March 26, 1968 R. K. SHELBY 3,374,922

FOAMED CONTAINERS

Filed Aug. 26, 1964 3 Sheets-Sheet 1

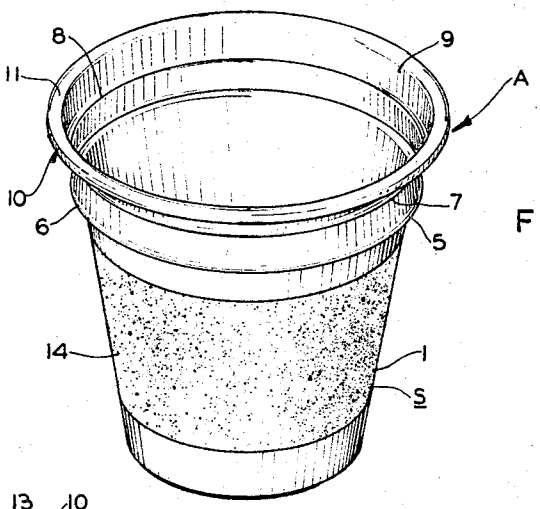


FIG. 1

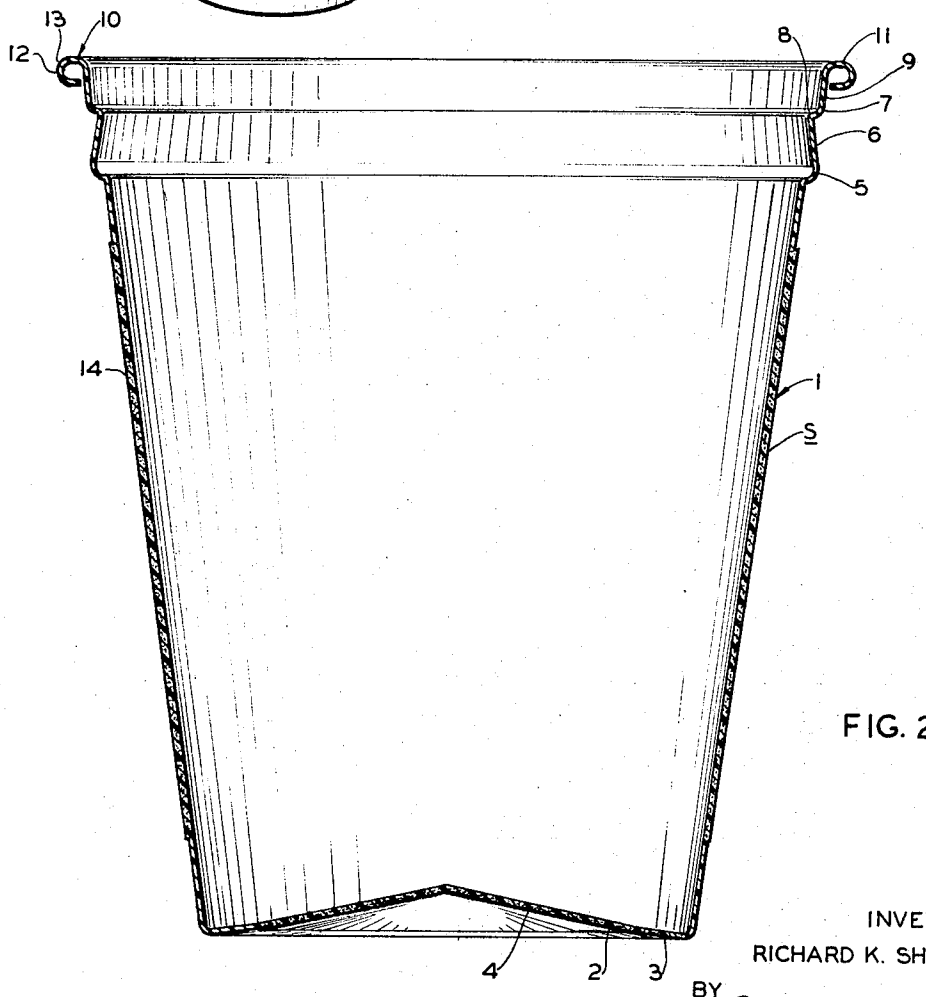


FIG. 2

INVENTOR
RICHARD K. SHELBY
BY Robert J. Schaap
ATTORNEY

March 26, 1968 R. K. SHELBY 3,374,922

FOAMED CONTAINERS

Filed Aug. 26, 1964 3 Sheets-Sheet 2

FIG. 6

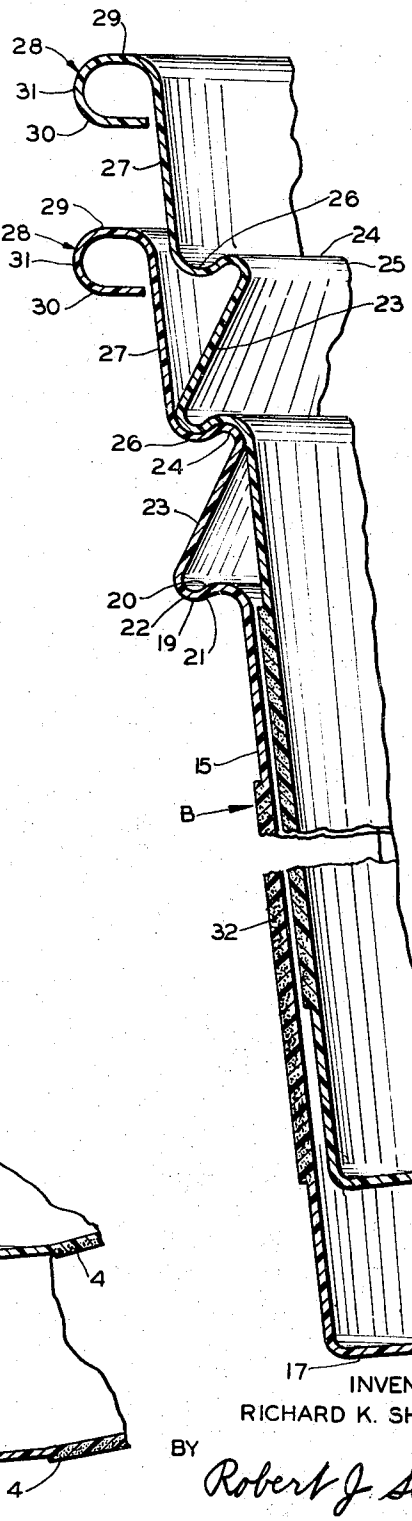
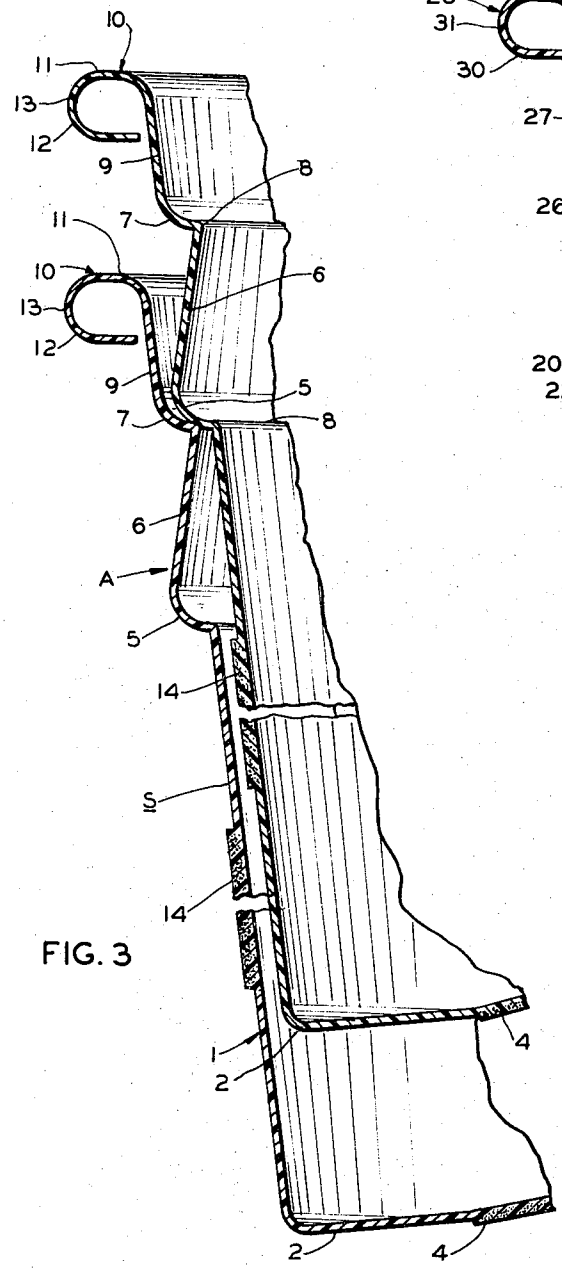


FIG. 3



INVENTOR
RICHARD K. SHELBY

BY Robert J. Schaap

ATTORNEY

March 26, 1968 R. K. SHELBY 3,374,922

FOAMED CONTAINERS

Filed Aug. 26, 1964 3 Sheets-Sheet 3

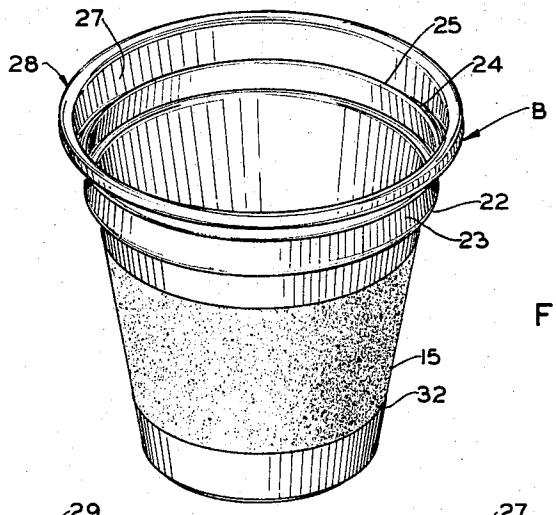


FIG. 4

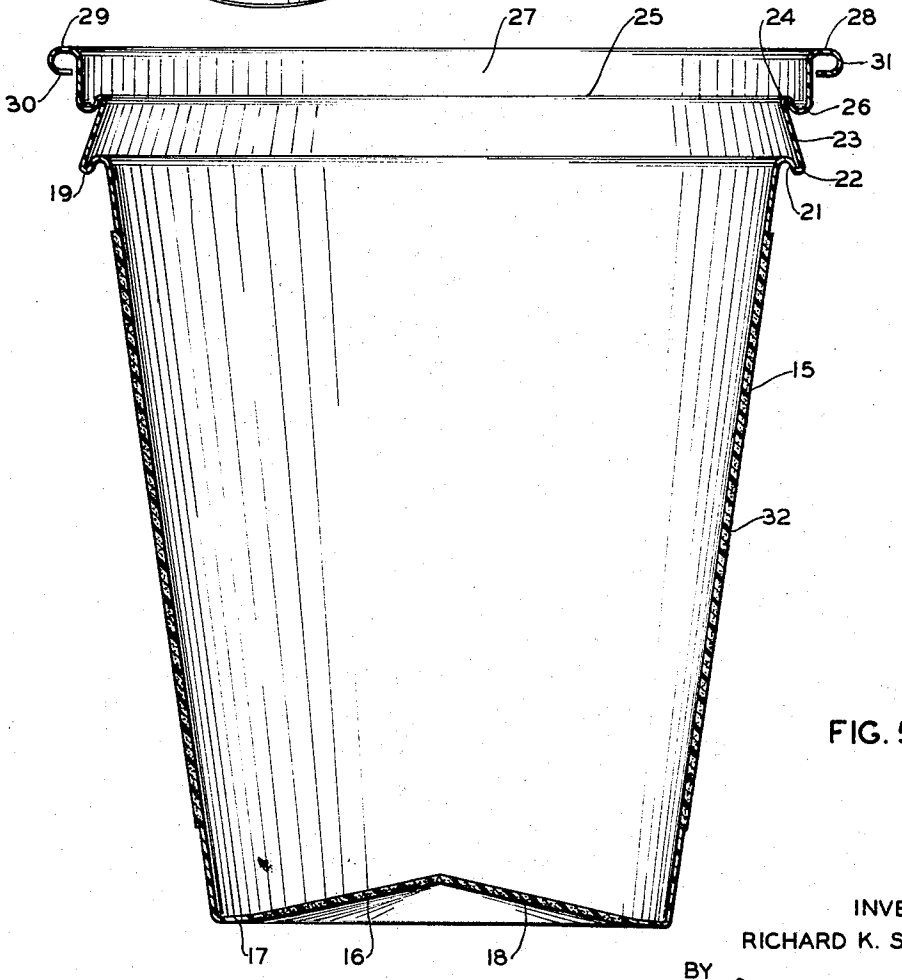


FIG. 5

INVENTOR
RICHARD K. SHELBY
BY Robert J. Schaap
ATTORNEY

United States Patent Office 3,374,922
Patented Mar. 26, 1968

3,374,922

FOAMED CONTAINERS

Richard K. Shelby, Downers Grove, Ill., assignor to Monsanto Company, St. Louis, Mo., a corporation of Delaware

Filed Aug. 26, 1964, Ser. No. 392,186
11 Claims. (Cl. 220—97)

This invention relates in general to foamed containers, and more particularly to nestable foamed containers which are suitable for use in automatic dispensing apparatus.

The dispensing of beverages from vending machines and similar types of coin-operated devices presents many problems which are not readily apparent to the casual observer. The vending machine must be adapted to accommodate suitably designed containers of proper size and shape, and which are capable of being nested in a stack of like containers. The containers must be readily removable from the stack of containers and unitarily separated therefrom. In most coin-operated beverage dispensing machines, the machine is designed to transfer a cup to a particular station upon the receipt of a coin and is further designed to fill the container to a desired level with a beverage selected by the purchaser. The cups are nested in a large stack and contained within a dispensing tube which is operable by a suitable mechanism to dispense each cup upon the receipt of the proper amount of money. If however, one of the cups should not separate from the nested stack, or should become jammed within the passageway leading to the beverage filling station, then the purchaser is unable to receive the consideration for his coin. Furthermore, this vending machine is unsuitable for operation until a repairman has had the opportunity to remove the lodged cup or correct any other malfunction with regard to the dispensing of the cups. Not only does such a malfunction lead to a loss of profits, but the good will lost from irate customers materially reduces the future sales in that particular vending machine.

From the standpoint of the customer, the vending machine operators are also confronted with another problem, particularly with vending machines that dispense hot fluids. It has been the practice to employ paper containers in the vending machines for such drinks as hot tea, hot coffee and hot chocolate. These paper containers proved to be unsuitable inasmuch as they had very little heat insulating qualities and the purchaser had considerable difficulty in holding the container for a long period of time. Moreover, the paper seemed to have a tendency to ruin the taste of the beverage contained therein, and finally, the container itself would often become soggy and fail to hold the liquid suitably after a long period of time. As a result thereof, there has been some tendency to change to plastic containers of the type described in U.S. Letters Patent 2,967,328. While these plastic containers have obviated most of the problems presented with paper containers, they have not corrected the deficiencies in heat insulating which were present in the paper containers. The purchaser of a hot beverage has as much difficulty in retaining a plastic cup containing the hot beverage as he does retaining a paper cup containing a hot beverage.

Recently, there have been new developments in the production of the so-called "foamed container." These containers are formed, usually by injection molding, of a modified polystyrene plastic material and are expanded in order to provide the foamed surface. However, these containers have proved to be totally unacceptable for use in vending machines inasmuch as the surface of the container possesses a high friction co-efficient and consequently, do not readily lend themselves to nesting in stacks in a relatively friction free manner. These foamed containers have a tendency to frictionally engage the interior walls of the containers in which they are nested and are, therefore, unsuitable for vending machine operations. Due to the high friction co-efficient of a foamed surface, the container cannot engage the wall of the tube in which it travels to the dispensing station, and moreover, must be designed so that it does not engage the wall of a similar container in which it is nested. The solution of this problem has further been complicated by the fact that the dispensing tubes in many vending machines are not truly vertical and, therefore, it is difficult for the nested containers to become properly aligned in the stack.

It is therefore the primary object of the present invention to provide a nestable foamed container which is capable of being used in vending machine operations.

It is another object of the present invention to provide a foamed container of the type stated which is provided with a series of novel stacking rings which provide for a relatively efficient nesting of the containers in a stack.

It is a further object of the present invention to provide a foamed container of the type stated which is economical to manufacture and competitive with conventional containers.

It is a further object of the present invention to provide a container of the type stated which has high heat insulating qualities and also has a commercially attractive outer appearance.

With the above and other objects in view, my invention resides in the novel features in form, construction, arrangement, and combination of parts presently described and pointed out.

In the accompanying drawings:

FIGURE 1 is a perspective view of a foamed container constructed in accordance with and embodying the present invention;

FIGURE 2 is a vertical sectional view of the container of FIGURE 1 taken along the axial centerline of the container of FIGURE 1;

FIGURE 3 is a sectional view partly broken away of two nested containers of the type shown in FIGURE 1;

FIGURE 4 is a perspective view of a modified form of container constructed in accordance with and embodying the present invention;

FIGURE 5 is a vertical sectional view of the container of FIGURE 4 and being taken along the axial centerline of the container of FIGURE 4; and

FIGURE 6 is a sectional view, partially broken away of two nested containers of the type shown in FIGURE 4.

Generally speaking, the present invention relates to nestable plastic containers of the so-called "throw-away" or disposable type, which have partially foamed outer surfaces. The containers of the present invention generally comprise a conically shaped skirt portion or side wall section which merges at its upper end into a series of novel stacking rings and at its lower end into a double conical base. The containers are generally formed of polyethylene, polystyrene, polybutadiene or modified polystyrene. A portion of their outer surfaces are expanded or foamed in accordance with the procedure set forth in copending application Ser. No. 272,540, filed Apr. 12, 1963, now Patent No. 3,262,625 issued July 26, 1966.

The containers which form the subject matter of this invention are so designed, that the foamed surfaces thereof do not come in contact with the dispensing tube in conventional vending machines, and moreover, the foamed surface of one container will not come in contact with the interior wall of a similar container in which it is nested.

Referring now in more detail and by reference characters to the drawings which illustrate practical embodi-

ments of the present invention, A designates a cup of the so-called "disposable" type and which has been preferably molded in a unitary structure of modified polystyrene. The particular compositions used in the formulation of the thermoplastic material from which the container A is formed, are more fully described in the aforementioned copending application. The container A is nonjamming when in nested positions, and is of the so-called "thin-walled" type, and is moreover formed of integral construction. The container A generally comprises an upwardly and outwardly tapering side wall S having a so-called "skirt portion" **1** with an overall maximum wall thickness of approximately 0.010 inch. Moreover, the side wall **1** tapers outwardly at an angle with respect to the vertical centerline of the container A of 7 degrees 50 minutes. In this connection, it should be pointed out that the minimum angle of taper of the side wall **1** is critical and is never less than 7 degrees 50 minutes.

Along its lower margin, the side wall **1** integrally merges into a so-called "double-conical base" **2** which consists of an outer base ring **3** extending inwardly and upwardly at a dihedral angle of approximately 11.5 degrees. The base **2** also includes an inner base ring **4** which integrally merges into the outer base ring **3** and tapers upwardly and inwardly at an angle of approximately 13.5 degrees displaced from the horizontal or from a plane passing through the base of the container A. The overall base has an outer diameter of approximately 1.798 inches, and at the geometric center thereof, the base is set inwardly from a plane passing along the peripheral margin of the base by approximately 0.187 inch. Through the double-conical base, each of the portions of which taper inwardly and upwardly at a different angle, and as a result thereof a much stronger base is obtained. In many of the plastic cups of the prior art, a hot beverage contained within the cup would tend to weaken the base until it would bow somewhat downwardly of the skirt portion and moreover, cause a stretching of the plastic material to a point where slight contact with a relatively sharp surface would rupture the surface of the base. This problem has been eliminated by the double-conicaly shaped base described herein.

In the cup A, the skirt portion **1** of the side wall S has an overall length of approximately 2.816 inches and at its upper end integrally merges into an outwardly flaring arcuately shaped supporting shoulder **5** and which has an overall radius of 0.040 inch. The innermost edge of the supporting shoulder **5** is displaced from the axial centerline of the cup A by a distance of 1.278 inches and the outermost margin of the supporting shoulder **5** is displaced from the axial centerline of the cup A by a distance of 1.313 inches. The upper edge of the supporting shoulder **5** integrally merges into an upwardly and inwardly tapering spacing skirt **6** which extends upwardly from the upper margin of the skirt portion **1** for a distance of 0.240 inch. The spacing skirt **6** tapers inwardly at an angle of approximately 7 degrees with respect to the axial centerline of the container A so that the upper margin thereof is spaced from the axial centerline of the cup A by a distance of approximately 1.297 inches.

The spacing skirt **6** is integrally formed with an upwardly and outwardly curving stacking shoulder **7** along its upper margin, the arcuate shape of which is formed by a radius of 0.040 inch. By reference to FIGURE 3, it can be seen that the point of integral adjoinment of the stacking shoulder **7** and the spacing skirt **6** forms an annular stacking edge **8**.

The stacking shoulder **7** integrally merges at its upper end into an upwardly extending and outwardly tapering upper side wall **9** which tapers at an angle of 7 degrees with respect to the axial centerline of the container A. The upper wall **9** is integrally formed with an outwardly flaring rim **10** consisting of an upper rim-forming wall **11** which merges into a reversely bent flange **12**, thereby defining an outer rim margin **13**, substantially as shown in

FIGURES 2 and 3. The vertical distance between the lower margin of the stacking shoulder **7** and the upper margin of the upper rim-forming wall **11** is approximately 0.200 inch and the outer margin **13** of the rim **10** is displaced from the axial centerline of the container A by a distance of approximately 1.456 inches.

The container A after being formed in a suitable molding operation such as by the process described in U.S. Letters Patent No. 2,967,328 is foamed on a portion of the side wall S in accordance with the method described in copending application Ser. No. 272,540, filed Apr. 12, 1963 now Patent No. 3,262,625, issued July 26, 1966. The container A is suitably masked in those areas in which it is not desired to produce a foamed surface and is then steeped by immersing the container A into a suitable solvent such as trichlorofluoromethane for a period of approximately ten seconds. Thereafter, the container A is withdrawn from this solvent, retained for an interval in dry room conditions, and then subsequently immersed into a hot water bath or subjected to a hot air stream for a predetermined period of time. This procedure results in a foamed outer surface throughout the area of solvent immersion. Moreover, it has been found that partially foaming the surface of the container A by this method produces expansion of the plastic material by approximately one-third of its overall thickness. It has also been found by this procedure, that the overall structural properties of the cup are not altered by this steeping operation while the insulating properties of the cup are materially increased. In the present invention, the side wall S of the container A is provided with an annularly extending foamed section **14** which extends to a point three-eighths of an inch above the lower margin of the container A and to a point one inch below the upper peripheral margin of the container A. The foamed section **14** has an overall thickness, measured from the outer surface of the skirt portion **1** extending outwardly, of 0.012 inch thereby rendering an overall side wall and foamed section thickness of 0.022 inch. By further reference to FIGURE 2, it can be seen that the foamed section of the container A is so located that it never comes in contact with a straight-walled surface. This can be readily illustrated by drawing a straight line between two of the outermost annularly located points of the container A which, for example, would be the outer margin **13** of the rim **10** and the lower annular margin of the container A at the base **2**. It can thus be seen that the foamed section **14** never comes in contact with this straight line. Consequently, a series of containers A located in the dispensing tube of a vending machine, will never come in contact with the wall of the dispensing tube. The inner base ring **4** of the base **2** is also entirely foamed for preventing condensation of vapor on a surface on which the container A is supported.

In use, the containers A are readily adaptable to being nested and stacked with a series of like containers in the manner as shown in FIGURE 3. When placed in the nested position, it can be seen that the outer surface of the supporting shoulder **5** is engaged by the annular supporting margin **8** of the stacking shoulder **7**. The supporting edge **8** is located at a point which is spaced inwardly from the skirt portion **1** so that the foamed surface **14** of one container A never comes into contact with the interior surface of a similar container A in which it is nested. This type of stacking shoulder arrangement in combination with the foamed surface **14** has been found particularly suitable for those containers, which when disposed within vending machines and similar dispensing devices, are located in a substantially upright position and where the dispensing tube does not have a great amount of curvature.

It is possible to provide a modified form of container B, substantially as shown in FIGURES 4–6 and which is substantially similar to the previously described container A. The container B is designed with a somewhat

modified form of stacking shoulder arrangement for those dispensing tubes where the containers may be shifted slightly from a purely vertical position or where the dispensing tube may contain a slight amount of curvature as is often the case in many dispensing machines.

The container B is also of the so-called "disposable" type and is preferably molded in a unitary integral structure of modified polystyrene. Again, the particular compositions used in the formulation of the thermoplastic material from which the container B is formed are more fully described in the aforementioned copending application. The container B generally comprises an upwardly and outwardly tapering side wall **15** which integrally merges at its lower margin into a so-called "double-conical" base **16**, the latter consisting of an outer base ring **17** which extends inwardly and upwardly at an angle of approximately 11.5 degrees. The base **16** also includes an inner base ring **18** which integrally merges into the outer base ring **17** and tapers upwardly and inwardly at an angle of approximately 13.5 degrees displaced from the horizontal or from a plane passing through the base of the container B. The relative dimensions of the side wall **15** and the base **16** are the same as the relative dimensions of the side wall **1** and the base **2** in the container A.

Integrally formed along the upper margin of the side wall **15** is an outwardly flaring supporting shoulder **19** which is formed by an arcuately shaped convex bight portion **20**, the latter also being defined by an outwardly and downwardly extending flange **21**. The flange **21** tapers outwardly and downwardly at an angle of approximately 45 degrees with respect to the axial centerline of the container B. Along its lower margin, the flange **21** integrally merges into an arcuate supporting edge **22** having an overall thickness of approximately 0.020 inch and which integrally merges into an upwardly and inwardly tapering intermediate wall **23**. By further reference to FIGURES 5 and 6, it can be seen that the supporting edge **22** is spaced from the side wall **15** by a distance of approximately 0.12 inch and furthermore, the intermediate wall **23** tapers upwardly and inwardly at an angle of approximately 8.5 degrees with respect to the axial centerline of the container B.

The intermediate wall **23** is integrally formed along its upper margin with an annular outwardly extending stacking shoulder **24** consisting of an arcuately shaped inwardly projecting annular stacking edge **25** substantially as shown in FIGURE 6. By reference to FIGURE 6, it can be seen that the stacking edge **25** is spaced slightly inwardly of the plane in which the side wall **1** lies. The stacking edge **25** integrally merges into a concave arcuate bend **26** which is sized to snugly, but nevertheless removably accommodate the supporting edge **22** and the supporting shoulder **19**. The arcuate bend **26** ultimately merges into an upwardly extending upper side wall **27** which tapers upwardly and outwardly at an angle of 7 degrees with respect to the axial centerline of the container A. The upper side wall **27** is integrally formed with an outwardly flaring rim **28** consisting of an upper rim-forming wall **29** which merges into a reversely bent flange **30**, thereby defining an upper rim margin **31**, substantially as shown in FIGURES 5 and 6. The outer margin **31** of the rim **28** is displaced from the axial centerline of the container B by a distance of approximately 1.456 inches, the same as in the container A.

In the container B, the skirt portion or side wall **15** has an overall length of approximately 2.816 inches. The innermost edge of the supporting shoulder **19** is displaced from the axial centerline of the container A by a distance of 1.278 inches and the outermost margin of the supporting shoulder **19**, that is the supporting edge **22** is displaced from the axial centerline of the container A by a distance of 1.384 inches. The intermediate wall **23** extends upwardly from the upper margin of the supporting shoulder **19** for a distance of 0.240 inch and tapers inwardly and outwardly at an angle of approximately 7 degrees, 50 minutes with respect to the axial centerline of the container B, so that the upper margin thereof is spaced from the axial centerline of the container B by a distance of approximately 1.297 inches. By further reference to FIGURE 6, it can be seen that the upper side wall **27** is substantially parallel to the side wall **15** but is displaced outwardly therefrom.

The side wall **15** of the container B is provided with an annularly extending foamed section **32** which extends to a point three eighths of an inch above the lower margin of the container B and to a point one inch below the upper peripheral margin of the container B. The foamed section **32** has an overall thickness, measured from the outer surface of the side wall **1**, extending outwardly, of approximately 0.012 inch, thereby rendering an overall side wall and foamed section thickness of 0.022 inch. By further reference to FIGURE 5, it can be seen that the foamed section of the container B is also located so that it never comes in contact with a straight-walled surface. This again can readily be illustrated by drawing a straight line between two of the outermost annularly located points of the container B, which for example, would be the outer margin **31** of the rim **28** and the lower annular margin at the base **16**. As a result thereof, it can be seen that the foamed section **32** never comes into contact with the straight line. Consequently, a series of the containers B located in a dispensing tube of a vending machine will never contact the wall of the dispensing tube. The inner base ring 18 is also foamed for its entire surface area, in the same manner as the inner base ring 4.

When placed in the nested position, it can be seen that the supporting edge **22** of one container fits snugly but nevertheless slidably within the stacking shoulder **26** of a similar container. Again, it can be seen that the supporting shoulder **19** is spaced outwardly from the side wall **15** by a distance which is sufficient to prevent the foamed surface **32** of one cup from engaging the interior surface of the side wall of a container in which it is nested. It can also be seen by reference to FIGURE 6, that the arcuate edge **25** of one container engages the arcuate bend **20** of a container in which it is nested. By means of the above outlined construction, it can be seen that one container B will not shift relative to its position within another container B and hence, it is impossible for the foamed surface **32** of one container to engage the interior surface of the side wall of the container B in which it is nested.

It should be obvious that it is possible to provide ice cream containers, cheese containers and the like, which are substantially similar to the previously described container A. These latter containers can also be formed with the novel stacking shoulders and can be provided with a foamed surface. However since easy removability from a stack of nested containers is not of critical importance, the entire side wall of the container and the entire surface area of the base can be foamed.

It should be understood that changes and modifications in the form, construction, arrangement and combination of parts may be made and substituted for those herein described without departing from the nature and principle of my invention.

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

1. A one-piece plastic container having a base, a side wall with substantially parallel opposed, inside and outside surfaces, a portion of said side wall composed throughout of a single layer of thermoplastic material which comprises a foamed polymer portion extending from within the body of said thermoplastic material and forming said outside surface, and a non-foamed polymer portion integral with said foamed polymer portion and forming said inside surface, said foamed polymer portion extending outwardly beyond the remainder of said wall, and nesting means for maintaining said foamed polymer portion of said side wall out of contact with the inside

surface of the side wall of a like container when one container is supported within another of said like containers.

2. A thin-walled nestable plastic container of integral construction comprising a bottom wall and an upwardly extending side wall forming a substantially open upper end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a single layer of thermoplastic material which comprises a foamed polymer portion extending from within the body of said thermoplastic material and forming said outside surface thereof, and a non-foamed polymer section integral with said foamed polymer portion forming said inside surface, said foamed polymer portion forming said inside surface, said foamed polymer portion extending outwardly beyond the remainder of said side wall, said side wall having nesting means for maintaining said foamed polymer portion of said side wall of a like container when one container is supported within another of said like containers, said bottom wall being formed by a first conically shaped portion which merges into said side wall and a second conically shaped portion which substantially closes the remainder of said bottom wall.

3. A thin-walled nestable plastic container of integral construction comprising a bottom wall and an upwardly extending side wall forming a substantially open upper end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a single layer of thermoplastic material which comprises a foamed polymer section extending from within the body of said thermoplastic material and forming the outside surface thereof, and a non-foamed polymer section integral with said foamed polymer section forming said inside surface, said foamed polymer section forming said inside surface, said foamed polymer section extending outwardly beyond the remainder of said side wall, said non-foamed polymer section of said side wall having a thickness of not more than 0.010 inch, said side wall having nesting means for maintaining the outside surface of said side wall out of contact with the inside surface of the side wall of a like container when one container is supported within another of said like containers, said foamed section extending to a point displaced from the periphery of said bottom wall by a distance of not less than three-eighths of an inch.

4. A thin-walled nestable plastic container of integral construction comprising a bottom wall and an upwardly extending side wall forming a substantially open upper end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a single layer of thermoplastic material which comprises a foamed polymer section extending from within the body of said thermoplastic material and forming the outside surface thereof, and a non-foamed polymer section integral with said foamed polymer section forming said inside surface, said foamed polymer section extending outwardly beyond the remainder of said side wall, said upper end being defined by an annularly extending rim-forming member, said non-foamed polymer section of said side wall having a thickness of not more than 0.010 inch, said side wall having nesting means for maintaining the outside surface of said side wall out of contact with the inside surface of the side wall of a like container when one container is supported within another of said like containers, said foamed section extending to a point displaced from the periphery of said bottom wall by a distance of not less than three-eighths of an inch, said foamed area extending to a point displaced from the upper margin of said container by at least one inch.

5. A thin-walled nestable plastic container of integral construction comprising a bottom wall and an upwardly and outwardly tapering side wall forming an open upper end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a single layer of thermoplastic material which comprises a foamed polymer section extending from within the body of said thermoplastic material and forming the outside surface thereof, and a non-foamed polymer section integral with said foamed polymer section forming said inside surface, said foamed polymer section extending outwardly beyond the remainder of said side wall, an annularly extending stacking shoulder formed in said side wall and being spaced downwardly from said open upper end, and an annularly extending supporting shoulder formed in said side wall and being spaced downwardly from said stacking shoulder, the supporting shoulder of one such container being sized to rest on the stacking shoulder of a like container, and to keep the foamed section of said side wall out of contact with the interior surface of said like container when one of such containers is disposed in supported position in another of such like containers.

6. A thin-walled nestable plastic container of integral construction comprising a bottom wall and an upwardly and outwardly tapering side wall forming an open upper end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a single layer of thermoplastic material which comprises a foamed polymer section extending from within the body of said thermoplastic material and forming the outside surface thereof, and a non-foamed polymer section, integral with said foamed polymer section forming said inside surface, said foamed polymer section extending outwardly beyond the remainder of said side wall, an annularly extending supporting shoulder formed in said side wall and being spaced downwardly from said open upper end, said supporting shoulder having a curved surface, a portion of which is disposed substantially perpendicular to the normal central axis of said container, and an annularly extending stacking shoulder formed in said side wall and being spaced upwardly from said supporting shoulder, the supporting shoulder of one such container being sized to rest on the stacking shoulder of a like container, and to keep the foamed section of said side wall out of contact with the interior surface of said like container when one of such containers is disposed in supported position in another of such like containers.

7. A thin-walled nestable plastic container of integral construction comprising a bottom wall and an upwardly and outwardly tapering side wall to form an open upper end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a single layer of thermoplastic material which comprises a foamed polymer section extending from within the body of said thermoplastic material and forming the outside surface thereof, and a non-foamed polymer section, integral with said foamed polymer section forming said inside surface, said foamed polymer section extending outwardly beyond the remainder of said side wall, an annularly extending supporting shoulder formed in said side wall and being spaced downwardly from said open upper end, said supporting shoulder having a curved surface, a portion of which is disposed substantially perpendicular to the normal central axis of said container, an annularly extending stacking shoulder formed in said side wall and being spaced upwardly from said supporting shoulder, the portion of the side wall located between said supporting shoulder and said stacking shoulder extending upwardly and tapering inwardly, the supporting shoulder of one such container being sized to rest on the stacking shoulder of a like container when one of such containers is disposed in supported position in another of such like containers, said foamed portion formed with said side wall extending from a point spaced below said supporting shoulder to a point spaced above the outer periphery of said bottom wall.

8. A thin-walled nestable plastic container of integral construction comprising a bottom wall and an upwardly and outwardly tapering side wall to form an open upper

end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a single layer of thermoplastic material which comprises a foamed polymer section extending from within the body of said thermoplastic material and forming the outside surface thereof, and a non-foamed polymer section integral with said foamed polymer section forming said inside surface, said foamed polymer section extending outwardly beyond the remainder of said side wall, an annularly extending supporting shoulder formed in said side wall and being spaced downwardly from said open upper end, said supporting shoulder having a curved surface, a portion of which is disposed substantially perpendicular to the normal central axis of said container, an annularly extending stacking shoulder formed in said side wall and being spaced upwardly from said supporting shoulder, the portion of the side wall located between said supporting shoulder and said stacking shoulder extending upwardly and tapering inwardly, the supporting shoulder of one such container being sized to rest on the stacking shoulder of a like container when one of such containers is disposed in supported position in another of such like containers, said foamed portion formed with said side wall extending from a point spaced below said supporting shoulder to a point spaced above the outer periphery of said bottom wall, said foamed section having a sufficient cross-sectional thickness so that it does not contact the interior surface of a like container when one of such containers is disposed in supported position in another of such like containers.

9. A thin-walled nestable plastic container of integral construction comprising a bottom wall and an upwardly and outwardly tapering side wall to form an open upper end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a single layer of thermoplastic material which comprises a foamed polymer section extending from within the body of said thermoplastic material and forming the outside surface thereof, and a non-foamed polymer section integral with said foamed polymer section forming said inside surface, said foamed polymer section extending outwardly beyond the remainder of said side wall, an annularly extending supporting shoulder formed in said side wall and being spaced downwardly from said open upper end, said supporting shoulder having a curved surface, a portion of which is disposed substantially perpendicular to the normal central axis of said container, an annularly extending stacking shoulder formed in said side wall and being spaced upwardly from said supporting shoulder, the portion of the side wall located between said stacking shoulder and said supporting shoulder extending upwardly and tapering inwardly, the supporting shoulder of one such container being sized to rest on the stacking shoulder of a like container when one of such containers is disposed in supported position in another of such like containers, said foamed section formed with said side wall extending from a point spaced below said supporting shoulder to a point spaced above the outer periphery of said bottom wall, said foamed section having a cross-sectional thickness of not more than 0.022 inch so that it does not contact the interior surface of a like container when said container is disposed in supported position in another of such like containers.

10. A thin walled nestable plastic container of integral construction comprising a bottom wall and an upwardly and outwardly tapering side wall to form an open upper end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a substantially thermoplastic material which comprises a foamed polymer portion extending from within the body of said thermoplastic material to the outside surface thereof and a non-foamed polymer section integrally connected to said foamed polymer portion, an annularly extending supporting shoulder formed in said side wall and being spaced downwardly from said open upper end, said supporting shoulder having an outwardly and convex downwardly extending bight surface, a portion of which is disposed substantially perpendicular to the normal central axis of said container, and an annularly extending stacking shoulder formed in said side wall being spaced upwardly from said supporting shoulder, said stacking shoulder having an outwardly and concave downwardly protruding surface, the portion of the side wall located between said stacking shoulder and said nesting shoulder extending upwardly and tapering inwardly, the outwardly convex downwardly extending bight surface of the supporting shoulder of one such container being sized to rest within the outwardly and concave downwardly protruding surface of the stacking shoulder of a like container when one of such containers is disposed in supported position in another of such like containers.

11. A thin walled nestable plastic container of integral construction comprising a bottom wall and an upwardly and outwardly tapering side wall to form an open upper end, said side wall having substantially parallel inside and outside surfaces, a portion of said side wall composed throughout of a substantially thermoplastic material which comprises a foamed polymer portion extending from within the body of said thermoplastic material to the outside surface thereof, and a non-foamed polymer section integrally connected with said foamed polymer portion, an annularly extending supporting shoulder formed in said side wall and being spaced downwardly from said open upper end, said supporting shoulder having an outwardly and convex downwardly extending bight surface, a portion of which is disposed substantially perpendicular to the normal central axis of said container, and an annularly extending stacking shoulder formed in said side wall and being spaced upwardly from said supporting shoulder, said stacking shoulder having an outwardly and concave downwardly protruding surface, the portion of the side wall located between said stacking shoulder and said nesting shoulder extending upwardly and tapering inwardly, the portion of the side wall extending upwardly from said stacking shoulder and the outermost peripheral edges of the supporting shoulder lying in the same plane, which plane is substantially parallel to the side wall of the container, the outwardly and convex downwardly extending bight surface of the supporting shoulder of one such container being sized to rest within the outwardly and concave downwardly protruding surface of the stacking shoulder of a like container when one of such containers is disposed in supported position in another of such like containers.

References Cited

UNITED STATES PATENTS

3,049,277	8/1962	Shappell	229—1.5
3,094,240	6/1963	Wanderer	220—97
3,126,139	3/1964	Schechter	220—94
3,139,213	6/1964	Edwards	220—97

THERON E. CONDON, *Primary Examiner.*

JOSEPH R. LECLAIR, GEORGE E. LOWRANCE, *Examiners.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,374,922 March 26, 1968

Richard K. Shelby

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 7, lines 13 and 14, 34 and 35, after "surface,", each occurrence, cancel "said foamed polymer portion forming said inside surface,"; line 17, after "side wall" insert -- out of contact with the inside surface of the side wall --.

Signed and sealed this 19th day of August 1969.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents