cam 58, will have to be changed for this particular operation. It is also to be understood that the second seaming operation and the foreshortening of the can body 13 will be accomplished at one station, such as the station B in FIGURE 7.

Although only a single bead 19 has been illustrated and described, it is to be understood that the number and height of the can beads will vary in accordance with the amount of foreshortening desired.

From the foregoing, it will be seen that novel and advantageous provision has been made for carrying out the desired end. However, attention is again directed to the fact that variations may be made in the example method and apparatus disclosed herein without departing from the spirit and scope of the invention, as defined in the appended claims.

I claim:

1. A method of packaging a fill in a container having a body and a pair of ends comprising the steps of providing an empty container, filling the container with the desired fill, placing the filled container under a subatmospheric pressure to reduce the quantity of air and gas within the container, mechanically applying an endwise pressure on the container in excess of atmospheric pressure to partially collapse the container and compressively engage the fill with the container ends, and then sealing the container.

2. A method of packaging a fill in a container having a body and a pair of ends comprising the steps of providing an empty container, filling the container with the desired fill, placing the filled container under a subatmospheric pressure to reduce the quantity of air and gas within the container while under sub-atmospheric pres-

sure, mechanically applying an endwise pressure on the container in excess of atmospheric pressure to partially collapse the container and compressively engage the fill with the container ends, and then sealing the container.

3. A method of packaging a fill in a container having a body and a pair of ends comprising the steps of providing an empty container, filling the container with the desired fill, placing the filled container under a sub-atmospheric pressure to reduce the quantity of air and gas within the container, mechanically applying an endwise pressure on the container in excess of atmospheric pressure to partially collapse the container and compressively engage the fill with the container ends, and then sealing the container while the container remains under sub-atmospheric pressure.

4. A method of packaging a fill in a can comprising the steps of providing an empty can having a body and one end, placing the fill within the can body, loosely connecting a second can end on the can body, subjecting the can and fill to sub-atmospheric pressure to reduce the quantity of air and gas within the can, mechanically applying an endwise pressure on the can in excess of atmospheric pressure to foreshorten the can body and move the can ends into compressive engagement with the fill, and then sealing the second can end to the can body.

5. A method of packaging a fill in a can comprising the steps of providing an empty can having a body and one end, placing the fill within the can body, loosely connecting a second can end on the can body, subjecting the can and fill to sub-atmospheric pressure to reduce the quantity of air and gas within the can, mechanically applying an endwise pressure on the can in excess of atmospheric pressure to foreshorten the can body and move the can ends into compressive engagement with the fill, and then sealing the second can end to the can body while the can remains under sub-atmospheric pressure.

6. A method of packaging a fill in a can comprising the steps of providing an empty can having a body and one end, placing the fill within the can body, loosely connecting a second can end on the can body, subjecting the can and fill to a sub-atmospheric pressure to reduce the quantity of air and gas within the can while under sub-atmospheric pressure, mechanically applying an endwise pressure on the can in excess of atmospheric pressure to foreshorten the can body and move the can ends into compressive engagement with the fill, and then sealing the second can end to the can body.

7. A method of packaging a fill in a can comprising the steps of providing a can having a body with at least one peripheral bead and one end, placing the fill in the can body, loosely connecting a second can end on the can body, subjecting the can and the fill to sub-atmospheric pressure, mechanically applying an endwise pressure on the can to foreshorten the can to a predetermined height by distorting the bead and to move the can ends into compressive engagement with the fill, and then sealing the second can end to the can body.

8. A method of packaging a fill in a can comprising the steps of providing a can having a body with at least one peripheral bead and one end, placing the fill in the can body, loosely connecting a second can end on the can body, subjecting the can and the fill to sub-atmospheric pressure, while under sub-atmospheric pressure mechanically applying an endwise pressure on the can to foreshorten the can to a predetermined height by distorting the bead and to move the can ends into compressive engagement with the fill, and then sealing the second can end to the can body.

9. A method of packaging a fill in a can comprising the steps of providing a can having a body with at least one peripheral bead and one end, placing the fill in the can body, loosely connecting a second can end on the can body, subjecting the can and the fill to a sub-atmospheric pressure, mechanically applying an endwise pressure on the can to foreshorten the can to a predetermined height

7

by distorting the bead and to move the can ends into compressive engagement with the fill, and then sealing the second can end to the can body while the can remains under sub-atmospheric pressure.

10. A method of compacting a fill within a can and sealing the can comprising the steps of providing a can with a fill therein, placing a cover in overlying relation on the can, placing the can in a can seamer, and while the can and the fill are in the can seamer operating the can seamer to both seam the cover on the can and place an endwise pressure on the can to foreshorten the can and compress the fill therein.

11. A method of compacting a fill within a can and sealing the can comprising the steps of providing a can with a fill therein, placing a cover in overlying relation on the can, placing the can in a can seamer of the type including a base plate and a seaming chuck which are mounted for relative movement, compressively engaging the can between the base plate and seaming chuck to foreshorten the can and compress the fill therein, and operating the can seamer to finally seam the can cover to the can.

12. A method of compacting a fill within a can and sealing the can comprising the steps of providing a can with a fill therein, placing a cover in overlying relation on the can, placing the can in a can seamer of the vacuum type, and while the can and the fill are in the can seamer and subjected to sub-atmospheric pressure operating the can seamer to both seam the cover on the can and place an endwise pressure on the can to foreshorten the can and compress the fill therein.

13. A method of packaging a fill in a can comprising the steps of providing an empty can having a body and

8

one end, placing the fill in the can, placing a second can end on the can, partially securing the second can end to the can body in a first seaming operation, mechanically applying an endwise pressure on the can in excess of atmospheric pressure to partially collapse the can body and compressively engage the fill with the can ends, and then finally securing the second can end to the can body in a second seaming operation.

14. The method of claim 13 wherein at least the collapsing of the can body and the second seaming operation are carried out under sub-atmospheric conditions.

15. A method of compacting a fill within a can and sealing the can comprising the steps of providing a can with a fill therein, placing a cover in overlying relation on the can, placing the can in a can seamer of the type including a base plate and a seaming chuck which are mounted for relative movement, operating the can seamer to seam the can cover to the can, and compressively engaging the can between the base plate and seaming chuck to foreshorten the can and compress the fill therein.

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