Sept. 17, 1968 H. J. WANDERER 3,401,862

DISPOSABLE CONTAINER

Original Filed May 8, 1964 3 Sheets-Sheet 1

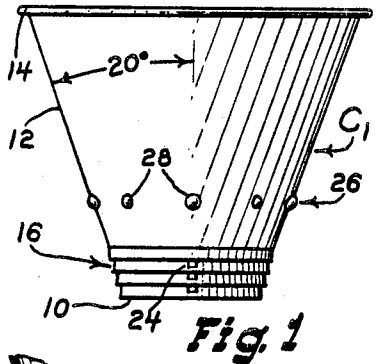


Fig. 1

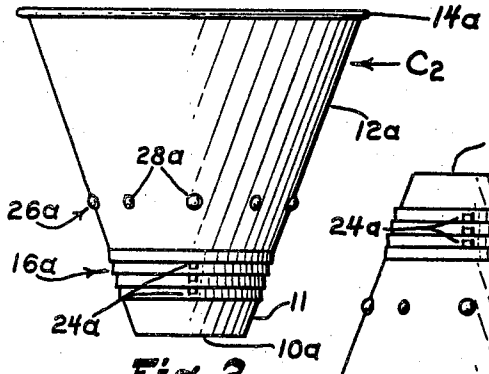


Fig. 2

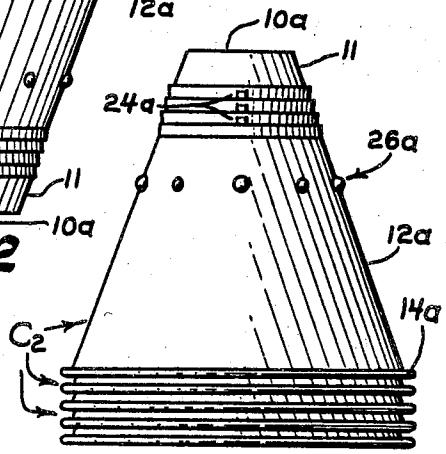


Fig. 3

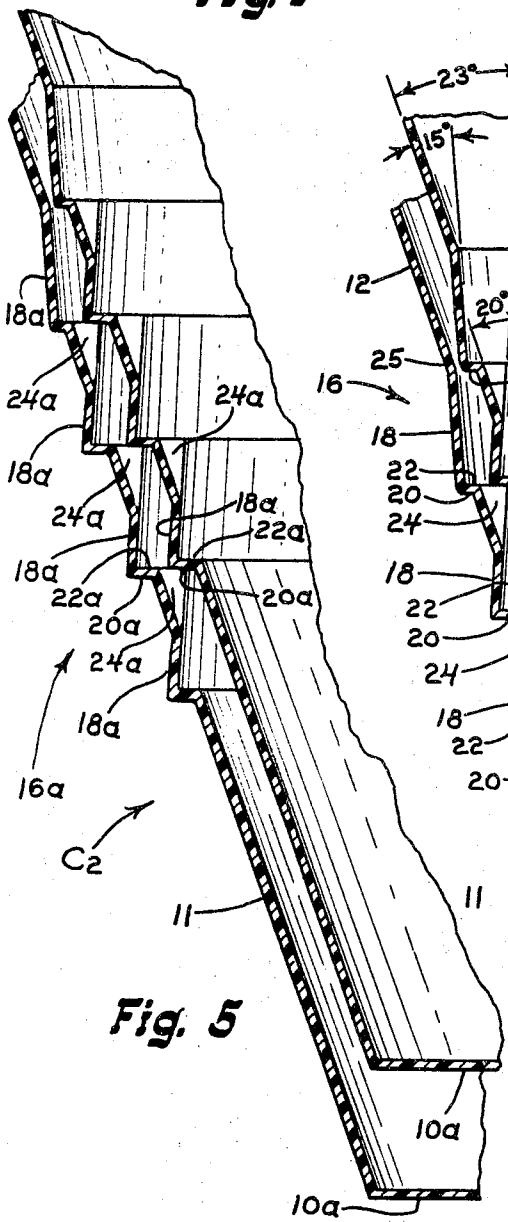


Fig. 5

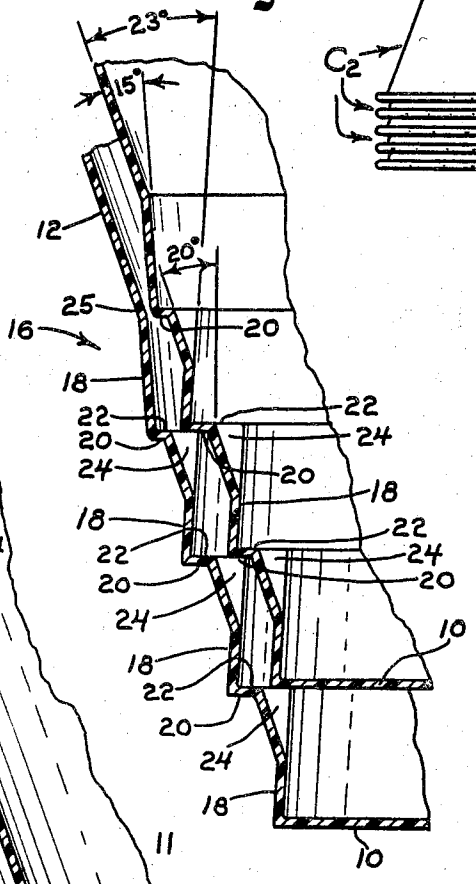


Fig. 4

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DISPOSABLE CONTAINER

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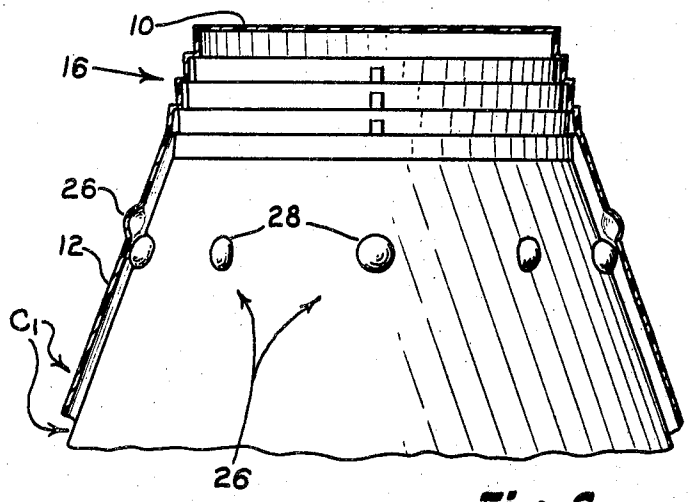


Fig. 6

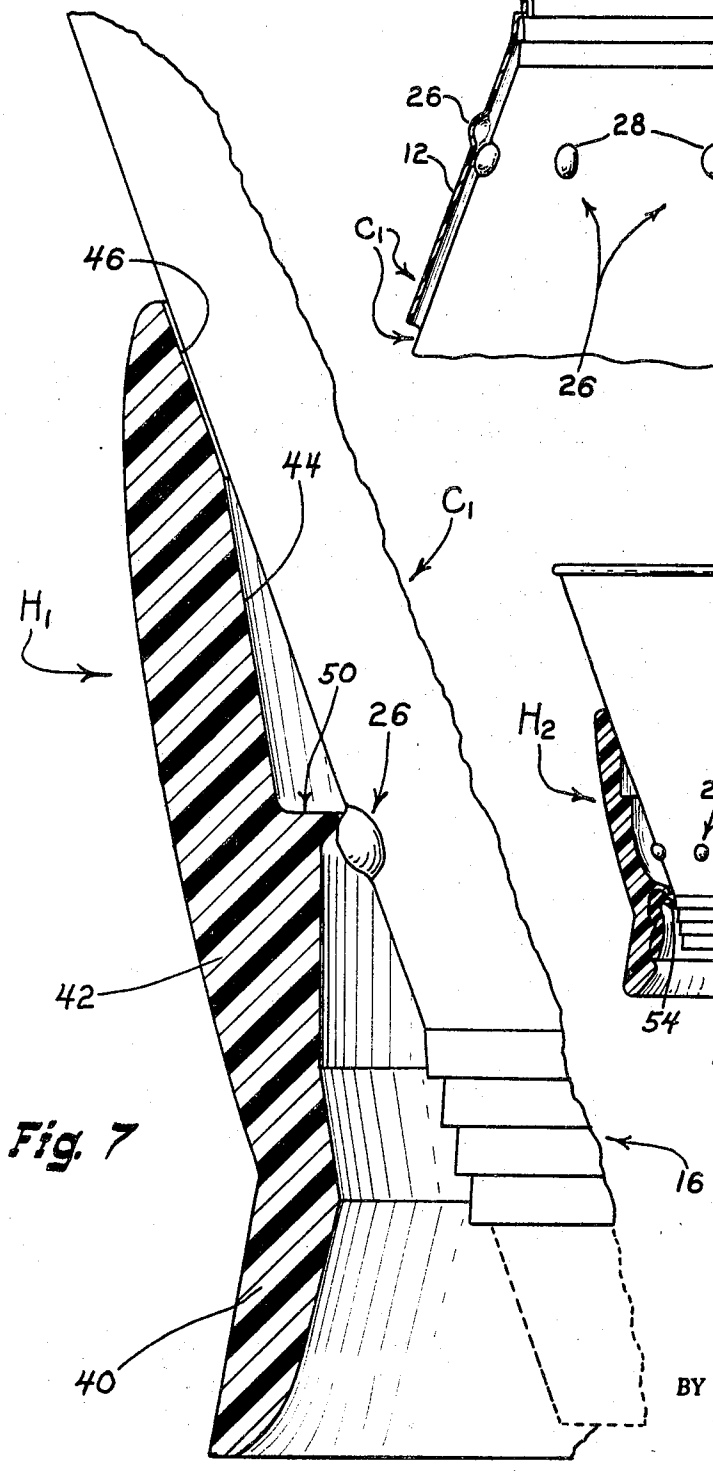


Fig. 7

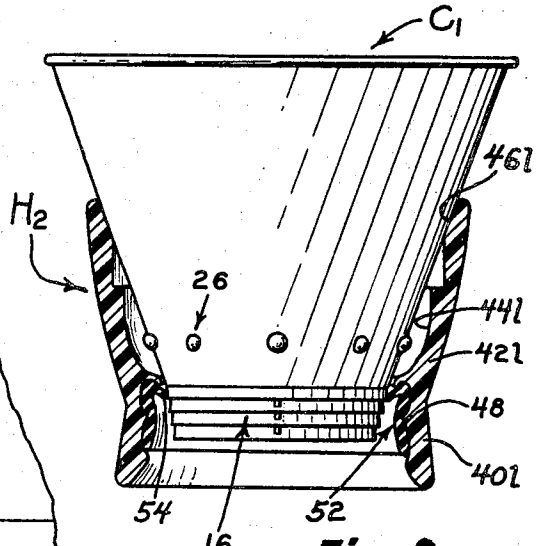


Fig. 8

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DISPOSABLE CONTAINER

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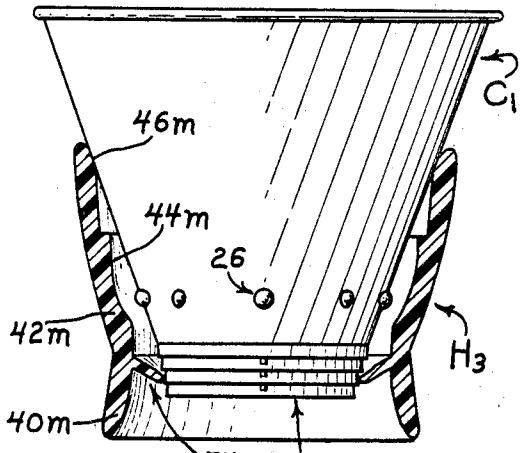


Fig. 9

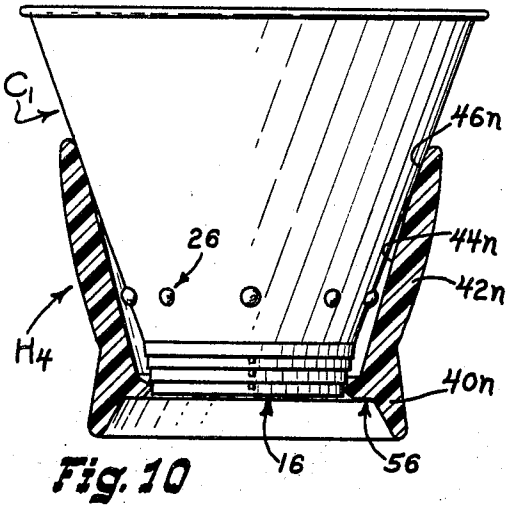


Fig. 10

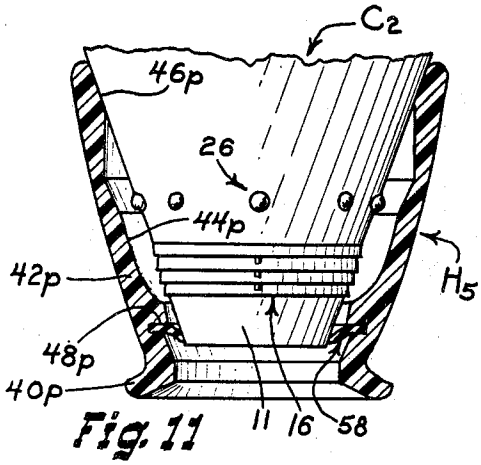


Fig. 11

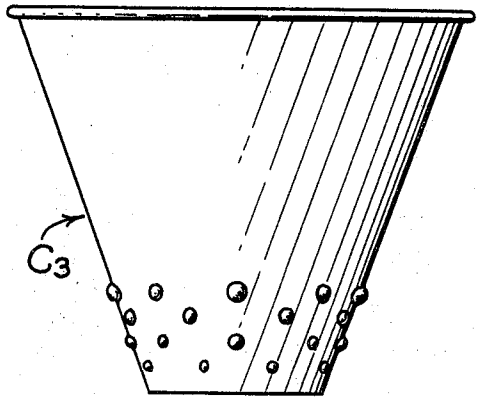


Fig. 12

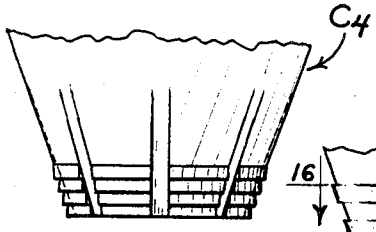


Fig. 13

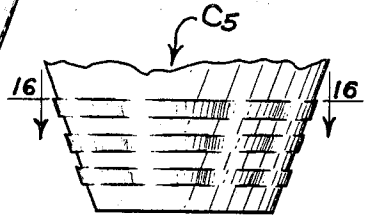


Fig. 15

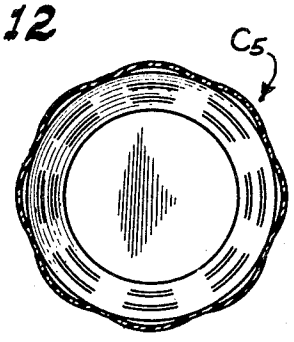


Fig. 16

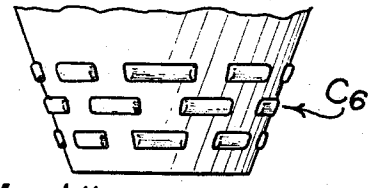


Fig. 14

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United States Patent Office 3,401,862 Patented Sept. 17, 1968

3,401,862

DISPOSABLE CONTAINER

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Continuation of application Ser. No. 366,081, May 8, 1964, now Patent No. 3,232,512. This application Aug. 3, 1966, Ser. No. 579,443

13 Claims. (Cl. 229—1.5)

ABSTRACT OF THE DISCLOSURE

A thin wall thermoplastic container for use with a supporting holder, and the combination thereof, wherein the container and supporting holder are provided with cooperating means for releasably retaining the container within the supporting holder.

This is a continuation of Ser. No. 366,081 filed May 8, 1964, now abandoned.

The present invention relates in general to plastic articles formed from a web of thermoplastic material, and more particularly to a plastic disposable insert cup which is adapted to be inserted and retained within hollow supporting holders of varying configuration.

The present invention is an improvement over the article disclosed and claimed in my copending application entitled, Stackable Insert Container With Axially Spaced Engaging Surfaces, filed on an even date herewith, with Ser. No. 366,081, now Patent No. 3,232,512.

Conically shaped disposable insert cups made from paper products are used quite extensively in soda fountains and other similar establishments for beverage, ice cream and other food products. These cups will normally be stacked in inverted relationship on a supporting table or other convenient location, and removed one at a time from the stack. Removal of individual cups from the stack is, in most cases, accomplished by a hollow supporting holder which is inserted axially over the uppermost container for gripping a portion of the container so as to secure and support the container therewithin.

As discussed in my above mentioned copending application, pressing the supporting holder over the uppermost cup in a stack tends to create a situation where it is not always possible to freely separate individual cups. The inherent weakness of paper cups, together with the relatively rigid column of cups that is created when the supporting holder axially squeezes the cups together, decreases the possibility that single cups will be removed from the stack. The variety of supporting holders now commercially available further complicates the situation since while the supporting holders of one manufacturer may function effectively with the cups he makes, they may not always work with cups produced by a competitor.

In my copending application, I disclose and claim a novel disposable insert container or cup which limits the extent of telescopic association of like containers to enhance individual container separation from a stack, while also permitting the container to be releasably retained within a plurality of dissimilarly configured supporting holders. It has been found however that, while the stacking feature of the above disclosed container will prevent wedging between nested containers, air can be entrapped between adjacent containers, and this tends to hold the containers together when an attempt is made to remove containers one at a time from the stack. The present invention eliminates this difficulty, and at the same time preserves the stacking and holder engaging features in a disposable insert cup.

Accordingly, it is an object of the present invention to provide a disposable insert cup which is so configured that it assures air communication between nested containers to provide individual cup separation.

Another object of the present invention is the provision of a novel disposable insert cup which, in addition to promoting the introduction of air between adjacently stacked containers, prevents wedging therebetween.

A still further object of the present invention is the provision of a disposable insert cup or container, which in addition to the aforementioned objects, also promotes gripping engagement with a variety of supporting holders of dissimilar configurations.

More particularly, it is an object of the present invention to provide a novel disposable container which can be accommodated and securely retained in a releasable manner within a plurality of dissimilarly configured supporting holders, and which, when nested together with containers of like configuration, will facilitate individual cup separation.

Still another object of the present invention is the provision of a novel disposable insert container which will have maximum gripping engagement with a plurality of dissimilarly configured containers, while also affording freedom of individual cup separation.

Another object of the present invention is to provide a one piece disposable insert cup which is inherently stronger than prior disposable insert cups and not subject to attendant leakage.

Other objects and advantages will become apparent from the following description when taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a front elevational view of one form of nestable insert cup constructed in accordance with the present invention;

FIG. 2 is a front elevational view of another form of nestable insert cup contemplated by the present invention;

FIG. 3 is a front elevational view of an inverted stack of nestable insert cups each having a shape identical to the form of the cup shown in FIG. 2 of the drawings;

FIG. 4 is an enlarged fragmentary sectional view illustrating the stacking between cups of the FIG. 1 variety;

FIG. 5 is an enlarged fragmentary sectional view illustrating the stacking between cups of the FIG. 2 variety;

FIG. 6 is an enlarged fragmentary sectional view further illustrating the stacking between cups of the FIG. 1 variety;

FIG. 7 is an enlarged fragmentary front elevational view, partly in section, of the form of cup shown in FIG. 1 as it is mounted within one form of supporting holder;

FIG. 8 is a front elevational view, partly in section, of the FIG. 1 cup as mounted within another form of supporting holder;

FIG. 9 is a front elevational view, partly in section, of the FIG. 1 cup as mounted within still another form of supporting holder;

FIG. 10 is a front elevational view, partly in section, of the FIG. 1 cup as mounted within yet still another form of supporting holder;

FIG. 11 is a fragmentary front elevational view, partly in section, of the FIG. 2 cup as mounted within one still further form of supporting holder;

FIG. 12 is a front elevational view of a modified form of disposable insert cup constructed in accordance with the principles of the present invention;

FIG. 13 is a fragmentary front elevational view of still

another form of disposable insert cup contemplated by the present invention;

FIG. 14 is a fragmentary front elevational view of yet still another form of disposable insert cup coming within the purview of the present invention;

FIG. 15 is a fragmentary front elevational view of one still further form of novel insert cup contemplated by the present invention; and

FIG. 16 is a sectional view of the cup shown in FIG. 15, and taken along line **16—16** thereof.

In the discussion that follows, it will become apparent that the disposable insert cup of the present invention can be associated with several forms of commercial holders now presently available. It is to be understood, however, that the disclosed forms of both the disposable insert cup and its supporting holder are to be viewed in an illustrative sense only, and are not to be taken as the only forms contemplated by the present invention.

Although any kind of material may be employed, the disposable insert cup of the present invention is preferably made of plastic, such as a high impact polystyrene. Such cups have marked advantages over paper cups which have been impregnated or coated with wax. Included among these advantages is the fact that a plastic container can be molded as a seamless thin walled unit without leakage difficulties as is well known in the art.

Referring now to the drawings, and in particular to FIG. 1, it will be seen that the form of disposable insert cup identified C1 is provided with a bottom wall **10**, and an upwardly and outwardly tapering side wall **12** extending therefrom to provide a container of generally frusto-conical shape. It will be observed that the side wall **12** is offset from the vertical axis of the container by an angle of approximately 20°. The side wall **12** terminates at its upper margin in an open top, a radially projecting lip portion **14** being formed integral with the side wall in this vicinity. Lip portion **14** can have various shapes and configurations such as discussed in my copending application. It is to be noted that cup C1 is provided with first and second axially spaced gripping areas designated **16**, **26** respectively for positive retention within hollow supporting holders of varying configuration as will subsequently appear.

The disposable insert cup shown in FIGS. 2–3 of the drawings and identified C1 is substantially similar to disposable insert cup C1 as indicated by the application of identical reference numerals with the suffix *a* employed to designate like parts. Cup C2 is also provided with axially spaced first and second gripping areas **16***a*, **26***a* respectively; however, in this instance, the first gripping area **16***a* is axially spaced upwards from the bottom wall **10***a* of the cup so as to provide a frusto-conical section at the lower margin of the side wall **12***a*. This frusto-conical section **11** provides an additional gripping area for one of the supporting holders as will become apparent.

An inspection of FIGS. 7–11 will reveal that the disposable insert cup C1 is capable of being mounted within and retained by gripping elements associated with the supporting holders designated H1–H4 whereas the cup C2, in addition to being mounted within such holders, is also capable of being received and retained within a supporting holder designated H5 in FIG. 11. This is due to the additional frusto-conical section **11** adjacent the bottom wall of cup C2.

Holders H1–H5 are illustrations of various types of supporting holders which are commercially available. The holders are generally similar in appearance, but have various gripping elements associated therewith at different axial heights in the holders as dictated by the manufacturer of the same. To facilitate an understanding of the various holder configurations, a discussion will first be given relative to holder H1, and will be followed by a comparison of holders H2–H5 therewith.

Holder H1 has a base **40**, and a hollow container support **42**. The inner peripheral wall **44** of the container support **42** has a tapered mouth area **46** which is generally complementary to the side wall taper of the containers C1, C2. Projecting radially inwardly from this inner peripheral wall of the container support is a gripping element **50**, which is in the form of an integral projection. As best seen in FIG. 7, this projection is adapted to cooperate with the second gripping area designated **26** in cup C1.

Holders H2–H5 as seen in FIGS. 8–11 respectively, are substantially similar to the H1 holder as indicated by the application of identical reference numerals with the suffix *l*, *m*, *n*, and *p* employed to designate like parts on holders H2, H3, H4 and H5. The holder H2, instead of having a relatively rigid abutment formed on the internal peripheral wall of the container support, is provided with an opening **48** in the internal peripheral wall **44***l* of the container support **42***l* for receiving the annular resilient grommet **52**. Grommet **52** is at a lower level than the integral projection **50** in holder H1, and thus a portion of the first gripping area **16** has been provided for cooperation therewith to axially restrain the container within this holder.

Holders H3, H4, shown in FIGS. 9, 10 of the drawings are provided with an integral finger and ring gripping element designated **54**, **56** respectively which is similar to the integral projection **50** in the H1 holder construction, but it should be noted that each of these gripping elements are formed at a different axial height with respect to each other and to the integral projection **50**. This has necessitated the provision of additional engaging portions in the first gripping area **16** for accommodating and retaining container C1 within each of the holders.

Holders H1–H4 have substantially the same axial height, but the holder H5 shown in FIG. 11 of the drawings has a slightly greater axial height. Holder H5 is also provided with an annular resilient grommet **58** which is received within an opening **48***p* formed in the internal peripheral wall **44***p* of the holder in a similar manner as the H2 holder. The grommet is designed to engage the frusto-conical section **11** projecting upwardly from the bottom wall in the C2 cup.

Where a conically-shaped paper cup of conventional character is used, each of the holders designated H1–H5 will engage different axial locations of the cup, but because of the inherent weakness of paper, there is no assurance that the cup will be positively restrained against tilting or accidental dislodgment when the cup is filled with a beverage or the like. In contrast to this, the disposable insert cup of the present invention in either of its two basic forms, will conform itself to a plurality of hollow supporting holders, and at the same time, positively engage the gripping elements of the holders.

The gripping or engaging portions on cups C1 and C2 have been previously discussed in general terms as first and second gripping areas **16**, **26**. Referring now more particularly to the construction of each of these gripping areas, it will be noted that the first gripping area **16** in cup C1, as best seen in FIG. 4, is provided with a plurality of engaging portions in the form of reinforcing ribs **18** which are adapted to cooperate with variously positioned gripping elements of the above discussed holders. The engaging portions decrease in diameter from the open mouth to the bottom wall as will be apparent. The bottom three engaging portions in each cup are offset from the side wall of the container by an angle of 23°, and since the side wall is offset 20° from the vertical axis of the container, each of such engaging portions have a reverse taper of approximately 3° relative to the vertical axis of the container. The uppermost engaging portion in the first gripping area **16** tapers in the same maner as the side wall **12**, but is offset only 15° from the vertical axis of the container to render underlying support to the side wall. The bottom three engaging portions **18** of the first gripping area each have an externally projecting shoulder **20** at its lower extremity, and an inwardly directed shoulder **22** at its upper extremity having a minimum diameter smaller than the

maximum diameter of the externally projecting shoulder to facilitate stacking of containers one within the other and prevent wedging between adjacent containers by limiting the amount of axial telescopic movement.

While three reversely tapered engaging portions **18** and preferably provided adjacent the bottom wall **10** of the container C1, it is obvious that this number may be reduced or increased as desired. It will also be apparent that only one of the reversely tapered engaging portions **18** need be used for stacking, but in such a case, it would be necessary that this particular engaging portion have an axial height greater than that of the other engaging portions, as well as that of the circumferentially extending spaced protuberances or nubs **28** which are formed in the second gripping area **26** of the container.

The stacking of the container C2 is accomplished in the same manner as the container C1 by the formation of shoulders on the upper and lower extremity of each of the bottom three engaging portions as will be apparent by the application of the suffix *a* to designate like parts in FIG. 5 of the drawings.

While the stacking feature incorporated in each of cups C1, C2 will prevent wedging between adjacent containers by limiting the amount of telescopic association therebetween, as well as spacing the side walls of adjacent containers a predetermined distance from each other, there is a possibility that air trapped in the vicinity of the gripping areas of each of the containers will prevent withdrawal of single cups from a stack of containers. This is primarily due to the fact that a partial vacuum is formed in this area when cups are stacked in nested relationship to each other, even though they are prevented from wedging together. To obviate this difficulty, channel means are formed in both the first and second gripping areas of the containers to assure the introduction of air therebetween, and thus enhance the separation of individual containers from a container stack. In the first gripping area **16**, these channel means take the form of circumferentially spaced grooves **24** which are radially outwardly offset from the inner wall of the bottom three engaging portions **18**. Preferably, there are three sets of such grooves spaced 120° apart around the circumferential periphery of the container. When the containers are nested together, these grooves will permit air to be introduced throughout substantially the entire extent of the side wall to enhance container separation. The juncture **25** between the uppermost engaging portion **18** and the side wall **12** in each container will not interfere with the similarly located engaging portion on a nested container even though this uppermost engaging portion tapers generally in the same direction as the side wall and is offset only 15° from the vertical axis of the container as compared with the 20° angle between the side wall and the container vertical axis.

It is important to note that the channel means formed in the C1 container does not reduce to any great extent the gripping area of the engaging portions **18** since the circumferentially spaced grooves **24** are formed in the internal peripheral wall of the container, and interrupt only a small portion of each engaging portion at circumferential discrete locations. Specifically, it is to be noted that each groove **24** preferably has a width and height which is approximately one half the axial height of an engaging portion **18**, and a depth at any one point less than the inwardly directed shoulder **22** of an engaging portion. While the second gripping area **26** could be formed with an engaging portion or portions similar to the first gripping area **16** construction, it has been found desirable to form an annular series of circumferentially spaced nibs or protuberances **28** which are radially outwardly deflected from the plane of the side wall so as to maintain the predetermined distance between the side walls of nested containers, and also afford passages between adjacent protuberances for the introduction of air therebetween. These protuberances are preferably hemispherical in configuration to provide a maximum cushion effect between adjacent containers, while also affording an effective engaging area with the gripping element of the H1 holder as best seen in FIG. 7.

Various types of engaging portion configurations are available for the disposable insert cup of the present invention, some examples of which are shown in FIGS. 12–16 of the drawings. In each of these views, it will be observed that there is no axially spaced first and second gripping area; however, it is to be understood that this can be provided if desired. The cup C3 shown in FIG. 12 of the drawings incorporates the circumferentially spaced protuberances which are exclusively used in the second gripping area of the preferred form of cup. It is to be noted that these circumferentially spaced protuberances are arranged in rows, the protuberances in one row being nonaligned with those of an adjacent row. In FIG. 13, the cup C4 is shown as being provided with a plurality of gripping portions decreasing in diameter from the open mouth to the bottom wall in the same manner as the preferred form of cup, and in this case, a plurality of axially extending grooves are provided which interrupt these gripping portions at circumferentially spaced locations. Cup C5 shown in FIGS. 15–16 is provided with circumferentially extending wavy portions which incorporate the engaging and channel features of the present invention. The cup C6 shown in FIG. 14 is constructed similarly to the FIG. 12 embodiment, but instead of providing hemi-spherical protuberances, the protuberances have an elongated rectangular shape.

The preferred construction of the disposable insert cup of the present invention is such that the bottom wall is at least two and one half times less than the diameter of the cup at its open mouth. Although this will reduce the possibility that the cup would be able to support itself in an upright position, it will facilitate the entry within supporting holders of the above mentioned type with which the cup of the present invention is designed for use.

From the foregoing, it will now be appreciated that the disposable insert cup of the present invention will facilitate the stacking as well as the ready separation of individual containers from a stack, while also permitting the containers to be engaged and retained within a plurality of dissimilary configured supporting holders. The engaging and rim portions of each container also aid in laterally strengthening the same as will be apparent. The containers will be inherently stronger and not subject to leakage since in a preferred form they are molded in one piece from a web of thermoplastic material as is well known in the art.

Although specific embodiments have been shown and described herein, it is with full awareness that many modifications thereof are possible. The invention, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim:

1. A seamless nestable thin wall thermoplastic container capable of being telescoped into and retained within a complementary hollow supporting holder, said container comprising a bottom wall and peripherally continuous side walls extending upwardly and outwardly from said bottom wall and terminating in an open upper end, said container generally defining a frusto-conical configuration wherein said side walls have a predetermined angular relationship with respect to the axis of the container to present a diametrical span at the open upper end at least two and one-half times greater than the diameter of said bottom wall, said side wall being provided with an annular series of circumferenttially spaced, outwardly extending protuberances spaced upwardly from the juncture of said bottom and side walls and presenting cam surfaces both toward the bottom wall and open upper end of the container, the cam surfaces and the resiliency of said protuberances being such in relation to the cir-

cumferential spacing of the protuberances and the shaping and resiliency of the connecting side wall that upon telescopic association of the container with a complementary hollow supporting holder said protuberances will be moved inwardly with said connecting portions of the side wall intermediate adjacent protuberances being flexed outwardly to provide a minimum diameter measurement enabling passage of the protuberances beyond an internal abutment surface in the complementary hollow supporting holder, said protuberances when returned to normal position beneath the abutment surface of said holder forming an underlying portion to retain said container against inadvertent telescopic disassociation relative to the holder.

2. A container of the type defined in claim 1 and including stacking means spaced from and having a greater axial height than the protuberances for cooperation with the stacking means of adjacent containers of identical construction when telescopically nested in a vertical stack of containers.

3. A container of the type set forth in claim 1 wherein the side walls of the container intermediate said protuberances and said bottom wall is formed to provide a series of ribs for reinforcing the wall construction of the container without interfering with telescopically associated containers of identical configuration when nested together, said ribs adapted to be engaged by complementary gripping elements provided in other hollow supporting holders.

4. A container of the type set forth in claim 1 wherein said container is provided in the vicinity of said open upper end with a laterally extending thickened rim portion for reinforcing said open upper end to facilitate its use for drinking purposes and handling.

5. A container of the type defined in claim 1 wherein the side walls of the container intermediate said protuberances and said bottom wall is formed to provide a series of reinforcing ribs, at least one of said ribs being provided with an externally projecting shoulder at its lower extremity and inwardly directed shoulder at its upper extremity, the inwardly directed shoulder of each such rib projecting inwardly by an amount sufficient to cause the externally projecting shoulder of a similarly located rib on an identically configured container to rest thereupon and limit the extent to telescopic association of said containers.

6. A container as set forth in claim 5 wherein each reinforcing rib configured for stacking is provided with channel means assuring air communication between nested containers and freedom of individual container separation from a container stack.

7. A container of the type set forth in claim 6 wherein said reinforcing ribs are circumferentially extending stepped abutments decreasing in diameter from said open upper end to said bottom wall, and said channel means includes circumferentially spaced grooves radially inwardly offset from the outer periphery from the container side wall and intersecting each reinforcing rib.

8. The container as set forth in claim 6 wherein said channel means includes circumferentially spaced grooves formed in said container side wall and intersecting each of said reinforcing ribs.

9. A container as set forth in claim 1 wherein part of the container side wall extends beneath said engaging portions to serve as an additional container holder embracing portion.

10. The combination of a one-piece thermoplastic container body and a complementary hollow supporting holder having annular rigid projection means formed on the internal wall surface therof, said container body having a bottom portion and a peripherally continuous upwardly and outwardly tapering side wall including an annular series of circumferentially spaced, outwardly extending protuberances provided in the side wall for cooperation with the annular rigid projection means of said complementary hollow supporting holder, said protuberances having an increased transverse dimension relative to the internal dimension of said annular rigid projection means and said protuberances and projection means being provided with sliding contact surfaces for initial inward flexing thereof upon engaging said projection means, the container side wall intermediate said protuberances being resilient to permit said protuberances to be moved past said projection means for underlying engagement therewith to retain said container within said holder.

11. The combination of a one-piece thermoplastic container body with any one of a plurality of complementary hollow supporting holders having resilient annular container embracing means situated in the interior thereof, said container body including a bottom wall and peripherally continuous outwardly diverging side walls which terminate in an open upper end, said container body being provided with first and second axially spaced gripping areas for engagement by the container embracing means of said complementary supporting holders, one of said gripping areas having at least one engaging surface radially outwardly offset from the container body side wall, the minimum diameter of said engaging surface being greater than the maximum diameter of said resilient annular container embracing means for releasably retaining said container body within one of said hollow supporting holders, the other of said gripping areas including a series of circumferentially spaced, outwardly extending protuberances of increased transverse dimension relative to the internal dimension of the annular rigid projection means of a complementary hollow supporting holder for initial inward flexing thereof and subsequent underlying engagement therewith to retain said container body within another of said hollow supporting holders.

12. The combination of a seamless thin wall thermoplastic container and a complementary hollow supporting holder having rigid projection means formed on the internal wall surface thereof, said container having a bottom wall and a peripherally continuous side wall extending upwards and outwards from the bottom wall and terminating in an open upper end, the side wall having outwardly extending flexible protuberance means for cooperation with the rigid projection means of said complementary hollow supporting holder, one of said means being circumferentially discontinuous and the other of said means being circumferentially continuous to provide unengaged resilient sections in circumferentially spaced relation on the container wall, the outwardly extending protuberance means having an increased transverse dimension relative to the maximum internal dimension of said rigid projection means and said container protuberance means and holder projection means having upper and lower cam faces to cause camming engagement of said container protuberance means with said holder projection means upon telescopic association and disassociation of said container and holder for flexing of said resilient sections upon movement of said protuberance means past said holder projection means, said protuberance means being adapted to be positioned in underlying engagement relative to the holder projection means for retaining the container within the holder, said circumferentially discontinuous means and said resilient sections functioning to assure passage of said container protuberance means relative to the holder projection means upon telescopic association and disassociation of said container and holder relative to each other.

13. The combination of a one-piece thermoplastic container body and a complementary hollow supporting holder having an internal projection in the side wall thereof, the container being capable of being telescoped into and retained within the holder, the container comprising a bottom wall and a peripherally continuous side wall extending upwardly and outwardly from the bottom

wall and terminating in an open upper end, the side wall having a radially outwardly extending shoulder which is configured and arranged relative to the internal projection of the holder to make circumferentially localized oblique contact from above with the internal projection to displace the outwardly extending shoulder inwardly relative to the remainder of the container enabling movement of the shoulder past the internal projection by a camming action, the shoulder then returning to its normal position beneath the internal projection to make circumferentially localized oblique contact with the internal projection from below so as to retain the container against inadvertent telescopic disassociation relative to the holder, but enabling return passage of the shoulder past the internal projection by a camming action.

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