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Weaver

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[54] **MULTIPLE CONTAINER CARRIER AND PACKAGE**

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[52] **U.S. Cl.** **206/150,** 206/158, 206/161

[51] **Int. Cl.** **B65d 75/00**

[58] **Field of Search** 206/145, 150, 151, 161, 206/158; 294/87.2; 35/34

[56] **References Cited**

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[57] **ABSTRACT**

A multiple container carrier made from a resilient deformable plastic sheet material and having a plurality of container encircling bands and integral webs which by virtue of their shape, size, and cooperation with certain cylindrical containers will cause the resulting package to be a tight, compact package.

13 Claims, 6 Drawing Figures

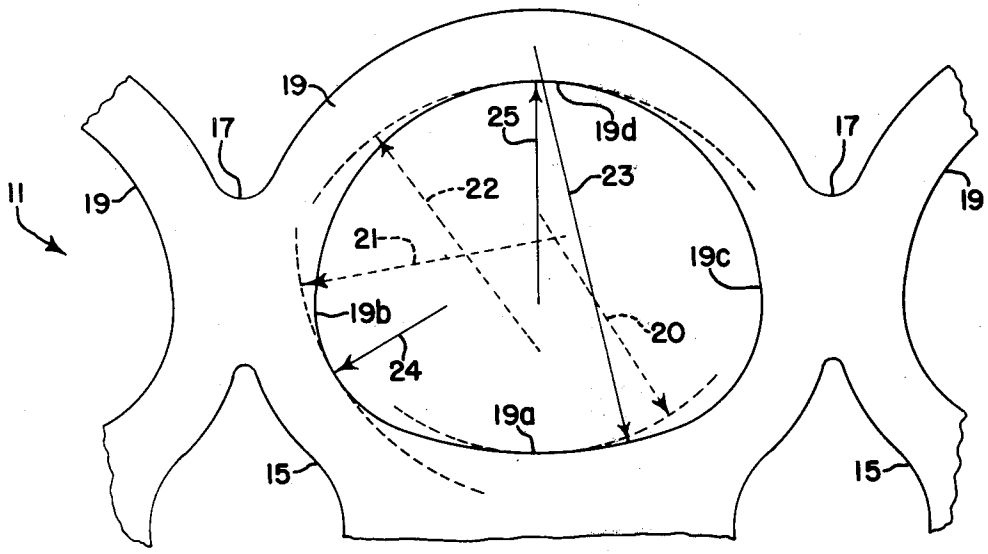


Fig. 1

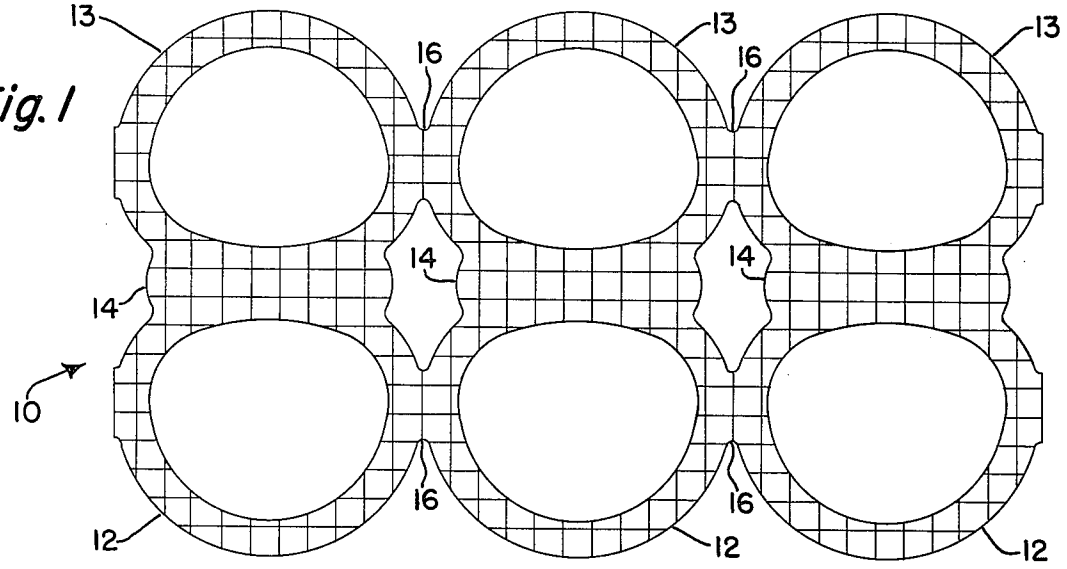


Fig. 2

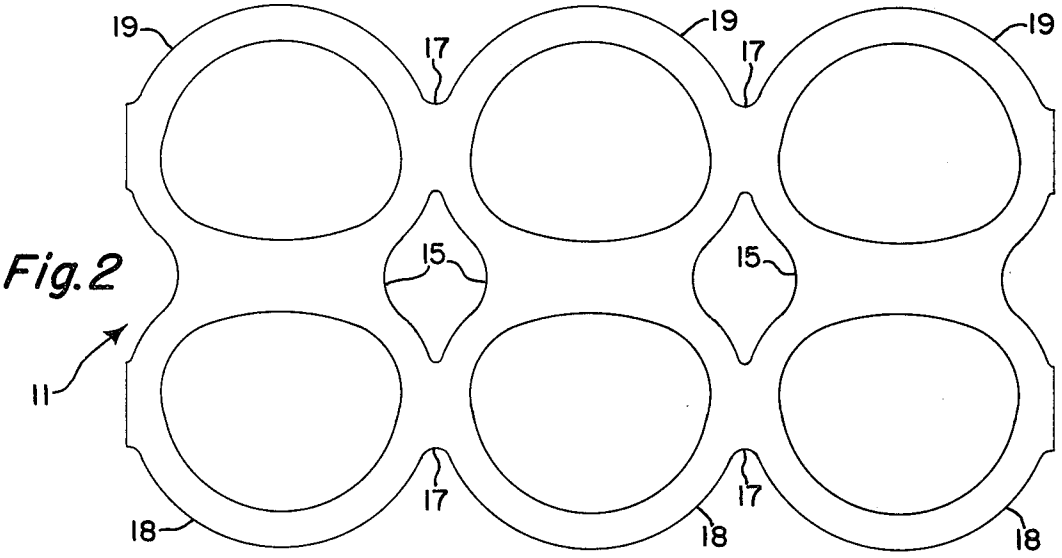


Fig. 3

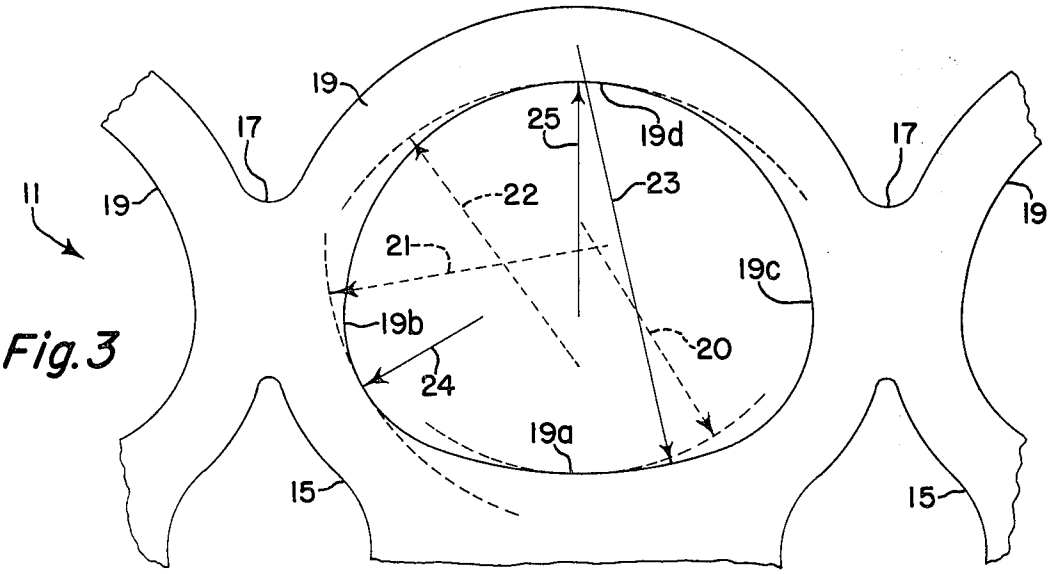


Fig.4

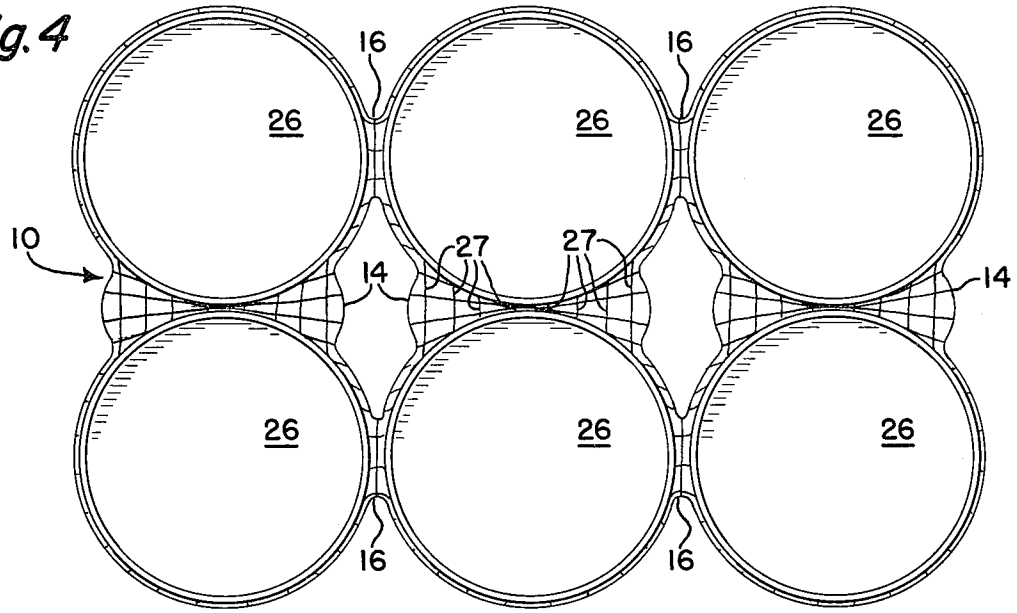


Fig.5

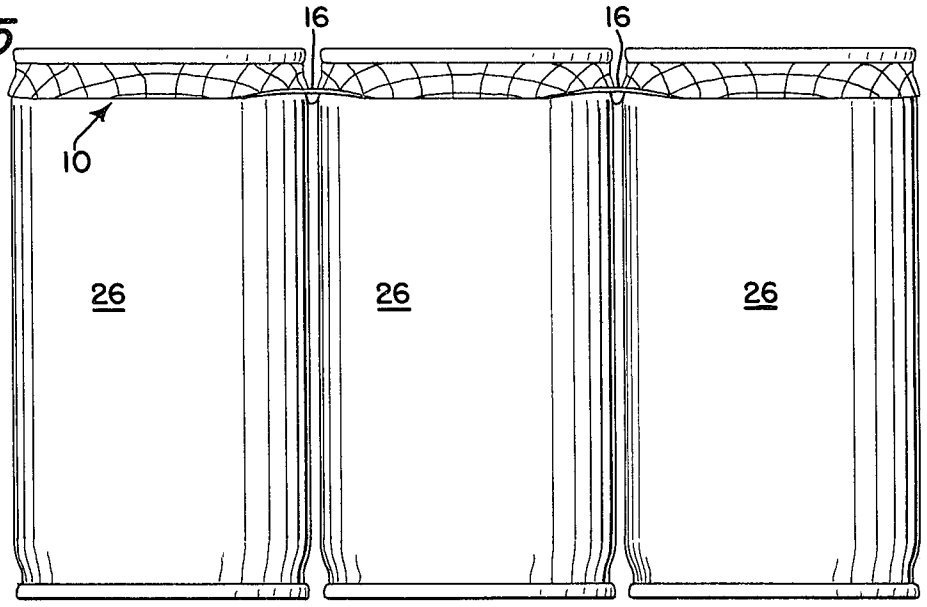
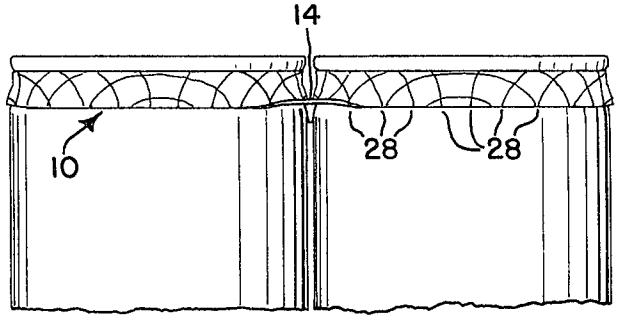


Fig.6



MULTIPLE CONTAINER CARRIER AND PACKAGE

BACKGROUND OF THE INVENTION

The invention pertains to packages of a plurality of containers held together by a carrier. Such containers are commonly cylindrical cans and such carriers are commonly made from an unsupported sheet of a resilient deformable plastic material such as low density polyethylene. Various forms of carriers and the resulting packages of the prior art may be seen in the U.S. Patent of Ougljesa Jules Poupitch, No. 2,874,835.

SUMMARY OF THE INVENTION

The subject invention, as a new and novel carrier and package, contemplates that the plurality of containers be cylindrical cans, the upper portions of which are necked-in. Basically, such necked-in cans have chimes which do not extend radially outwardly of the body of the can.

The carrier of the invention is made from an unsupported sheet of resilient deformable plastic material and generally comprises a strip of longitudinally-extending transversely-aligned pairs of container encircling bands. Such a carrier, after being mounted on a plurality of cans, can be divided, and is often machine applied and divided, into selected or desired packages, each of a selected number of containers and a carrier section. A common commercial package is the well known 6-pack for beverages.

In the carrier of the present invention, the container encircling bands have a particular inner peripheral shape or configuration and size, and cooperate with the integral webs so that when the carrier is applied to necked-in cans a firm compact package results. The particular inner peripheral configuration of each of the container encircling bands includes three different curved shapes particularly disposed or arranged in the carrier. In the portion of the inner periphery of one band which is adjacent to the web which interconnects the other band of each transverse pair of container encircling bands, the radius of curvature of that portion is substantially greater than the radius of curvature of the necked-in portion of the can immediately below the chime. The portions of the inner periphery of each container encircling band adjacent to each end of the first portion are provided with a radius of curvature which is substantially less than the radius of curvature of the necked-in portion of the can beneath the chime thereof. The remaining portion of the container encircling band is preferably such that the inner peripheral portion has a radius of curvature substantially equal to or slightly less than the radius of curvature of the necked-in portion of the can immediately below the chime thereof.

Additionally, the total peripheral dimension of each aperture of each container encircling band is substantially less than the circumferential dimension of the necked-in portion of the can below the chime thereof, and the webs between the bands have lengths such that they do not interfere with the band orientation, or necessary band elongation that occurs when the carrier is stretched and applied to a plurality of necked-in cans.

With a carrier as generally described above, and as described hereinafter in detail, it has been found that a firmly constricted compact package is formed when the carrier is applied to a plurality of necked-in cans.

While all of the reasons why the carrier of the subject invention performs as described may not be easily perceived, it is believed that the grid lines shown in the drawing can help one to understand why the firm compact package is formed.

The provision of a carrier which will produce a tight, compact package of a plurality of necked-in cans is the primary object of the present invention.

Other objects and the features of the invention will be apparent upon a perusal of the hereinafter following specification taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of one embodiment of the carrier of the subject invention;

FIG. **2** is another embodiment of the carrier of the subject invention;

FIG. **3** is an enlarged fragmentary view of a portion of the carrier shown in FIG. **2**;

FIG. **4** is a top plan view of a package comprising the carrier of FIG. **1** and with necked-in cans;

FIG. **5** is a side elevational view of the package of FIG. **4**;

FIG. **6** is a fragmentary end elevational view of the package shown in FIG. **4**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

To form the firmly constricted compact package of the invention the carrier **10** of FIG. **1**, or **11** of FIG. **2** is made from a resilient deformable, unsupported plastic sheet material such as low density polyethylene. In one successful reduction to practice of the invention, the material used was a low density polyethylene having a sheet thickness of 0.018 inches, and a secant modulus at 2 percent elongation of approximately 36,000 p.s.i. That material had the desired elasticity and stiffness. However, it is contemplated that the invention may be practiced with other plastic materials having substantially similar resiliency and elastic memory characteristics.

The carrier **10** of FIGS. **1** and **4–6** comprises a longitudinal series of transversely arranged pairs of container encircling bands **12** and **13.** The directions "longitudinal" and "transverse" are used to aid in the description of the invention and are not used to define the direction in which a large number of pairs **12** and **13** may be formed and arranged to produce a carrier stock. Commonly in the machine application of such carrier stock, a large number of cans and the carrier stock are simultaneously fed through the applicating machine and after application of the carrier to the cans, the machine selectively severs the webs interconnecting the pairs **12** and **13** to produce a plurality of packages of two or more containers. The invention contemplates that two or more pairs of bands **12** and **13** may be alternatively formed and arranged in a carrier stock so that each pair of bands **12** and **13** is aligned either transversely or longitudinally of the length of the stock. An important construction feature of the invention that must be kept in mind in practicing the invention is to maintain the integral webs which interconnect adjacent pairs of bands **12** and **13** of effective lengths such that they cooperate with the bands **12** and **13** to permit firm gripping of the bands about the containers with the necessary band elongation when the carrier is stretched and applied to the necked-in cans.

There are two different webs in the carrier of the invention, the web which integrally interconnects a band **12** and a band **13** as a pair, and the web which integrally interconnects bands **12** and **13** of adjacent pairs.

The web which interconnects a band **12** and a band **13** as a pair may have different end shapes. That web **14** in the embodiment of FIGS. **1** and **4–6** has convex ends which may be folded downwardly by a person carrying the package to function as finger grips or handle means. That web **15** in FIGS. **2** and **3** has concave ends. The different end construction of the webs **14** and **15** is the only substantial difference between the carrier embodiments of FIGS. **1, 4–6** and FIGS. **2** and **3.**

The webs which integrally interconnect adjacent pairs of bands **12** and **13** are indicated at **16** in FIGS. **1, 4–6** and at **17** in FIGS. **2** and **3.**

In the embodiment of FIGS. **2** and **3,** the container encircling bands are indicated at **18** and **19,** and those bands are substantially respectively identical in construction and arrangement to the bands **12** and **13** of FIGS. **1, 4–6.** Important features of the invention are the shape or configuration of the container encircling bands, the size of the bands and webs relative to the size of the necked-in cans intended to be associated therewith, the relative arrangement of the bands in each pair of bands, and the web configurations and cooperations with the bands.

FIG. **3** in an enlarged view shows the shape and size of the container encircling bands relative to the necked-in cans intended to be multipackaged with the carrier of the invention. The inner periphery or container encircling aperture of the container encircling band **19** is shaped to have four arcuate sections **19***a*, **19***b*, **19***c* and **19***d*. The outer periphery over the free areas and over its imaginary extension through the webs **15** and **17** is substantially parallel to the inner periphery.

The size of the outer surface of the container substantially immediately below the chime relative to the size of band **19** is shown in FIG. **3** by the dotted line arrows **20, 21** and **22.** Each of the arrows **20, 21** and **22** are of the same length and represent the outer radius of curvature of the necked-in container substantially immediately below the chime thereof. As used hereinafter that radius is referred to as the radius of curvature of the container or can.

The section **19***a* is formed to have a radius of curvature substantially greater than the radius of curvature of the can. That radius of curvature is shown by the arrow **23.**

The sections **19***b* and **19***c* have substantially the same radius of curvature, and that radius of curvature, which is substantially smaller than the radius of curvature of the can, is shown by the arrow **24.**

The section **19***d* preferably has a radius of curvature which is substantially equal to or slightly smaller than the radius of curvature of the can, and that radius of curvature is shown by the arrow **25.** The inventor believes that the section **19***d* may have other shapes, but that whatever its shape, it should be substantially the equivalent of the described section **19***d* in function, operation and result.

As shown in the drawings, one end of each section **19***b* and **19***c* is connected to one end of section **19***a*, and section **19***d* is connected to the other ends of sections **19***b* and **19***c* to define the continuous uninterrupted inner periphery of the band **19.**

The total length of the inner periphery of the band **19** is substantially less than the circumferential dimension, measured immediately below the chime, of the necked-in can intended to be associated therewith. Thus it may be seen that the inner periphery of the band **19** must be stretched when the band **19** is applied to the can. The larger circumferential dimension of the can in cooperation with the described shape of the bands and with the arrangement and shape of the webs causes the carrier package to assume a tight compact configuration. The firm compact arrangement of the package is apparent by the close spacing between adjacent cans and by the extreme folding of the webs as may be seen in FIGS. **5** and **6.** The necked-in cans about which the carrier is applied are shown at **26.**

The inventor believes that one important factor in the described arrangement is the size of the webs **14** and **16** in the embodiment of FIGS. **1, 4–6,** and webs **15** and **17** in the embodiment of FIGS. **2** and **3.** In width the webs vary from a substantially zero width at their longitudinal centers to varying widths which are a result of their lengths and the curvature of the outer peripheries of the bands. Each of the webs **14** and **15** has a length less than the diameter of the outer surface of the can immediately below the chime thereof. Each of the webs **16** and **17** has a length less than the length of a straight line drawn between the widest transverse dimension of the aperture of the bands. It should be noted that webs **14** of FIG. **1** and **15** of FIG. **2** have substantially the same effective length by virtue of their connection points to the adjacent bands. The convex ends of webs **14** do not add to the effective length of webs **14.** If the webs are made substantially longer than as described, the longer webs will cause the free band portions to be excessively stressed. Excessive stress in the free band portions will result in exceeding the elastic yield point of the plastic material and the free band portions will experience a necking down with a resultant loose band.

In an attempt to aid in understanding the invention, the carrier of FIG. **1** has been drawn with substantially equally spaced grid lines thereon and the resulting distortion of those grid lines when the carrier is applied to the appropriate cans is shown in FIGS. **4, 5** and **6.** Note in FIG. **4** that there is very little variance in spacing between grid lines **27.** Some visual distortion occurs because that view is a plan view of a concave surface. From those grid lines it is apparent that the adjacent band sections corresponding to **19***a* of FIG. **3** are being caused to fold downwardly against the cans somewhat in the manner a sheet of paper will tend to fold when a straight edge thereof is urged against a cylindrical surface. The webs **14** do not interfere in the downward folding action of those sections and will not cause excessive elongation in sections **19***b*, **19***c* or **19***d*.

Note should next be taken of the distortion of the grid lines **28** in FIG. **6.** Again, some visual distortion occurs because the curved surfaces are shown projected into the plane of the drawing. The grid lines **28** are greatly stretched at their upper portions with very little stretching at their lower ends. From that distortion it is apparent to the inventor that the adjacent band sections corresponding to band sections **19***b* and **19***c* of FIG. **3** are being caused to fold downwardly against the cans because the high stretching of the inner periphery of the sections is causing those sections to assume a substantially cylindrical configuration. The webs **16** do

not interfere in the downward cylindrical formation of those sections and will not cause excessive elongation in the free areas of sections **19***b*, **19***c* or **19***d*.

The inventor further believes that the sections corresponding to sections **19***d* of FIG. **3** are and should function substantially merely as an interconnecting member to produce the action described in the other sections of each band. Those sections are shown in FIG. **5**. Some substantial stretching of the inner periphery of those sections occurs because of the pull of the other sections. However, in practicing the invention, one should avoid high stretching of the inner periphery of those sections to the detriment of the stretching needed in the sections corresponding to sections **19***b* and **19***c* of FIG. **3**. To that end the radius of curvature of section **19***d* more closely approximates the radius of curvature of the cans than the radii of curvature of sections **19***a*, **19***b* and **19***c*. Although it is believed that one skilled in the subject art can practice the invention from the foregoing description, mention of the actual differences in the radii of curvature for a specific successful reduction to practice of the invention may be meaningful. In a reduction to practice the sections **19***a* had a radius of curvature 52 percent larger than the outer radius of curvature of the can immediately below the chime. The sections **19***b* and **19***c* had a radius of curvature 50 percent smaller than that of the can, and the section **19***d* had a radius of curvature 16 percent smaller than that of the can. Further, the total length of the sections **19***a*, **19***b*, **19***c* and **19***d* was 22 percent smaller than the circumferential dimension of the can immediately below the chime. In measuring the elongation that had occurred in the various sections of that reduction to practice, when applied to pairs of necked-in cans, it was found that a 10 percent elongation had occurred in section **19***a*, a 40 percent elongation had occurred in each of sections **19***b* and **19***c*, and a 25 to 30 percent elongation had occurred in section **19***d*. In any particular incremental circumferential portion the elongation varies from a maximum at the upper edge of the bands immediately below the can chime to a minimum at the lower edge of the bands. Reductions to practice of the invention have established that carriers of the subject invention use substantially less material than previously known sheet formed carriers.

Having described the invention, it is to be understood that changes can be made in the described embodiments within the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A multiple container carrier for a plurality of pairs of cylindrical containers, said carrier comprising a plurality of pairs of bands, a web interconnecting the outer marginal edges on one side of each of the bands of each pair of bands, a second web interconnecting the outer marginal edges on one side of each of the bands of adjacent pairs of said bands, said bands and said webs being formed from a resilient deformable plastic sheet material with said bands and said webs lying in the plane of said sheet material, the inner peripheral margin of each of said bands being uninterrupted and shaped to define a closed loop of four arcuate sections, said first arcuate section being contiguous to said first web and said one side of each of said bands and having a radius of curvature substantially greater than the radius of said containers, the second and third arcuate sections extending from each end of said first arcuate section and being contiguous to said second web, said second and third arcuate sections having substantially the same radius of curvature, the radius of curvature of said second and third arcuate sections being substantially less than the radius of said containers, the fourth arcuate section extending between said second and third arcuate sections and having a radius of curvature no greater than the radius of said containers, the total arcuate extent of said four arcuate sections being substantially less than the circumferential dimension of said containers, the distance between the end connections of said first webs to said bands being greater than the length of a straight line extending between the ends of said first arcuate section and less than the diameter of said cylindrical containers, and the distance between the end connections of said second webs to said bands being substantially less than the length of a straight line drawn between the points of widest spacing on the inner peripheral margin of said first and fourth arcuate sections.

2. A multiple container carrier as defined in claim **1**, wherein the inner and outer peripheral margins of said bands including the extensions thereof integral with said webs are substantially parallel.

3. A multiple container carrier as defined in claim **2**, wherein the width of said webs at the longitudinal centers thereof is substantially zero.

4. A multiple container carrier as defined in claim **1**, wherein integral tabs are provided on the ends of said first webs as finger gripping handle means.

5. A multiple container carrier for a plurality of pairs of cylindrical containers, said carrier comprising a plurality of pairs of bands, a web interconnecting the outer marginal edges on one side of each of the bands of each pair of bands, a second web interconnecting the outer marginal edges on one side of each of the bands of adjacent pairs of said bands, said bands and said webs being formed from a resilient deformable plastic sheet material with said bands and said webs lying in the plane of said sheet material, the inner peripheral margin of each of said bands being uninterrupted and shaped to define a closed loop of four arcuate sections, said first arcuate section being contiguous to said first web and said one side of each of said bands and having a radius of curvature substantially greater than the radius of said containers, the second and third arcuate sections extending from each end of said first arcuate section and being contiguous to said second web, said second and third arcuate sections having substantially the same radius of curvature, the radius of curvature of said second and third arcuate sections being substantially less than the radius of said containers, the fourth arcuate section extending between said second and third arcuate sections, said fourth arcuate section having a radius of curvature substantially between the range of the radius of curvature of said containers and a radius of curvature 20 percent less than the radius of curvature of said containers, and the total arcuate extent of said four arcuate sections being substantially less than the circumferential dimension of said containers.

6. A multiple container carrier as defined in claim **5**, wherein the distance between the end connections of said first webs to said bands is substantially greater than the length of a straight line extending between the ends of said first arcuate sections and less than the diameter of said cylindrical containers, and the distance between the end connections of said second webs to said bands being substantially less than the length of a straight line

drawn between the points of widest spacing between said first and fourth arcuate sections.

7. A multiple container carrier as defined in claim **6** wherein the inner and outer peripheral margins of said bands including the extensions thereof integral with said webs are substantially parallel, and the width of said webs at the longitudinal centers thereof is substantially zero.

8. A multiple container carrier as defined in claim **7**, wherein integral tabs are provided on the ends of said first webs as finger gripping handle means.

9. A package of a plurality of pairs of cylindrical containers and a carrier, said containers having frusto-conical circumferential portions immediately below the upper chimes thereof, said carrier comprising a plurality of pairs of frusto-conical bands with each of said bands encircling one of said containers immediately below the upper chime thereof, a plurality of first webs, each of said first webs integrally interconnected between opposed lower edges of the bands of each pair of bands, a plurality of second webs, each of said second webs integrally interconnected between opposed lower edges of the bands of an adjacent pair of said bands, each of said bands being in a circumferentially stretched condition, each of said bands having four circumferential sections of substantially different elongation, the first of said sections being continguous to said first web, the second and third sections extending circumferentially about the container from the ends of said first section and being contiguous to said second web, the fourth section being connected between the ends of said second and third sections, said second and third sections being elongated substantially greater than said first and fourth sections, and said fourth section being elongated substantially greater than said first section.

10. A package as defined in claim **9**, wherein the elongation of each of said sections decreases from the upper edges of said sections to the lower edges of said sections.

11. A package as defined in claim **10**, wherein said carrier is formed from a resilient deformable plastic sheet material with said bands and said webs lying in the plane of said sheet material, each of said webs formed in said sheet material to interconnect the opposed outer marginal edges of one side of each of said pair of bands, each of said second webs interconnecting the opposed outer marginal edges on one side of the bands of adjacent pairs of said bands, said bands further being formed in said sheet material with the inner peripheral margin of each of said bands being shaped to define a closed loop of four arcuate sections, the first arcuate section being formed contiguous to said first web and having a radius of curvature substantially greater than the radius of curvature of said containers, the second and third arcuate sections being formed to extend from each end of said first arcuate section, said second and third arcuate section being formed to have substantially the same radius of curvature, the radius of curvature of said second and third arcuate sections being formed substantially less than the radius of said containers, the fourth arcuate section extending between said second and third arcuate sections and being formed to have a radius of curvature no greater than the radius of said containers, and the total arcuate extent of said four arcuate sections being substantially less than the circumferential dimension of said containers.

12. A package as defined in claim **11**, wherein the width of each of said webs at the longitudinal center thereof is substantially zero, and the length of each of said webs is substantially less than the diameter of said containers.

13. A package as defined in claim **12**, wherein integral tabs are provided on the ends of each of said first webs as finger gripping handle means.

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