

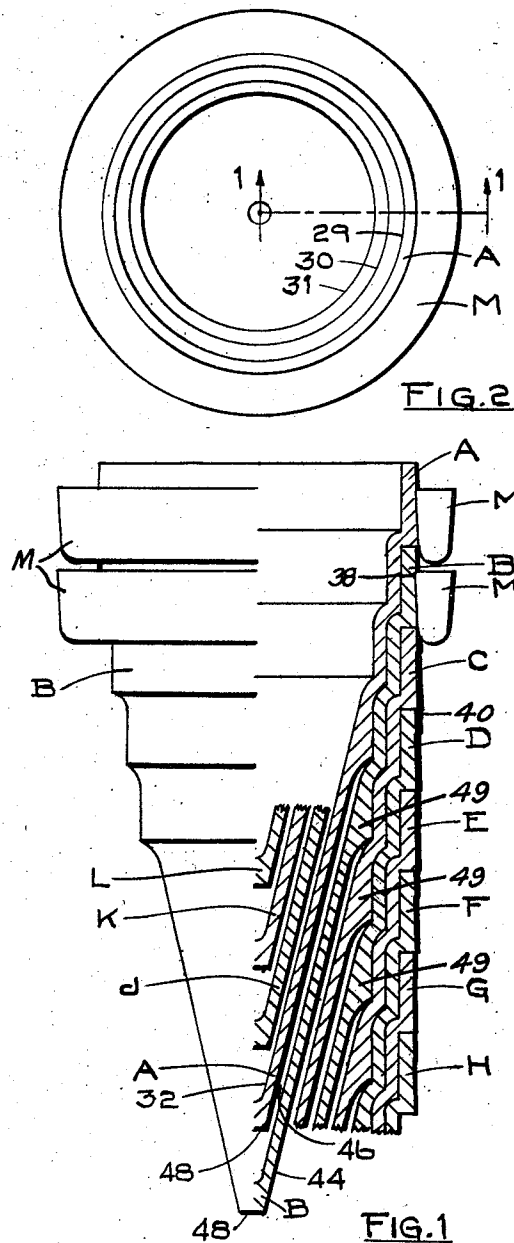
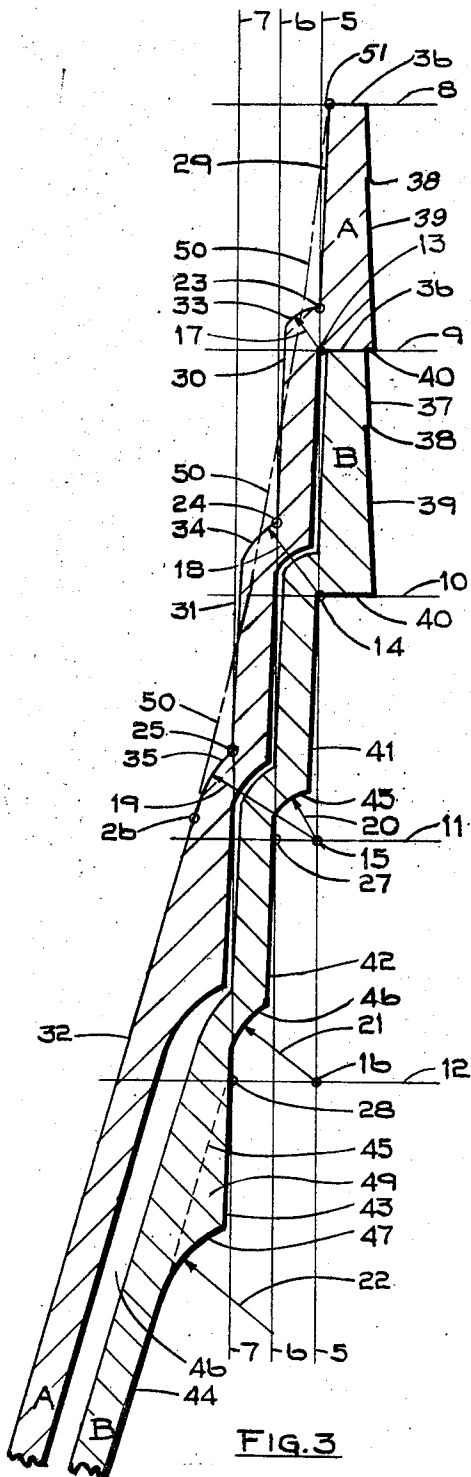
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R. R. DOWNIE

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CONE SHELL FOR FROZEN CONFECTION

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INVENTOR

ROBERT REX DOWNIE

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2,862,820

CONE SHELL FOR FROZEN CONFECTION

Robert Rex Downie, Beaver Falls, Pa.

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2 Claims. (Cl. 99-89)

This invention relates to baked pastry containers for frozen confections, commonly called cones; and a principal object is to improve the stacking or nesting compactness of these baked shells and thereby to lower their packaging, storage and shipping costs.

Further specific objects are: to reduce the breakage of cone shells, in handling and shipment, by better interfit in stack and thus better distribution of lateral forces transmitted between shells; to better preserve freshness by reducing the air inclusion in the stack of nested shells and by reduced external exposure of the shell; to improve the support or hang of the shell and reduce surface crumbling, this by increased area and truer shoulder contact between nested shells; to obtain confection engagement or retention, against overturning of the charge en masse, by a riffled or undulating surface in socketing engagement with the base of the charge; to provide the shell with an outer rim of a shape adapted to engage one form of melt collar as covered by my companion application Ser. No. 454,006, filed September 3, 1954.

The geometrical mode of construction is of the essence of this invention. The shell is designed in multiple, as a component of a stack, rather than as a unit. The stack is constructed with a minimum of empty space; and the invention resides in the matching of this desideratum with the known and more-or-less fixed practical requirements of the making, handling and ultimate use of individual shell units.

In the accompanying drawings, forming a part of this specification:

Fig. 1 is a sectional elevation of two stacked cone shells, A and B, made in accordance with the present invention and fitted illustratively with melt collars M, M as above referred to. The view is half in section, on line 1-1 in Fig. 2. Fragments (only) of nine additional units, C, D, E, F, G, H, J, K, L, are shown in stacked relation with shells A, B in the sectional portion of the view.

Fig. 2 is a top plan view of the upper shell of Fig. 1, with its melt collar M in place.

Fig. 3, drawn to an enlarged scale, is a detail sectional view of the upper portions of the walls of two duplicate stacked shells such as A and B of Fig. 1, but without the melt collars M.

Broadly, the cone shell of my invention consists of seven annular parts, three cylindrical segments, three involute segments as transitions and one generally conical segment. The top cylindrical segment is the largest in diameter, is external in the stack, and in vertical dimension represents the stacking height of the shell unit. The second main segment, of reduced diameter, fits inside the top segment of the shell nested immediately beneath. The third main segment, with further reduction in diameter, fits inside the second segment of the shell beneath and, at its lower extremity, is joined to the conical segment by the lowermost involute segment.

It is convenient, both for the practical designing of the shell stack and avoidance of confusion in this descrip-

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tion of it, first to determine and draw certain lines of reference, as shown in Fig. 3. There are three vertical reference lines, 5, 6, 7, drawn parallel to the common medial line or axis of the stack; the outermost, line 5, being located at a distance from the medial line equal to the selected top inside radius of the shell. Reference line 6 is spaced from line 5, and line 7 from line 6, a distance in each instance very slightly more than the selected nominal wall thickness of the shell. Intersecting the vertical reference lines, five horizontal reference lines are shown, 8, 9, 10, 11, 12, which are uniformly spaced at a distance representing the height of the top segment and the stacking height of the shell. From vertical line 5 are located the inside surface of the top segment and the outside surface of the second segment; and from the points of intersection of vertical line 5 with the horizontal reference lines 9, 10, 11 and 12 are located both the inner and outer surfaces of the three transition segments. From vertical line 6 are located the inner surface of the second segment and the outer surface of the third. From line 7 are located the inner surface of the third segment and the outer line of a protuberant portion of the conical segment.

Proceeding now with more particular description, and first following the inner wall of shell A:

About intersection points 13, 14, 15 (circled, for distinction, as are all other key points referred to below) arcs 33, 34, 35 are drawn, respectively, upon radii 17, 18, 19, which are respectively of lengths equal to very slightly more than one, two and three times the nominal wall thickness. Points 23, 24, 25 mark the intersections of said arcs with reference lines 5, 6, 7. From these points are drawn, upwardly, surface lines 29, 30, 31 to intersection respectively with reference line 8 and arcs 33, 34; said lines being drawn at such an angle from reference lines 5, 6, 7, as to afford requisite draft for withdrawal of the internal or mandrel mould in the manufacture of the shell. In Fig. 3 the draft angle is exaggerated, for clarity of lines and procedure. From point 26, and approximately tangent to arc 35, is drawn line 32, the inside surface of the conical segment, at such an angle from the vertical as to produce, at intersection with the medial or axial line, the selected overall height of shell. The shell may be truncated at this point, see 48 (Fig. 1), and the inner surface filleted at the apex for closure.

The preceding directly defines the interior wall for given mouth diameter, wall thickness, number of segments, segment height, stacking height and overall height of shell.

The vertical positioning is set and all vertical load transmitted by an external annular shoulder 40 of one shell bearing upon lip surface 36 of another shell beneath.

Referring to shell B, the exterior of the top segment is made up of cylindrical guide surface 37, an offset 38 for engagement with the upper inside lip of collar or melt trough M, and a tapered collar seating surface 39. The outside dimensions of each shell, below the level of shoulder 40, must clear the interior of the duplicate unit one level beneath, to avoid wedging, because of the fragility of the article.

From intersection points 14, 27, 28 are drawn the three lines 41, 42, 43 at the same angle from the vertical as lines 29, 30, 31. About points 15, 16 as centers are drawn arcs 45, 46 respectively of radii 20, 21 respectively which are sufficiently longer than radii 17, 18 to provide shoulder clearance for inside arcs 33, 34. Arc 47 is drawn to clear arc 35, on any convenient radius 22, from intersection with line 43 to tangency with 44, the outside surface of the conical segment.

The inner surface of shell A and the outer surface of shell B have been selected for description because of their accessibility for marking. But the shells being duplicates, interchange of position would produce the same

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proximity and clearance of the surfaces described as that here shown between the inner wall of shell B and the outer wall of shell A.

As may be seen in Fig. 1 at and below the level of shell D, except for the slight draft relief as above described, the stack has no voids for a radial depth of four wall thicknesses. And, except at the extremities, the stack has, as shown at the level of shell E and below, eight walls in transverse section. This compares to a range of but three to five walls in section for all commercial shells that applicant knows of.

The cone wall portion 49 lying outside of the dotted line 45 (shell B, Fig. 3) may be either a solid band, for enhanced crushing strength of the shell, or may be used for relief moulding of trade name or other legend, or ornamental lines or any combination of these. In any such use this shape detail has the incidental utility of aiding the hand-hold or grasp of the shell. Of course the conical space 46 may also accommodate raised lines of any kind, with some further grasp utility.

A practical point of design from the viewpoint of space economy is that the smaller the basic cylindrical segment height is made, and hence the stacking height, the greater will be the stacking compactness or space efficiency of the shell, for given overall height, top diameter and wall thickness. But there is a counter consideration of practical importance from the viewpoint of utility to the customer, that decrease of the cylindrical segment height makes the mean effective inside wall line approach the lip point of the shell at an obtuser angle, and hence reduces the charge socketing or retention quality of the shell. It will be noted that with the proportionate segment height of the construction here shown, a line, as broken line 50-50-50 (shell A, Fig. 3), drawn upwardly from point 26 to the lip point 51 of the shell, and bowed outwardly to represent the mean or trend of the three outward dips and two intervening ridges of the traversed portion of the wall, approaches the lip point at a sharp angle with the vertical; at a sharper angle than would be the case if the cylindrical segments were of lesser height. And, it should be noted, this approach of the effective wall line is, and must be kept, at a much sharper angle than would be formed by the inside surface line of a straight, full height, true conical wall.

On the point of shell strength and economy of wall

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thickness, it may be noted that the involute or transition segments, by substantially increasing the wall thickness at the transition points, strengthen the wall against crushing, to a value equivalent of substantial circular beads or ribs. This feature of built-in stiffener ribs contributes some economy of material without interference with the general objective of space efficiency of the shell; and is inherent in the geometry of the shell cylindrically segmented in the manner here shown.

The comparative gain of the multiple design, cylindrical segment shell as here described, over those known shells which are, in their upper or charge retaining portion, of either conical or spherical segment form, may be summarized thus: That, for a given lip diameter, wall thickness and height of shell, it obtains a charge capacity, a charge retention, a crushing strength, an outside shoulder support, a facilitation of grasp, a legend space and a material economy equivalent of or superior to conical and spherical segment shells of much greater stacking height and hence greater per unit required container space. Furthermore, the shell design here described and shown obtains these results with a remarkable economy of material, there being no rings, ribs or other wall structures on the inside of the shell cone.

I claim:

1. A compactly nestable cone shell for frozen confection having a body whose lower portion is conical and whose upper portion is generally conical, the upper portion consisting of a connected series of at least three substantially cylindrical segments whose inside diameters vary by substantially uniform amounts; the interior of the cone shell being entirely free of any annular rings, radial ribs or other projections or reinforcements, so that the nested cone shells have a minimum of voids.

2. The invention defined in claim 1, wherein the decrements of diameter of said cylindrical segments are each substantially equal to twice the wall thickness of the cone shell, and the segments are joined together by annular transition areas which are arcuate as viewed in section, with the convexity of the arcs directed toward the interior of the cone shell.

References Cited in the file of this patent

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