Title: MULTI-PACK SINGLE SERVE CONTAINERS

Abstract: A container system (100) can include a plurality of plastic containers (102, 104, 106, 108), each container joined to an adjacent container by a pinched region (110). The pinched region can be made of a plastic and be continuous with the plastic containers. The container system can be formed from an array (500). The array can be blow molded, for example extrusion blow molded.
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- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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Multi-Pack Single Serve Containers

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates generally to a multipack of containers. More particularly the invention relates to a multipack of containers joined side by side.

Related Art

[0002] Plastic containers have become commonplace for the packaging of beverages. A particularly common use is the packaging of a single serving size, for example, 8-16 fluid oz., in a plastic container. This size of serving is common for water, fruit juices and sports drinks. Single serving size containers are frequently marketed and sold as individual units. However, there is a demand for marketing multiple units for purchase in bulk quantities.

[0003] Several methods have been used for packaging multiple units of single serve containers, most of which require secondary packaging. For example, units can be packaged as a "case" of 12-24 containers. Most commonly, this involves placing multiple containers in, for example, a cardboard box, and shrink wrapping the box and containers for sale as a single unit. Another method that has been employed is the use of plastic holders that consist of a number of rings. Each ring is fiction fit over the neck of a single container, and the rings hold the package together. The holder can include additional holes for holding and carrying the containers as a unit. This type of system generally holds 4-8 containers. Another type of packaging is the use of a cardboard container sealed around a group of containers. These systems are common for cans and typically hold from 6-24 individual containers. Yet another means of packaging multiple products is the placement of a shrink wrap, without the supporting box described above, around multiple containers. This method generally accommodates from 4-12 individual containers.

[0004] Each of these methods suffers from drawbacks. Use of a cardboard box and shrink wrap adds cost to the packaging of the filled containers. A plastic holder adds some cost to production, adds an additional part for disposal and disposal of the ringed holder can present environmental hazards to animals. Use of sealed cardboard packaging also adds cost to processing and packaging, and, when individual containers are removed from the open box, the packaging remains bulky, although is may be only partially filled. Finally, with the use of shrink wrap alone, when the shrink wrap is opened and one or more containers removed, the individual units are no longer held together securely and can fall out of the shrink wrap.
[0005] There is thus a continuing need for packaging that can securely and economically hold multiple individual containers for sale, transport and use.

**BRIEF SUMMARY OF THE INVENTION**

[0006] In summary, the invention includes a plurality of containers joined by plastic pinched regions formed from the flash region between the containers. The pinched regions can be perforated. Individual containers can be removed from the unit by tearing along the pinched region, which leaves the remaining containers as an intact unit.

[0007] This invention omits an element employed in the prior art without loss of ability. In particular, the invention reduces or eliminates the need for secondary wrapping or casing in the packaging of multiple containers. The reduction in packaging can reduce production, packaging and disposal costs.

[0008] This invention differs from the prior art in modifications which were not previously known or suggested. Containers have not previously been interconnected for packaging and marketing purposes.

[0009] In one aspect, the present invention is a container system made up of a plurality of plastic containers, where each container is joined to an adjacent container by a pinched region that is continuous with the plastic containers. The pinched region can be perforated. The containers can be formed simultaneously in a blow molding process and the pinched region formed by compression molding in the flash region between the containers. The containers are separable by tearing along the pinched region.

[0010] The system can include four containers that can be substantially square. In this exemplary system, each container is joined to an adjacent container by a pinched region and the two inner containers have pinched regions at opposite corners of the container. A system according to the invention can include a first connector attached to a first outer container and a second complementary connector attached a second outer container, where the first and second connectors are capable of being interconnected. The containers can be configured in a substantially square arrangement, where each container has a side in contact with a side of an adjacent container and the first outer container having a side in contact with a side of the second outer container. The square arrangement can have a shrink wrap label around the containers. If the system has connectors on the outer containers, the first connector can be fastened to the second container such that the substantially square arrangement is maintained.
[0011] In another aspect, the invention is a method of making a container system by molding in a blow mold a plurality of plastic containers having a pinched region between adjacent containers. The method can include extrusion blow molding the containers. The containers can be blowmolded from a single parison, that can be extruded along an axis that is substantially perpendicular to the longitudinal axis of the containers. The pinched region can be formed by compression molding when the blow mold cavities are closed around a parison, which can be formed in a flash pocket of the blow mold. Holes can be formed in a flash region between two adjacent containers. The method can also include folding the container system into a compact configuration.

[0012] In another aspect, the invention is an array of a plurality of plastic containers, each container joined to an adjacent container by a pinched region. The pinched region is plastic and is continuous with the plastic containers. The array also includes a manifold connected to each container by an inlet that joins the cavity of the manifold at a moil attached to a finish of each container. The manifold can have a blow hole that was formed during blow molding of the array. The pinched region of the array can include a perforation. The array can have a tail flash attached to the containers and a flash region between the containers. The flash region can include a perforation where it meets the container. There can also be holes in the flash region.

[0013] Further objectives and advantages, as well as the structure and function of preferred embodiments will become apparent from a consideration of the description, drawings, and examples.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The foregoing and other features and advantages of the invention will be apparent from the following, more particular description of a preferred embodiment of the invention, as illustrated in the accompanying drawings wherein like reference numbers generally indicate identical, functionally similar, and/or structurally similar elements.

[0015] FIG. 1 depicts a front view of a container system according to an exemplary embodiment of the present invention;

[0016] FIG. 2 depicts a detail of the pinched region joining adjacent containers according to an exemplary embodiment of the present invention;

[0017] FIG. 3 depicts a top view of an exemplary containers system and the folding of multiple containers according to an exemplary embodiment of the present invention;
FIG. 4 depicts a detail of an exemplary embodiment of a latch that may be present according to the present invention; and

FIG. 5 depicts a container array from which a container system can be prepared according to an exemplary embodiment of the present invention.

5 DETAILED DESCRIPTION OF THE INVENTION

Embodiments of the invention are discussed in detail below. In describing embodiments, specific terminology is employed for the sake of clarity. However, the invention is not intended to be limited to the specific terminology so selected. While specific exemplary embodiments are discussed, it should be understood that this is done for illustration purposes only. A person skilled in the relevant art will recognize that other components and configurations can be used without parting from the spirit and scope of the invention. All references cited herein are incorporated by reference as if each had been individually incorporated.

According to the invention, a series of laterally positioned containers can be molded, for example blow molded. Any number of containers can be present in a side by side configuration. In some embodiments, an even number of containers can be blow molded side by side with the flash between the bottles being perforated by pinch between the mold cavities. Optionally, this set of containers can be folded together into a compact multi pack bundle that can be fastened by a connector, such as a latch, that can be compression molded in the flash at the ends of the series of containers. This creates a multi pack system for containers that can be torn apart at the perforations and consumed individually.

The invention can therefore be considered a system of multiple, individually fillable containers. FIG. 1 depicts a front view of a container system 100 according to an exemplary embodiment of the present invention that includes four containers 102-108. Adjacent containers, for example the first outer container 102 and inner container 104, are joined by a pinched region 110. The pinched region 110 can be formed in a flash region between adjacent containers during the blow molding process, described in more detail below. The individual containers can be any size. However, the container system of the present invention is particularly useful when the containers hold a single serving size of the contents. As shown in the detail of the pinched region of FIG. 2, the pinched region can include perforations 200. The perforations further facilitate separation of adjacent containers by tearing. In the embodiment
illustrated in FIG. 1, the first and second outer containers 102, 108 include complementary connectors 112, 114. As described further below, embodiments of the invention can be manufactured so as to be foldable to form a more compact configuration that would bring the outer containers 102, 108 in contact with one another. The connectors 112, 114 can then be used to fasten the outer containers 102, 108 to one another holding the compact configuration of the package.

[0023] FIG. 3A depicts a top view of a container system 300 according to the present invention. In the illustrated embodiment, the individual containers 302-308 are generally square in shape with rounded or chamfered corners. The containers are joined by pinched regions 310a-310c between adjacent corners of adjacent containers. On the first and second inner containers 304, 306, the pinched regions 310a-310c are located at opposite corners of the square. The outer containers 302, 308 have complementary first and second connectors 312, 314 located at corners opposite the corner bearing the pinched region 310 that connects the respective outer container to the adjacent inner containers 304, 306. FIGS. 3A-3D illustrate how the container system 300 can be folded to form a more compact configuration 320. As shown in FIG. 3B, the first outer container 302 is folded about the pinched region 310a such that a side 302a of the first outer container 302 comes in contact with a side 304a of the first inner container 304. In FIG. 3C, the first inner container 304 is folded about the pinched region 310b such that a side 304b of the first inner container 304 comes in contact with a side 306b of the second inner container 306, while maintaining the configuration of the first outer container 302 and first inner container 304. In FIG. 3D, the second inner container 306 is folded about the pinched region 310c such that a side 306c of the second inner container 306 comes in contact with a side 308c of the second outer container 308, while maintaining the configuration of the remaining containers. As will be understood, the pinched regions 310a-310c must have a length sufficient to allow bending and contact of the sides of adjacent containers, for example, the first outer container side 302a and adjacent inner container side 304a.

[0024] The compact configuration 320 illustrated in FIG. 3D can be held in place by way of the complementary connectors 312, 314 on the first and second outer containers 320, 308. As can be seen, a side 302b of the first container 302 and a side 308b of the second container 308 are brought into contact by the folding of the container system 300 illustrated in FIG. 3. Accordingly, the first and second connectors 312, 314 are brought into proximity. As illustrated
in the detail of FIG. 4, the connectors 312, 314 can comprise a pair of complementary hooks. One of the hooks 312 has its open end facing upward and the other hook 314 has its open end facing downward. These hooks can then be interconnected as illustrated in FIG. 4 in order to hold the containers in the compact configuration 320.

[0025] A compact configuration, such as the illustrated square configuration 320 can be maintained by several means in addition to or instead of the illustrated hooks. For example, rather than the pair of hooks illustrated, the connectors could include a blow molded hook and eye on the first and second outer containers, respectively. Other connector configurations can also be used. Alternatively, connectors can be absent from the outer containers, and the configuration maintained by placing a label, for example a shrink wrap, around the compact structure. The shrink wrap can in this case include a label, logo or other product identifying information. As will be understood, although not necessary, it may be advantageous to apply a shrink wrap label around a compact configuration of containers even if connectors are used. Even when a shrink wrap or other label is applied around the compact configuration, the present invention offers advantages over prior art packaging solutions. In particular, the shrink wrap can be removed and a single container removed from the packaging. The unused containers remain connected together, and can therefore be transported or carried more easily, without the possibility of a single container becoming dislodged and falling from the package.

[0026] Individual containers according to the invention can have a variety of cross sectional shapes in addition to the substantially square shape described above and shown in FIG. 3. Where the system is intended to be folded into a compact configuration, substantially polyhedral cross sectional shapes with relatively flat sides can be useful. When prepared by a blow molding process, the polyhedral shapes can have rounded or chamfered corners, such as in the square embodiment illustrated in FIG. 3. In cases where the system will not be folded into a compact configuration, the individual containers can be rounded, for example circular or oval. In either case, a combination of flat and rounded sides can also be used.

[0027] The container system 100 has a one-piece construction and can be prepared from a monolayer plastic material, such as a polyamide, for example, nylon; a polyolefin such as polyethylene, for example, low density polyethylene (LDPE) or high density polyethylene (HDPE), or polypropylene; a polyester, for example polyethylene terephthalate (PET), polyethylene naphthalate (PEN); or others, which can also include additives to vary the physical
or chemical properties of the material. For example, some plastic resins can be modified to improve the oxygen permeability. Alternatively, the container can be prepared from a multilayer plastic material. The layers can be any plastic material, including virgin, recycled and reground material, and can include plastics or other materials with additives to improve physical properties of the container. In addition to the above-mentioned materials, other materials often used in multilayer plastic containers include, for example, ethylvinyl alcohol (EVOH) and tie layers or binders to hold together materials that are subject to delamination when used in adjacent layers. A coating may be applied over the monolayer or multilayer material, for example to introduce oxygen barrier properties.

A container system according to the invention can be made by processes known for the production of plastic containers. In particular, the container can be prepared by a blow molding process, for example extrusion blow molding. An exemplary method for preparing the present container system utilizes technology for producing container arrays in an extrusion blow molding apparatus. This methodology is disclosed in co-pending U.S. Patent Application No. 60/628,651, entitled "Multi-Container Array and Method of Making Same" of common assignee, which is incorporated herein by reference in its entirety. Briefly, the system can be prepared from a mold constructed such that the mold cavities are arranged in a side by side manner and can be perpendicular to the long side of the mold. Above and along the container necks, at an edge of the mold, is located a long blow channel, which is supplied with blow air from one blow cylinder and needle. The cavities have pinches along the sides which form the pinched regions between the containers. Only one parison is required to produce all of the containers of the container system.

Using the methodology described above, an array of containers 500, as shown in FIG. 5, can be produced. The illustrated array 500, includes the individual containers 502-508 joined by pinched regions 510. The array can be prepared in an extrusion blow molding apparatus where the parison is blown along the direction Dp. The containers are connected to a manifold 516 and blown through a single blow needle, leaving a blow hole 518. The individual containers are connected to the manifold at a moil region 522, which is located at the finish end of the containers, and is connected to the manifold 516 through an inlet 524. This allows air or another inflating gas blown into the manifold 516 to enter into and inflate the containers within the mold cavity. As the mold halves in such a system close, the pinched region 510 is formed by
compression molding in the flash pockets between the containers. The flash pockets can be configured to produce perforations, as shown in FIG. 2, during the blow molding process. As with other extrusion blow molding processes, the array 500, as formed, can include additional flash 526 between the containers as well as a tail flash region 528.

[0030] After molding, excess material is trimmed from the array 500. For example, the tail flash 528 is removed and the containers are cut between the finish 532 and moil 522 to separate the containers from the moil 522 and manifold 516. Excess flash 526 located between the containers is trimmed, at least to expose the finish of the containers so that a closure can be applied. The pinched regions 510 are maintained in the array.

[0031] FIG. 5 illustrates an additional possible feature of the invention. The flash region 526 can be molded to include holes 530. During trimming, only enough flash is removed to allow a closure to be applied to the finish 532. The region of the flash where the hole 530 is located is maintained, for example by cutting at about the position of the dotted line 534 shown in FIG. 5. The holes 530 can then be used for carrying or transporting the container system.

Alternatively, holes can be formed in the flash between the containers by cutting or reaming after molding. To facilitate removal of the flash around the holes in use, perforations can be formed at the region 536 where the flash meets the container wall. Using this embodiment, the containers can be maintained in a linear array, i.e. not folded into a compact configuration as in FIG. 3, yet still be separable for use.

[0032] After manufacturing, the containers are filled and processed according to methods generally known in the art, although some equipment modification may be required. Any required modification can be accomplished by persons skilled in the relevant art using routine, known methods. The individual containers are filled, either sequentially or simultaneously, by any process including hot fill and cold fill processes. The containers can be used to package a wide variety of liquid, viscous or solid products including, for example, juices, other beverages, yogurt, sauces, pudding, lotions, soaps in liquid or gel form, and bead shaped objects such as candy. Closures are applied to each container, again either sequentially or simultaneously, after filling. The containers can then be folded into a compact configuration, if desired, using a manual or automated process, and the connectors, if present, can be engaged to maintain the compact configuration. A label or shrink wrap can be applied to the container system, whether or not it is folded into a compact configuration and whether or not connectors are used.
[0033] In use, a consumer purchases a container system that is made up of a plurality of containers joined by pinched regions. Any label or shrink wrap that has been applied to the entire system is removed. If the system is being held in a compact configuration by connectors, the connectors are unfastened. An outermost container is then removed from the container system by tearing along the pinched region between it and the next most interior container. Perforation of the pinched region helps facilitate tearing and separating of the containers without tearing a hole in the container that would allow the enclosed product to spill or leak. Where flash remains between adjacent containers outside the pinched region, this can also be removed. As with the pinched region, perforations can be formed where the flash meets the container to facilitate removal of the flash. The unused containers thus remain connected for ease of carrying and transport.

[0034] The embodiments illustrated and discussed in this specification are intended only to teach those skilled in the art the best way known to the inventors to make and use the invention. Nothing in this specification should be considered as limiting the scope of the present invention. All examples presented are representative and non-limiting. The above-described embodiments of the invention may be modified or varied, without departing from the invention, as appreciated by those skilled in the art in light of the above teachings. It is therefore to be understood that, within the scope of the claims and their equivalents, the invention may be practiced otherwise than as specifically described.
WHAT IS CLAIMED IS:

1. A container system comprising a plurality of plastic containers, each container joined to an adjacent container by a pinched region, wherein the pinched region comprises plastic continuous with the plastic containers.

2. The system of claim 1, wherein the pinched region is perforated.

3. The system of claim 1, wherein the containers are formed simultaneously in a blow molding process.

4. The system of claim 1, wherein the pinched region is formed by compression molding in the flash region between the containers.

5. The system of claim 1, comprising four containers.

6. The system of claim 5, wherein each of said four containers is substantially square.

7. The system of claim 6, wherein each container is joined to an adjacent container by a pinched region and the two inner containers have pinched regions at opposite corners of the container.

8. The system of claim 6, further comprising a first connector attached to a first outer container and a second connector attached a second outer container, the first and second connectors capable of interconnecting.

9. The system of claim 7, wherein the containers are configured in a substantially square arrangement, each container having a side in contact with a side of an adjacent container and the first outer container having a side in contact with a side of the second outer container.
10. The system of claim 9, further comprising a shrink wrap label around the containers.

11. The system of claim 8, wherein the containers are configured in a substantially square arrangement, each container having a side in contact with a side of an adjacent container, the first outer container having a side in contact with a side of the second outer container, and the first connector fastened to the second container such that the substantially square arrangement is maintained.

12. The system of claim 1, wherein the containers are separable by tearing along the pinched region.

13. A method of making a container system comprising molding in a blow mold a plurality of plastic containers having a pinched region between adjacent containers.

14. The method of claim 13, wherein the containers are formed by blow molding.

15. The method of claim 14, wherein the containers are blowmolded from a single parison.

16. The method of claim 16, wherein the parison is extruded along an axis perpendicular to the longitudinal axis of the containers.

17. The method of claim 13, wherein the pinched region is formed by compression molding.

18. The method of claim 17, wherein the compression molding is performed in a flash pocket of the blow mold.
19. The method of claim 13, further comprising forming holes in a flash region between two adjacent containers.

20. The method of claim 13, further comprising folding the container system into a compact configuration.

21. An array comprising
   a plurality of plastic containers, each container joined to an adjacent container by a pinched region, wherein the pinched region comprises plastic continuous with the plastic containers;
   a manifold connected to each container in the plurality of containers by an inlet that joins the cavity of the manifold at a moil attached to a finish of each container.

22. The array of claim 21, wherein the pinched region comprises a perforation.

23. The array of claim 21, further comprising
    a tail flash attached to the containers; and
    a flash region between the containers.

24. The array of claim 23, further comprising a perforation in the flash region where it meets the container.

25. The array of claim 23, further comprising holes in the flash region.

26. The array of claim 21, wherein the manifold comprises a blow hole.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

B65D1/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D A61J B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Relevant to claim No.</th>
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<td>column 1, line 16 - line 21</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

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*A* document defining the general state of the art which is not considered to be of particular relevance

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*P* document published prior to the international filing date but later than the priority date claimed

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*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

*&* document member of the same patent family

Date of the actual completion of the international search

29 March 2006

Date of mailing of the international search report

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