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(54) **Wrapped bundles of containers**

(57) The invention relates to a wrapped bundle (20) comprising one or more rows of plastic containers (1) and an outer wrapping layer (16), the or each row comprising a container at each end of the row, each of the end containers comprising a handle (10), the handle being asymmetrically located on the container to provide a first side of each container which contains the handle, and a second, opposing, side of each container which does not contain the handle, and wherein the first side is more rigid than the second side, whereby the first side of the end containers is directed towards the outside of the wrapped bundle (20), and the second side of the end containers is directed towards the middle of the row; or the handles (10) of adjacent containers (1) are directed towards opposite sides of the wrapped bundle (25).

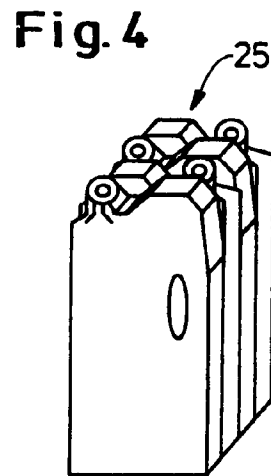
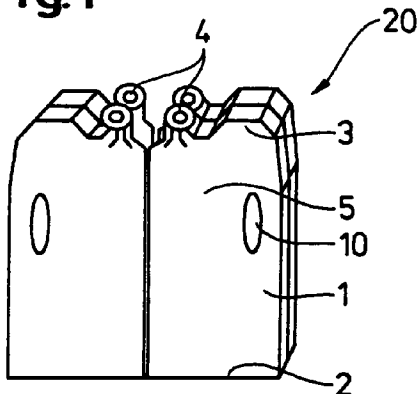


Fig.1



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## Description

The present invention relates to the field of packaging, in particular to containers packaged into wrapped bundles for transport.

A great variety of containers have been described in the art and it is also known that packaged articles in general can be shipped in boxes or as bundles wrapped in plastic films. The latter shipping mode has the advantages that it avoids having to use expensive shipping containers, it avoids complicated manipulations to take the articles out of the boxes once they have reached the final destination, and it finally avoids the environmentally undesirable use of large quantities of cardboard material, i.e. such shipping mode produces less waste.

However, this stacking and wrapping shipping mode is not applicable to all containers, because it requires that the containers which are being shipped be rigid enough to withstand the absence of an outer box which would normally provide the desired rigidity.

Simultaneously, it is a general trend in packaging to diminish the amount of material used for the manufacture of containers. In the case of plastic materials, this leads to the use of so-called lightweight bottles, including the so-called blister bottles, such as those available from Unifill, Italy. Naturally, thermoplastic containers of lighter weight are more prone to the above problems.

When lightweight plastic containers are packaged into bundles, the bottles are readily deformed making them more difficult to stack and to transport without damage. In an extreme case a shipping unit or pallet may collapse during transport or storage due to deformation of one or more of the containers. In particular when one or more rows of bottles are held together by a film in tension, the bottles at the ends of the rows, or corners of the bundles, carry most of the load imposed by the film in tension, and are most vulnerable to deformation.

Consequently, it is an object of the present invention to provide a wrapped bundle comprising a plurality of lightweight plastic containers which requires less packaging material to be used than those known in the prior art. In particular it is an object of the present invention to provide a wrapped bundle which resists substantial deformation at the ends or corners when the outer wrapping layer is in tension. Furthermore it is an object of the present invention to provide wrapped bundles which are suitable for stacking into shipping units with greatly reduced risk of the shipping unit collapsing.

### Summary of the Invention

The object of the present invention is achieved by means of a wrapped bundle comprising one or more rows of plastic containers and an outer wrapping layer, the or each row comprising a container at each end of the row, each of the end containers comprising a handle, the handle being asymmetrically located on the container to provide a first side of each container which

contains the handle, and a second, opposing, side of each container which does not contain the handle, and wherein the first side is more rigid than the second side, whereby the first side of the end containers is directed towards the outside of the wrapped bundle, and the second side of the end containers is directed towards the middle of the row.

In a first embodiment of the invention the wrapped bundle consists of one row of containers, the row comprising from two to five containers, preferably two or three.

In a second embodiment of the invention the wrapped bundle consists of from two to four rows of containers, each row comprising from two to five containers, preferably two or three.

In an alternative embodiment of the invention the wrapped bundle comprises one or more rows of plastic containers and an outer wrapping layer, the or each row comprising at least two containers, each of the containers comprising a handle, the handle being asymmetrically located on the container to provide a first side of each container which contains the handle, and a second, opposing side of each container which does not contain the handle, and wherein the first side is more rigid than the second side, whereby the handles of adjacent containers are directed towards opposite sides of the wrapped bundle.

The outer wrapping layer of the wrapped bundle is preferably a film or tape in tension. Suitable materials for the film or tape are plastic, especially polyethylene, polypropylene, polyester, polystyrene, polyvinyl chloride, acrylic, or combinations or laminates of these; or paper.

### Detailed Description of the Invention

Figure 1 shows a perspective view of a bundle of four containers having two rows of containers, each row consisting of two containers. The outer wrapping layer is not shown for clarity.

Figure 2 shows a perspective view of a bundle of six containers having two rows of containers, each row consisting of three containers. The outer wrapping layer is not shown for clarity.

Figure 3 shows a perspective view of a bundle of eight containers having four rows of containers, each row consisting of two containers. The outer wrapping layer is not shown for clarity.

Figure 4 shows a perspective view of an alternative embodiment of the invention comprising a bundle of four containers arranged in a single row with handles on adjacent containers directed towards opposite sides of the bundle. The outer wrapping layer is not shown for clarity.

Figure 5a shows the wrapped bundle of figure 1 with part of the outer wrapping layer shown cut-away.

Figure 5b shows the configuration of a shipping pallet loaded with bundles. The outer wrapping layer is not shown for clarity.

As defined herein a "wrapped bundle" 20, 25 is a packaged unit which contains at least two containers 1. The containers are held together by an outer wrapping layer 6 which is preferably a film or tape in tension. Hence very little movement of the containers relative to each other is possible. According to the present invention the containers are oriented within the wrapped bundle with respect to each other, such that there is a minimum amount of deformation of the containers. This makes it possible to assemble the wrapped bundles into closely packed shipping units 30 for transport.

The lightweight container 1 herein can be made of a variety of materials, but preferred containers herein are made of a thermoplastic material or blends thereof, including blends of recycled and virgin plastic.

The lightweight container 1 of the invention first comprises a base portion 2. The base portion 2 is the portion on which the container stands in its normal upright position.

The container further comprises a top portion 3 which will generally comprise an opening 4 which will allow filling and/or emptying of the container. Accordingly, preferred containers herein are bottles, however the present invention is also applicable to containers which do not have an opening, i.e. which need to be torn or otherwise ruptured to be emptied.

The container further comprises at least one side wall 5 which joins the top portion 3 and the base portion 2. The present invention is not limited to containers of a particular cross section. When the container is of a generally cylindrical cross section, in a plane perpendicular to the container's vertical axis A (i.e. an axis which is perpendicular to the base), there is only one, continuous side wall. Containers herein can alternatively have an ellipsoid cross section in which case they are considered to have two side walls. It is preferred that containers herein have four side walls and a substantially square or rectangular cross section. In particular for the purpose of providing containers which are suitable to be assembled in wrapped bundles 20 which are wrapped in films, it is preferred to have containers which have substantially flat side walls, i.e. containers of substantially square or rectangular cross section. Indeed, such containers allow best use of space, and provide shipping units and sub-units of good rigidity. However, lightweight containers having this square or rectangular cross section are vulnerable to deformation when packaged by an outer wrapping layer in tension.

In most containers above about 1 litre in size any handle 10 must be located asymmetrically with respect to the main container axis A for ergonomic reasons. The effect of this is that one side of the container, the side where the handle is located is inherently more rigid than the opposing side. According to the present invention, if two containers are bundled together in a wrapped bundle, it is advantageous to orient the containers so that the handles are located nearest to the opposing ends of the wrapped bundle. If three containers are bundled together, it is advantageous to orient the end con-

tainers so that the handles are located nearest to the opposing ends of the wrapped bundle, the middle container may be oriented in either direction. As shown in Figures 1 and 5a, if four containers are bundled together one possible arrangement is two rows of two containers. In this case it is advantageous to orient the end containers so that the handles are located nearest to the four corners of the wrapped bundle. In the alternative embodiment of the invention, shown in Figure 4, the four containers are lined up in a single row, the handles of adjacent containers being directed towards opposite sides of the wrapped bundle. For wrapped bundles comprising more than four containers similar advantageous arrangements can be constructed following the same principle. Figure 2 illustrates one possible configuration for a wrapped bundle comprising six containers, and Figure 3 illustrates one possible configuration for a wrapped bundle comprising eight containers.

The outer wrapping layer 6 preferably consists of paper or plastic film.

Containers according to the present invention can be assembled in bundles, then wrapped in either pre-stretched plastic films (stretch-wrapping) or in heat-shrinkable films (shrink-wrapping). In the latter case, the bundles wrapped in the film must be processed through a heating means for the film to shrink. Preferred films in both cases are polyethylene wrapping films available for instance from Mobil. Plastic films useful herein typically have a thickness of less than 250 micrometers, preferably less than 150 micrometers, and more preferably less than 50 micrometers. In one embodiment of the invention the outer wrapping layer of the wrapped bundle is applied by shrink-wrapping, the plastic film being sealed around the bottles and shrunk in a heat tunnel. Most preferably the plastic film thickness for shrink-wrapping is 35 to 50 micrometers. In an alternative embodiment of the invention the outer wrapping layer of the wrapped bundle is applied by stretch-wrapping, the plastic film most preferably having a thickness of 10 to 30 micrometers. The plastic film may also be applied in the form of strips, for example, adhesive strips which may be wrapped around the wrapped bundle. Wrapped bundles according to the present invention preferably consist of a single height of containers, but the wrapped bundles can in turn be stacked.

In an alternative embodiment of the invention the bundles may also be contained by paper wrapping. A material which is formed as a cellulosic web, and which fulfils these requirements is suitable for use as the wrapping in the present invention. For example the cellulosic web may be a laminate, a bonded compressed air laid web, or a wet laid web, although wet laid paper wrapping is preferred due to its tensile properties. Paper having a basis weight of at least 40 grams per square metre, and preferably about 70 grams per square metre is preferred. In order to achieve the benefits of the lightweight package of the invention, the paper should most preferably have a basis weight of less than 125 grams per square metre. The most preferred material of con-

struction of the wrapping is a wet-laid paper made from wood- or manila fibres, or a mixture of these. Both virgin and recycled paper may be used.

### Claims

1. A wrapped bundle (20) comprising one or more rows of plastic containers (1) and an outer wrapping layer (6), the or each row comprising a container (1) at each end of the row, each of the end containers comprising a handle (10), the handle being asymmetrically located on the container to provide a first side of each container which contains the handle, and a second, opposing, side of each container which does not contain the handle, and wherein the first side is more rigid than the second side, whereby the first side of the end containers is directed towards the outside of the wrapped bundle (20), and the second side of the end containers is directed towards the middle of the row. 10 15 20
2. A wrapped bundle (20) according to claim 1 consisting of one row, the row comprising from two to five containers. 25
3. A wrapped bundle (20) according to claim 2 consisting of one row, the row comprising two or three containers. 30
4. A wrapped bundle (20) according to claim 1 consisting of from two to four rows, each row comprising from two to five containers. 35
5. A wrapped bundle (20) according to claim 4 consisting of two rows, each row comprising two or three containers. 40
6. A wrapped bundle (25) comprising one or more rows of plastic containers (1) and an outer wrapping layer (6), the or each row comprising at least two containers, each of the containers comprising a handle (10), the handle being asymmetrically located on the container to provide a first side of each container which contains the handle, and a second, opposing, side of each container which does not contain the handle, and wherein the first side is more rigid than the second side, whereby the handles (10) of adjacent containers (1) are directed towards opposite sides of the wrapped bundle (25). 45 50
7. A wrapped bundle (20,25) according to any of the previous claims, the outer wrapping layer (6) being a film or tape in tension. 55
8. A wrapped bundle (20,25) according to claim 7, the outer wrapping layer (6) being a plastic film, the plastic being selected from the group consisting of polyethylene, polypropylene, polyester, polysty-

rene, polyvinyl chloride, acrylic, or combinations or laminates of these.

9. A wrapped bundle (20,25) according to claim 7, the outer wrapping layer (6) being paper.

Fig.1

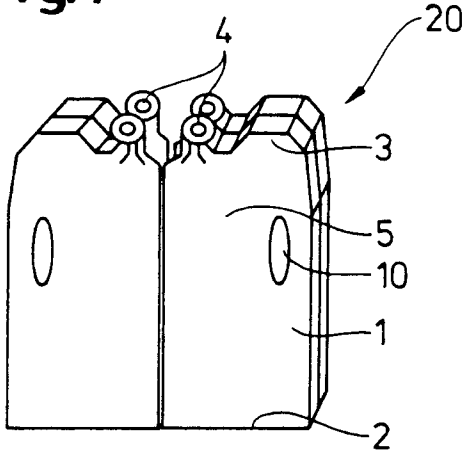


Fig. 2

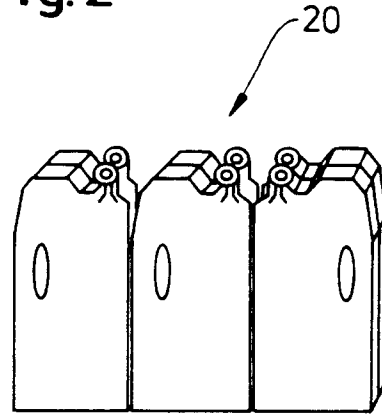


Fig. 3

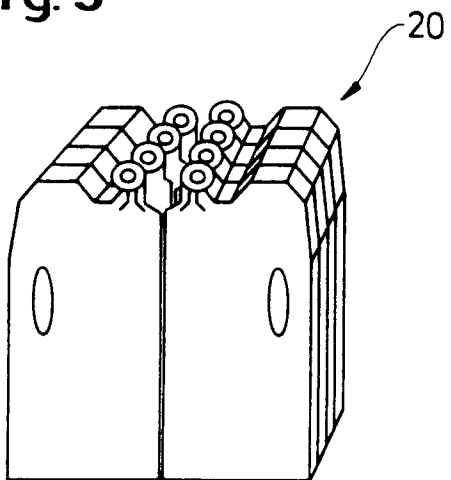


Fig. 4

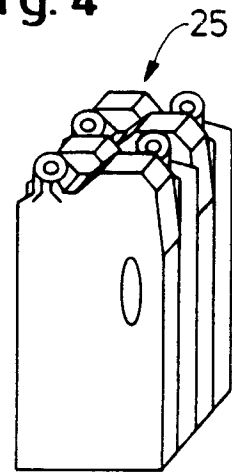


Fig. 5a

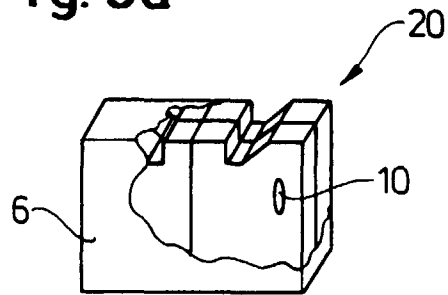
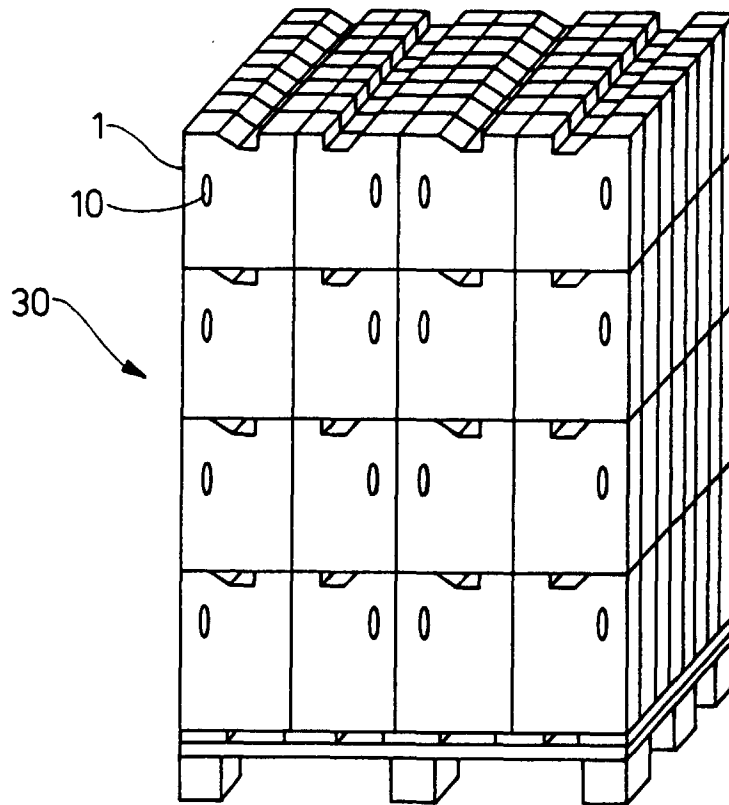


Fig. 5b





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EUROPEAN SEARCH REPORT

Application Number  
EP 95 20 3500

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FR-A-2 467 793 (COMPAGNIE FRANÇAISE DE RAFFINAGE) * page 2, line 16 - line 19; figures 1-3 *	1,4-8	B65D71/00
Y	* page 4, line 22 - line 24 *	2,3,9	
Y	--- US-A-3 215 266 (DREYFUS) * column 3, line 70 - line 75; figure 5 *	2,3	
A	* column 1, line 67 - line 72 *	8	
Y	--- EP-A-0 533 520 (NEWTEC INTERNATIONAL) * claim 1 *	9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		9 May 1996	Bridault, A
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone                      Y : particularly relevant if combined with another document of the same category                      A : technological background                      O : non-written disclosure                      P : intermediate document</p> <p>T : theory or principle underlying the invention                      E : earlier patent document, but published on, or after the filing date                      D : document cited in the application                      L : document cited for other reasons                      .....                      &amp; : member of the same patent family, corresponding document</p>			

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