Jan. 15, 1935. W. E. BURNS 1,987,817

CAN

Filed March 31, 1931

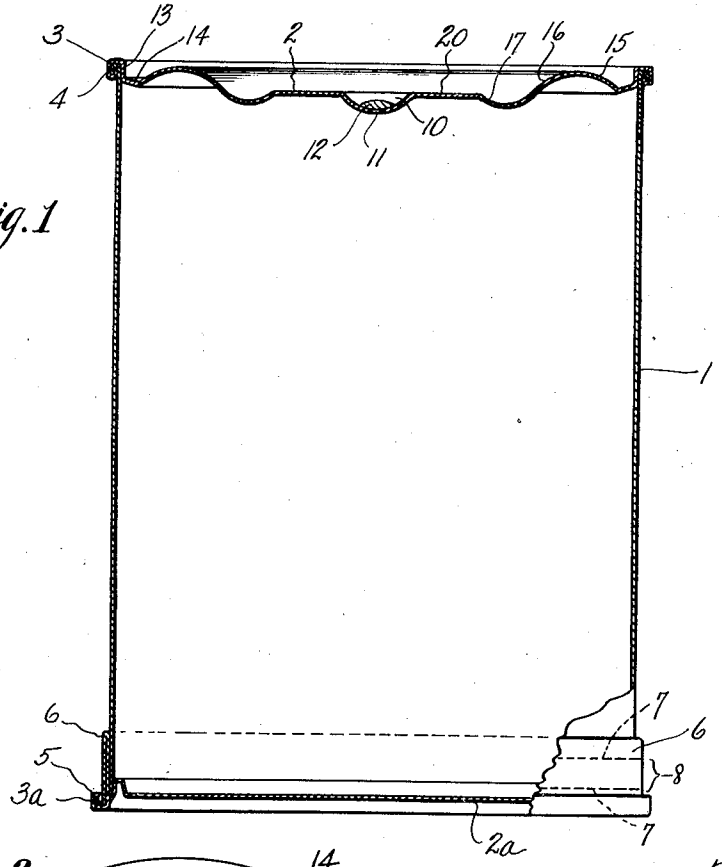


Fig. 1

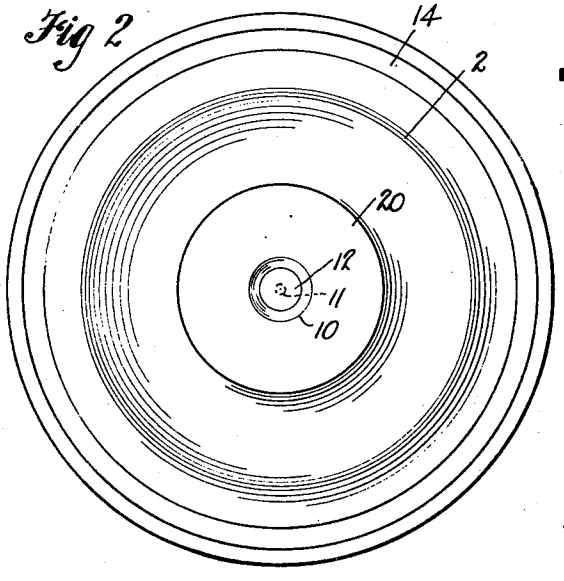


Fig 2

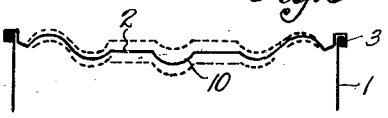


Fig. 3

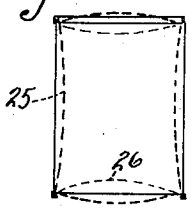


Fig. 4

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4 Claims. (Cl. 220—66)

This invention relates to cans, and more particularly to improvements in hermetically sealed cans of that character now in general use for the packing of food products, the invention applying in particular to cans of the larger sizes, as used for vacuum packed coffee, although not confined in use to large cans or to the packing of any special product, or to packing in vacuum.

It is the principal object of the invention to provide certain improvemets in can construction whereby the bulging, warping, collapsing or other deformation of cans resultant to their being sealed in vacuum, or because of differences in inside and outside pressures occurring after the cans are sealed, is overcome.

Explanatory to the invention, it will be here stated that present-day methods in the vacuum packing of food products require, or make it most desirable to seal the product in vacuum, and it is not unusual that as much as a twenty-eight-inch vacuum be drawn. This consequently subjects the sealed container to considerable outside pressure, which is sufficient, frequently, to cause the can to be partially collapsed, or deformed; that is, the side walls and the ends will be bent inwardly. Then, in the packing of some products, for example, coffee, gas will form within the can after it is sealed, and the internal pressure thereby created will cause the can walls to be bulged outward, sometimes to an extent sufficient that the cans cannot be stacked.

This warping, bulging, deforming of the cans is very undesirable, since it is detrimental not only to the appearance of the can by materially affecting its sale, but also causes trouble in packing the cans and especially in stacking them for display or storage.

In view of the above, it has been the principal object of this invention to provide a can having an end of novel form so constructed as to permit of a diaphragmatic action inwardly and outwardly to thus automatically compensate for changes of pressure or differences between internal and external pressures to thereby sufficiently relieve the opposite end and body walls of strain that they will not be warped either inwardly or outwardly.

It is also an object of the invention to provide a can end wall construction of a flexible character which may move inwardly or outwardly as a diaphragm to an appreciable extent, but which is inset to sufficient extent that it will not at any time project beyond the end of the body to cause trouble in stacking.

Other objects reside in the details of formation of the can end as will hereinafter be described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the acompanying drawing, wherein—

Fig. 1 is a sectional view of a can equipped with an end wall formed in accordance with details of the present invention.

Fig. 2 is a plan view of the can end.

Fig. 3 is a sectional view showing, in dotted lines, the end in different positions to which it may be flexed by pressure inside or outside of the can.

Fig. 4 is a sectional detail showing, for purposes of comparison, the usual form of can and its end construction.

Referring more in detail to the drawing—

1 designates a can body of cylindrical form, closed at one end by the novel end wall 2 that is double seamed, as at 3, to the body flange 4. At its other end the can is closed by an end wall 2*a*, which in this particular type of can is double seamed as at 3*a* to the flange 5 of a collar 6 that is integral with and formed about that end of the body by first being folded downwardly against the body wall and then upwardly, and then provided with the rim flange 5 for double seaming to the end 2*a*. The folds of the collar 6 are pressed tightly together and against the can body wall, and the outer fold is formed with parallel score lines 7—7 setting off a tearing strip 8 that is removable by means of a key in the usual manner, to thereby release the end, or closure, for removal from the can.

In this type of can, it is the usual practice to attach the end 2*a* first, then to fill the can body, while inverted, through the open end and then to apply the end 2. As shown in Fig. 1, the can is in what would be its inverted position. The end wall, 2 in which the novelty of the present invention resides, is provided with a central depression 10 in which there is a small port or perforation 11 through which vacuum is drawn in the can and over which a drop of molten solder 12 is then placed to seal the opening, or perforation, after the vacuum has been drawn. However, it is to be understood that this invention is not to be limited to cans having the externally formed collar nor is it to be limited to cans that are vacuumized in this particular manner, but that it shall apply likewise to cans of the usual forms and which may be sealed in vacuum during the double seaming process or otherwise, or which are closed in normal atmospheric conditions.

The features of this particular invention reside in the specific details of formation of the can end 2, which permit it to flex inwardly or outwardly as a diaphragm in accordance with the variation of internal or external pressure incident to vacuumizing or to creation of gas within the sealed can, and thereby overcomes the warping, bulging or deforming of the can ends

and side walls incident to unequal internal and external pressures. The can end, as here illustrated, is a circular, metallic disc formed with the usual peripheral flange that is interlocked in the double seaming operation with the end flange 4 of the can body. The can end is also provided with the usual countersink 13 adjacent the seam for receiving the chuck which holds the cover in place and counteracts the pressure of the seaming rolls during the double seaming operation. From the countersink there is a narrow and slightly downwardly inclined annular portion 14, merging into a reversely curved, intermediate position that is bent upwardly, as at 15, then downwardly, as at 16, and again upwardly, as at 17, and which merges into a flat central portion 20 of the end. Looking at the end in cross sections, as shown in Fig. 1, this intermediate portion is in the form of a reverse bend, the outer part of which extends above the plane of the central portion of the end, and the inner portion which extends below it, but which does not extend above the plane of the end flange or seam of the can end, even when flexed outwardly to its limit. This is by reason of the countersink and special formation which places it substantially below the plane of the end seam.

In a construction which has been found by a experiment to be the most satisfactory, the diameter of the central portion 20 of the can is substantially one-third that of the cover, and the reverse bend is of substantial fulness so as to permit the required flexure for all conditions.

It is desired also that the tin plate that is used in forming this end be slightly thinner or more flexible than that of the body, so that it will flex sufficiently that other parts of the can will be relieved.

It is apparent that after the can is closed and vacuumized, there will be a consequent external pressure which will in some instances warp the walls of the body inwardly. In the ordinary types of cans this external pressure operates to draw the side walls of the can body inwardly, as designated by dotted lines at 25 in Fig. 4, and it also draws the ends inwardly, as to the dotted line position 26. Heretofore attempts have been made to strengthen the body walls against such collapsing by the provision of beads about the body, but the effect of beads has not been sufficient, and they are objected to also as they interfere with formation of the cylindrical body. Furthermore, it will be understood that the ordinary end becomes very taut under any pressure inwardly or outwardly, and if bulged or warped to any extent, will place the end seam and the side walls under considerable strain and will in most instances cause the side walls to kink or bend under this strain.

The present construction of the can end, with its fulness of material in the reversely bent intermediate portion, permits of an easy diaphragmatic action inwardly or outwardly in accordance with inside and outside pressure differences, and this movement automatically relieves the body walls of strain. The can end, in this instance, is set down well within the end of the body so that its outward movement will not, under any circumstances, cause it to extend beyond the plane of the end flange, and therefore there can be no interference with stacking of the cans. While can ends of this type are especially desirable for cans of the larger sizes and cans which are vacuum packeted, they are not confined to these sizes or to vacuum packing, but apply equally well to small cans and to cans that are sealed in atmospheric conditions, although cans that are not vacuum packed are not generally subjected to outside pressure.

It is to be understood also that, while the present description has indicated that only the bottom end of the can is of this particular form, it is just as well adapted to the upper end. In fact a can may have either, or both ends so constructed; this being a matter to be determined by the packer, and it is usually dependent upon the type of machines used in the packing process.

Having thus described my invention, what I claim as new therein and desire to secure by Letters-Patent is—

1. A can of the character described comprising a body and an end seamed thereto; said end being countersunk at the seam and having a medial portion of a diameter approximately equal to one half the diameter of the end inset below the countersink and formed with an annular reversely corrugated portion extending between the countersink and medial portion, permitting limited inward and outward movement of the medial portion.

2. A can of the character described comprising a body having an end doubleseamed thereto; said end being countersunk at the seam and formed with a flat, circular medial portion that is farther inset below the plane of the seam, and an annular, flexible portion extending from the countersink to the medial portion; said annular portion being of substantial width and comprising concentric oppositely formed corrugations together forming a reverse bend transversely yieldable for inward and a limited outward movement of the central part of the end under pressure changes.

3. A can of the character described comprising a body having an end seamed thereto; said end being countersunk at the seam and formed with a flat, medial portion of a diameter approximately equal to one half the diameter of the can end, and inset below the level of the countersink and an annular, flexible portion extending from the countersink to the medial portion; said annular portion comprising about its outer portion an outwardly formed corrugation of substantial width lying above the plane of the countersink, and comprising about its inner portion, a downwardly formed corrugation extending below the plane of the medial part of the can end; said corrugations being contiguous and merging together in a reverse bend affording flexibility for limited inward or outward movement of the end.

4. A can comprising a body and an end seamed thereto; said end comprising an inwardly and outwardly flexible central portion and an annular strip constituting an immovable anchor and seal between the end and body wall with the innermost edge of the annular strip disposed below the periphery of the can body whereby movement of the flexible portion of the end is confined below the plane of the periphery of the can body.

WILFRED E. BURNS.