

PATENT SPECIFICATION

(11) 1 283 753

DRAWINGS ATTACHED



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- (21) Application No. 56187/69 (22) Filed 17 Nov. 1969
(31) Convention Application No. 777 441 (32) Filed 20 Nov. 1968 in
(33) United States of America (US)
(45) Complete Specification published 2 Aug 1972.
(51) International Classification B65D 71/00 61/00
(52) Index at acceptance
B8C 12D2 26 29A
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(54) CONTAINER CARRIER PACKAGES

(71) We, ILLINOIS TOOL WORKS INC., a corporation organized under the laws of the State of Delaware, United States of America, of 8501 West Higgins Road, Chicago, Illinois 60631, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

Multipackaging of containers, such as canned food products, has received substantial impetus in the United States of America from the development of plastics sheet carrier devices of the type disclosed and claimed in British Patent No. 914,202. The many advantages of such plastics sheet carrier devices over competitive paperboard products, such as relative simplicity, adaptability to high speed application techniques, ease of removal, economic feasibility, and numerous other advantages well-known to those skilled in the art, has resulted in the enthusiastic commercial acceptance of such plastics sheet carrier devices for a wide variety of container products of diverse sizes.

In a typical container package of the type described, a plurality of containers, usually in multiples of two, are secured together as a unit by the plastics sheet carrier device having constrictive apertures provided therein which are designed to resiliently grip and engage the containers beneath an enlarged bead or rim on each container to prevent container withdrawal.

It is an object of the present invention to provide plastics sheet carrier devices of the type described which include features which will enhance the tensile strength of the carrier without increasing material cost and/or fabrication techniques.

This may provide a carrier device which utilizes less material than that currently achievable in known and existing plastics sheet carrier devices.

In existing carrier devices, the material adjacent to each aperture is designed to be

stretched within predetermined limits. As a result, it is necessary to provide several carrier devices having different constrictive aperture diameters for accepting and carrying containers of different diameters.

The invention may provide plastics sheet carrier devices which can accommodate a range of container sizes.

A further object of the present invention is to provide plastics sheet carrier devices which can also provide controlled bending at selected locations without jeopardizing or impeding the gripping and carrying function of the carrier.

A further object of the present invention is to provide carrier devices which, in addition to the aforementioned objects, are compatible with existing carrier fabrication and application techniques as well as consumer preferences for the current commercially available carrier devices.

These and other objects and advantages of the present invention are attained, according to this invention, by a sheet carrier device made from a resiliently deformable plastics material, and having at least one container receiving aperture provided therein, whereby upon the insertion of a container of somewhat greater circumference axially through each aperture, the surrounding material is stretched for gripping and resiliently engaging the container to resist container withdrawal, having at least one area which has had its resistance to stretching increased as compared with adjacent areas by having a thickness-reducing groove impressed in it.

Furthermore, a carrier device according to this invention may include handle means, the areas including grooves in the vicinity of the handle means.

Further features of the invention, which are preferred but not essential, are mentioned in the course of the following description of various examples of carrier devices embodying the invention. These are shown in the accompanying drawings, in which:—

Figure 1 is a perspective view of a container package showing a plurality of containers which are secured together as a unit by a first plastics sheet carrier device;

Figure 2 is a top plan view of the plastics sheet carrier device prior to its application to a plurality of containers as illustrated in Figure 1;

Figure 3 is a section of the plastics sheet carrier device on the line 3—3 in Figure 2;

Figure 4 is a fragmentary side elevation, partially in section, which illustrates the manner in which the plastics sheet carrier device shown in section resiliently grips and engages containers arranged in the manner shown in Figure 1;

Figure 5A is an enlarged fragmentary section of a modified carrier device;

Figure 5B is a fragmentary side elevation, partially in section, depicting the carrier device of Figure 5A assembled to and resiliently gripping and engaging a container;

Figures 6A and 6B are views similar to Figures 5A and 5B and illustrate in pre-assembly and assembled form another modified carrier device;

Figures 7A and 7B are views also similar to Figures 5A and 5B and depicting a further modified form of carrier device prior to and after assembly to a container;

Figures 8A and 8B are views also similar to Figures 5A and 5B and depicting an additional modified form of carrier device prior to and after assembly to a container;

Figures 9 to 15 are fragmentary plan views of various modified forms of plastics sheet carrier device; and

Figure 16 is an enlarged fragmentary section of another modified carrier device.

The container package 10 illustrated in Figure 1 of the drawings includes six beverage containers arranged in a cluster and held together by a plastics sheet carrier device 14 of the general type disclosed in our British Patent No. 914,202, previously mentioned. This package 10 forms the "six pack" which is generally available in the United States of America in various food stores. It will be appreciated that while the present invention will be generally described in terms of this type of multipackaging unit, it has adaptability for container packages comprising one or more container units.

Each of the containers 12 of the package 10 are of the type which includes a cylindrical side wall 16, the opposite ends of which are joined to top and bottom ends 18, 20 respectively in a conventional manner to provide rolled, enlarged peripheral beads 22, 24 respectively at the upper and lower ends of the containers 12. The containers 12 are thus of the three-piece metal beverage can variety which are commonly used for a variety of food products. It will be appreciated and understood, however, that other

types of containers of various shapes and sizes such as bottles, rectangularly shaped containers, and the like may also be used in conjunction with appropriately configured carrier devices incorporating the features of the present invention.

The plastics sheet carrier device 14, as previously indicated, is of the type shown in British Patent No. 914,202 which comprises a flat sheet of a plastics material in which there are provided a plurality of spaced apertures for receiving containers. Each aperture of the carrier device is somewhat smaller in circumference than the beads of the container with which the carrier is to be assembled, since the carrier device is made from a resiliently deformable plastics material, such as polyethylene, to permit the surrounding material portions adjacent to each of the apertures to stretch and deform when the containers are inserted in the carrier apertures. When finally assembled, the material adjacent to each of the apertures is deflected upwardly into axially extending embracing portions which resiliently and firmly grip the containers, preferably beneath the enlarged bead thereof at the upper end of the container, as at 22, to hold a plurality of containers together as a unit and prevent container withdrawal.

Plastics sheet carrier devices made from a resiliently deformable material such as polyethylene have specific characteristics which can be determined by comparing the circumference of the container receiving aperture in relation to the circumference of the container and the width of the material band which surrounds and resiliently grips the container. The present invention is concerned with achieving satisfactory strength with less material. This will increase the advantages of this type of carrier device, provided that the cost of manufacture is not significantly increased. At the present state of material development, it has not been possible to increase the tensile strength of the material band surrounding each container receiving aperture without either elongating the band by stretching, or providing more material in the band. Both of these approaches will result in increased raw material cost and/or carrier fabrication cost, and further the carrier application techniques might require modification in applying such a modified carrier device to containers. Additionally, the band of material when surrounding each container may extend further down the side wall below the upper bead of the container than is desired by the distributors of canned products, who print identifying indicia such as trademarks and the like on the container side wall.

To achieve the objective mentioned above, there are provided, as an important feature embodying the present invention, grooves 130

which are impressed in the plastics sheet carrier adjacent to each container receiving aperture. By providing such grooves in a plastics sheet carrier of the type described, the thickness is reduced while the density of the material is increased in the area of the grooves and this provides a substantial increase in the resistance to stretching of the material within the areas of the grooves as compared with adjacent areas. Consequently, in making a carrier device for a given size of container, the amount of material used may be reduced as compared with a carrier device without grooves.

With the material which is being used today, such as polyethylene, it has been found that containers of different sizes and capacities, and thus generally of different circumferences, have required different carrier devices with the container receiving apertures thereof proportioned to match to the size of the containers. There has thus been limited versatility in using a specific carrier device for containers of different sizes. By an appropriate use of grooves it is possible to make a carrier device which will provide adequate grip on a range of sizes of containers. In this case the saving of material is not the principal object, but the possibility of making larger numbers of a smaller range of sizes of carrier enables the unit cost to be reduced.

There are various forms of grooves shown in the several Figures of the drawings, the particular choice of which in a given set of parameters depends upon the objectives sought to be accomplished as will become apparent from the discussion that is to follow.

Referring first to Figures 1 to 4 of the drawings, it will be seen that there is provided in the band of material 26 surrounding each container receiving aperture 28 of the carrier device 14 a groove 30. Each of the grooves 30 is circumferentially continuous and is impressed in the upper surface of the carrier device 14, thereby reducing the thickness, to such an extent that it increases the density of the material from which the carrier device is made, and thus increases the tensile strength of the band of material 26 around each container receiving aperture 28. The grooves 30 may be impressed in the web of thermoplastic material from which the carriers are made either before, during or after the formation of the carrier devices as may be desired.

By increasing the resistance to stretching, the band of material 26 around each container receiving aperture 28 is strengthened against tensile stresses set up when the carrier device is applied and thereafter assembled to the containers 12 as illustrated in Figures 1 to 4 of the drawings. In addition to improving the resistance to stretching, the

impressed groove 30 adjacent to each aperture 28 of the carrier will provide controlled bending of that portion of the material band 26 surrounded by the groove 30, and this feature can be taken advantage of in providing additional versatility or flexibility in carrier application techniques as, for example, where different can diameters are involved.

The impressed grooves in plastics sheet carrier devices of the type described can be varied in size, location, number, circumferential arrangement, etc. to promote or achieve various purposes. For example, the impressed grooves can be important from the standpoint of versatility in the use of less carrier devices for a wider range of container sizes than at present available; they can be used to enable the use of less material in the carrier device and thus reduce overall cost; they can be useful in enhancing carrier application techniques for various container diameters; they can be used to promote better container retention or release characteristics, etc. Other potential advantages and uses of the impressed grooves which result from or are attributable to this feature are, of course, within the ambit of the present invention.

Figure 4 shows how each groove acts as a hinge at which the bending of the material is concentrated. This ensures that there is a substantial cylindrical band of material embracing the entire circumference of a container.

Reference is now made to the other embodiments as shown throughout the various Figures of the drawings. To provide correspondence between the various Figures, the same reference numeral will be used to designate the like parts, with an alphabetical sequence being employed to designate different embodiments as described in consecutive fashion in the discussion that is to follow.

Figures 5A-5B to 8A-8B depict various locations of an impressed groove, both with respect to the upper or lower surface of the carrier as well as the degree of spacing from the inner or outer margins of the band of material surrounding each container receiving aperture. It will be appreciated that each material band may assume the shape of axially directed neck portions or may flare outwardly, as indicated for example in dotted lines in Figure 5B of the drawings.

In Figures 5A and 5B, the carrier device 14a includes the groove 30a which is located on the lower surface of the carrier device 14a and has a diameter corresponding to the external diameter of the bead 22a at the open upper end of the container 12a.

The carrier device 14b shown in Figure 6A includes a groove 30b which is provided in the upper surface of the carrier device 14b and is spaced a substantial distance from

the outer margin of the band of material 26b which surrounds each aperture. Thus, the groove 30b has a relationship with respect to the container 12b such that the groove 30b has a greater circumference than any portion of the container 12b, as will be seen in comparing the carrier device prior to assembly as seen in Figure 6A and after assembly as viewed in Figure 6B.

The embodiment of the carrier device 14c illustrated in Figures 7A and 7B portrays the groove 30c as being provided in the upper surface of the carrier device 14c in close proximity to the inner margin of the band of material 26c, such that the groove 30c has a smaller circumference than the smallest circumference of the container 12c. This is readily apparent in comparing Figures 7A and 7B.

In addition to the possibility that the grooves may be provided in the upper and lower surface of the carrier, it is also conceivable that the inner and/or outer margins of the band of material may be utilized in achieving desired objectives. This is illustrated in Figures 8A and 8B of the drawings wherein the groove 30d is impressed within the inner margin of the band of material 26d of the carrier 14d.

In addition to the location of the grooves, their type or style, including their cross-sectional configuration, may be varied to suit the parameters required. This is illustrated for example, in Figures 9 to 11 of the drawings where carrier devices 14e to 14g depict various interrupted styles of grooves 30e to 30g. In Figure 9 of the drawings, the interrupted style provides grooves 30e in each of the four quadrants of the band of material 26e which surrounds the container receiving aperture 28e. Figure 10 illustrates grooves 30f in opposing quadrants of the band of material 26f which surrounds the container receiving aperture 28f. In Figure 11, the interrupted style provides generally equal groove segments 30g which are spacedly arranged in equidistant fashion about each container receiving aperture 28g. The interrupted style of grooves will provide areas of increased resistance to stretching at desired locations, such as the points of maximum stress encountered in the assembly of the carrier devices by carrier application equipment. Additionally, the interrupted style can be utilized in various embodiments to facilitate removal of containers from the carrier while at the same time providing greater tensile strength than has heretofore been available with the same type of carrier device in the absence of the grooves illustrated.

Another feature which can be advantageously utilized is the relieving of the inner margin of the band of material which surrounds the container receiving aperture,

in conjunction with grooves, to permit easy application and removal of the carrier from containers. Specifically, as illustrated in Figure 12 of the drawings, the carrier device 14h includes grooves 30h as in the previous embodiments, and additionally is provided with a convoluted or undulated surface 32 extending from the inner margin of the band of material 28h towards each groove 30h. This permits expansion of the aperture without stretching of the material during the start of assembly. In addition to the convoluted or undulated portion 32, other means may be provided for relieving the inner margin or portion of the material surrounded by the groove 30h.

While the grooves are preferably of the type which extend in a circumferential manner about the container receiving aperture of a carrier device, it is contemplated that radial grooves 34 may be impressed in a carrier device 14i as illustrated in Figure 13 of the drawings to achieve the same or similar purpose as a circumferentially arranged groove. The radial grooves 34 may be associated with a circumferentially extending groove 30i as, for example, shown in Figure 13 of the drawings.

The number of grooves may be varied, including the provision of grooves on the same or opposite sides of the carrier device. This is illustrated in Figures 14 and 15 of the drawings. In Figure 14, there are provided two concentric grooves 30j on the upper surface of the carrier device. In Figure 15, a single groove 30k is provided on the upper surface of the carrier device 14k while a single concentric groove 30k is provided on the lower surface of the carrier.

Figure 16 is an enlarged fragmentary sectional view illustrating that another variable is width of the groove 30l in relation to the width of the material band 26l. In this embodiment the groove has a width greater than the depth of its impression. In this way, a marked difference in the stretchability of the material in the area of the groove 30l and in the adjacent area of the band 26l will be provided, as may be desired in particular instances. Additionally, coaxial grooves, instead of concentric grooves, may be useful in achieving particular results in certain instances.

In the various carrier devices shown, there is handle means comprising two fingers receiving apertures, e.g. the apertures 40 in Figure 2. The grooves 30 are impressed in the vicinity of the handle means at least to an extent which increases the resistance to stretching of the material in the vicinity of the handle means. The handle means may take other forms, such as smaller apertures, to receive a separate handle component, or a strap portion integral with the carrier device.

WHAT WE CLAIM IS:—

1. A sheet carrier device made from a resiliently deformable plastics material and having at least one container receiving aperture provided therein, whereby upon the insertion of a container of somewhat greater circumference axially through each aperture, the surrounding material is stretched for gripping and resiliently engaging the container to resist container withdrawal, having at least one area which has had its resistance to stretching increased as compared with adjacent areas by having a thickness-reducing groove impressed in it.
2. A carrier as defined in claim 1, wherein the areas are grooves which extend circumferentially about each aperture.
3. A carrier as defined in claim 1, wherein the areas are grooves at least in the areas surrounding each aperture which are subject to the highest tensile stress.
4. A carrier as defined in claim 1, wherein the areas are grooves in the form of a plurality of spaced, generally equal segments circumferentially arranged about each aperture.
5. A carrier as defined in claim 1, wherein the areas are grooves located at the inner margin of each aperture.
6. A carrier as defined in claim 1, wherein the areas are a plurality of concentric grooves.
7. A carrier as defined in claim 6, wherein the concentric grooves are located on the same surface of the carrier.
8. A carrier as defined in claim 6, wherein the concentric grooves are located on opposite surfaces of the carrier.
9. A carrier as defined in claim 1, wherein the areas include a plurality of radially extending groove portions circumferentially spaced around each aperture.
10. A carrier as defined in claim 1, wherein the areas include both circumferentially and radially extending groove portions around each aperture.
11. A carrier as defined in claim 1, wherein the areas are grooves spaced from the interior margin of each aperture, and

the material surrounded by each groove is relieved to permit expansion of the aperture without stretching of the material during the start of assembly.

12. A carrier as defined in claim 1, wherein each of the grooves has a width greater than the depth of its impression.

13. A carrier as defined in claim 1, including handle means, the areas including grooves in the vicinity of the handle means.

14. A carrier as defined in claim 13, wherein the handle means comprises a finger receiving aperture provided in the carrier.

15. A package comprising a carrier as defined in any of claims 1 to 14, assembled with a container in each aperture, the container having a somewhat greater circumference than the circumference of the respective aperture when the carrier is unstressed.

16. A package as defined in claim 15, wherein each of the grooves in the carrier is impressed in the upper surface thereof.

17. A package as defined in claim 15, wherein each of the grooves in the carrier is impressed in the lower surface thereof.

18. A package as defined in claim 15, wherein each of the grooves in the carrier is arranged on a circumferential line which is smaller than the circumference of the container.

19. A package as defined in claim 15, wherein each of the grooves in the carrier is arranged on a circumferential line which is equal to the circumference of the container.

20. A package as defined in claim 15, wherein each of the grooves in the carrier is arranged on a circumferential line which is greater than the circumference of the container.

21. A carrier as defined in claim 1, substantially as any one of the examples described with reference to the accompanying drawings.

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