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(54) Stretch wrapped units for flexible articles

(57) A unit (10) comprising an array (11) of at least two substantially parallelepipedal flexible packs (12), said packs (12) comprising compressed flexible articles (14) encased in a flexible bag (13), said compressed articles (14) having been compressed to between 20 percent and 70 percent of their uncompressed volume in a direction of compression C, said array (11) comprising a top face (15), a bottom face (16), a front face (17), a back face (18) and two side faces (19, 20) characterised in that

said unit (10) comprises a cold stretchable plastic film (21) disposed adjacent at least a part of at least four consecutive faces (15, 16, 17, 18, 19, 20) of said array (11) and said cold stretchable plastic film (21) non-adhesively attaches to said top face (15), said bottom face (16), said front face (17), said back face (18) and said side faces (19, 20) of said array (11).

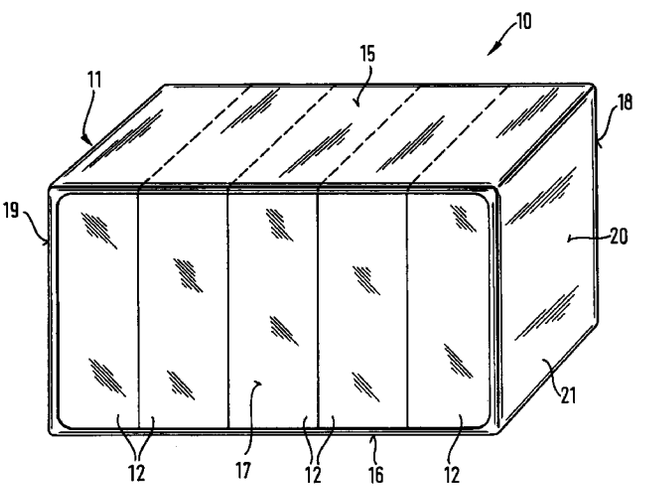

Fig. 2

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Description

Field of the invention

The invention relates to an array of packs, comprising compressed flexible articles encased in flexible bags, which are stretch wrapped with a cold stretchable plastic film and sealed to form a rigid stretch wrapped unit.

Description of the prior art

It is widely known in the art to pack an array of flexible packs comprising compressed flexible articles encased in flexible bags in cardboard cases of fixed dimensions for ease of handling, storage and transport. The space inside these cases cannot be fully utilised because of the tolerances imposed by the variations in the pack dimensions resulting from the production processes and the usual automatic mechanical packaging systems. Furthermore, due to the deviations in the pack dimensions resulting from the packing of compressible flexible articles into flexible bags, the cardboard cases need to be over-dimensioned. As a consequence of this over-dimensioning, arrays of packs on the bottom of pallets are incapable of supporting the imposed loads when pallets of products are stacked or grouped three pallets high. Therefore, the cardboard cases must be designed to support the extra loads.

An array of packs of compressed flexible articles can also be wrapped in a plastic film. The plastic film can comprise relatively inexpensive materials such as polymeric films or thermoplastic films. Such materials reduce the severity of the disposal problem from an environmental standpoint both with respect to the amount of wrapping material required and the disposability/degradability of the particular wrapping material. In addition, plastic film is lighter and more flexible than cardboard, which is heavy, requires space and has less flexibility for storage since it is rigid and in use continues to occupy the same amount of space even when nearly empty.

Prior art developments include US 5,049,423, which discloses thermoplastic films and more particularly, thermoplastic films having properties making them especially suitable for use as stretch wraps for various foodstuffs, rolls of carpet, liquid containers etc. in various bundling and palletising operations. The load of the pallet may be bundled by stretch wrapping a film several times around the articles to be palletised. The document focuses on the properties of the thermoplastic film.

EP 0 294 339 A2 discloses a machine for packaging a plurality of articles, either loose, collected on a tray or inside a container, within a cold stretchable or a semi-stretchable type of film web. The machine includes a stretching device which prevents shrinking of the central region of the film in the longitudinal direction, a wrapping device and a complete sealing unit which seals the film ends while the film is still under tension. The invention takes advantage of the elastic memory of the film web to tightly enclose the packaged articles rather than using the compressibility of the articles to form a rigid stretch wrapped unit.

DE 33 41 897 A1 discloses a process developed by the Hagemann company which results in a stretch wrapped product. The machine wraps articles in pre-stretched film, which contracts at a later stage. The film is drawn from a reeling device under tension and continuously wound in a spiral fashion around the conveyor belt and reels to form a tube, whose end is drawn off. The machine can wrap loosely stacked articles in continuous action and single articles can be handled. The invention does not teach a stretch wrapping process which exploits the compressibility of an array of packs of flexible articles.

Therefore, the prior art does not teach a wrapping system which is independent of the fixed dimensions of the outer cases, which exploits the compressibility of an array of packs of flexible articles and which allows the possibility of sealing the sides of the array of packs to form a completely closed unit.

Object and summary of the invention

The object of the present invention is to produce a rigid and stable unit by stretch wrapping an array of flexible packs of disposable absorbent diapers, sanitary articles, incontinent pads or briefs, bandages and the like, with a cold stretchable plastic film.

The present invention eliminates cardboard as a packaging material by making use of a plastic film, which is stretch wrapped around four consecutive faces of an array of flexible packs. This has subsequently led to several benefits namely, units that are more stable and that are capable of sustaining higher load carrying capacities; a reduction in the overall weight of the units to be handled, stored and transported; a decrease in the level of waste packaging material; and an improved and optimised pallet fit during handling, storage and transport operations.

In accordance with the object of the invention, a unit comprising an array of at least two substantially parallel-epipedal packs is provided. The unit has a top face, a bottom face, a front face, a back face and two side faces and comprises a cold stretchable plastic film, which is disposed adjacent to at least four consecutive faces of the array of packs. The cold stretchable plastic film non-adhesively attaches to the faces of the array. Two options exist: either the faces of the array not covered by the cold stretchable plastic film can be left exposed to the environment or the cold stretchable plastic film can be made wide enough to cover the remaining two faces of the array and can be sealed to form a closed unit by a variety of means.

According to the present invention, the object is achieved by a unit having the characteristics specified in the claims.

Brief description of the drawings

The invention will be described hereinafter with reference to the following drawings:

Figure 1 shows a pack comprising compressed flexible articles encased in a flexible bag;
Figure 2 is a perspective view of an array of five packs and a cold stretchable plastic film disposed adjacent to four consecutive faces of the array.

Detailed description of the invention

Figure 1 shows a pack **12** comprising compressed flexible articles **14** encased in a flexible bag **13**. The substantially parallelipedal packs **12** are arranged in an up-on-base configuration. Other configurations such as flat-on-face and up-on-side are also possible. The compressed flexible articles **14** may comprise disposable absorbent diapers, sanitary articles, incontinent pads or briefs, bandages and the like. The flexible articles **14** are compressed to between 20 and 70 percent of their uncompressed volume in a direction of compression **C**. In particular, figure 1 shows a diaper pack **12** comprising between one to fifty disposable absorbent diapers **14** and a plastic bag **13** with a thickness ranging from 20 to 120 micrometres. A method for the compression packing of disposable absorbent diapers into flexible bags has been described in detail in the following patents US 4,934,535, US 4,966,286, US 5,022,216, US 5,050,742 and US 5,150,561.

As is displayed in figure 2, the packs **12** are arranged in the form of an array **11** before transport and storage. An array **11** usually comprises at least two substantially parallelipedal packs **12**. More specifically, figure 2 shows a perspective view of a substantially covered array **11** comprising five substantially parallelepipedal packs **12** of the type shown in figure 1. The stretch wrapped array forms the unit **10**. For the purposes of transport and storage, a number of units **10** can be stacked or grouped in a plurality of configurations to form a case on a pallet such that a load can be applied to a top panel or to a side panel of the case with the direction of the load being perpendicular to the direction of compression, which is around the circumference of the case. The units are less compressible in directions perpendicular to the direction of compression.

In figure 2, the unit **10** comprises a top face **15**, a bottom face **16**, a front face **17**, a back face **18** and two side faces **19**, **20** and a cold stretchable plastic film **21**, which is disposed adjacent to at least four consecutive faces of the array **11** of packs **12**. Three stretch wrapping configurations are possible with permutations, namely the cold stretchable film **21** can be disposed adjacent to the top face **15**, the back face **18**, the bottom face **16** and the front face **17**; the side face **19**, the top face **15**, the remaining side face **20** and the bottom face **16**; or the back face **18**, the side face **20**, the front face **17** and the remaining side face **19**. The cold stretchable plastic film **21** non-adhesively attaches to all the faces **15**, **16** **17**, **18**, **19**, **20** of the array **11**. The faces **15**, **16** **17**, **18**, **19**, **20**, depending on the selected stretch wrapping configuration, not covered by the cold stretchable plastic film **21** remain exposed to the environment. In figure 2, in particular, the cold stretchable plastic film **21** is wrapped around the side face **19**, the top face **15**, the remaining side face **20** and the bottom face **16**.

The cold stretchable plastic film **21** can also be disposed adjacent to the top face **15**, the back face **18**, the bottom face **16**, the front face **17** and the side faces **19**, **20** of the array **11** to form a completely closed unit **10**.

The preferred film **21** is a cold stretchable polyethylene film, which is a plastic film that after being stretched exhibits the property of elastic memory. Such a property enables the film to return substantially to its starting dimensions. The preferred thickness for the cold stretchable film **21** ranges from 15-60 micrometres and it can be stretched in an elongation range from 80-150 percent. The cold stretchable film **21** may either be transparent, white or coloured and in addition, it may comprise graphical indicia, which can also be coloured. By tightly stretch wrapping the cold stretchable film **21** around the array **11** of packs **12**, the stability of the array **11** is improved without resulting in a deterioration of the substantially parallelepipedal shape of the array **11**. Furthermore, a strong and rigid outer casing for the array **11** is created, which guarantees stability.

Glossary

10	unit
11	array
12	pack
13	flexible bag
14	compressed articles
15	top face
16	bottom face
17	front face
18	back face
19, 20	side faces
21	cold stretchable plastic film

Claims

1. A unit (10) comprising an array (11) of at least two substantially parallelepipedal packs (12), said packs (12) comprising compressed flexible articles (14) encased in a flexible bag (13), said compressed articles (14) having been compressed to between 20 percent and 70 percent of their uncompressed volume in a direction of compression C, said array (11) comprising a top face (15), a bottom face (16), a front face (17), a back face (18) and two side faces (19, 20) characterised in that said unit (10) comprises a cold stretchable plastic film (21) disposed adjacent at least four consecutive faces (15, 16, 17, 18, 19, 20) of said array (11) and said

cold stretchable plastic film (21) non-adhesively attaches to said top face (15), said bottom face (16), said front face (17), said back face (18) and said side faces (19, 20) of said array (11).

2. A unit (10) according to claim 1 wherein said faces (15, 16, 17, 18, 19, 20) of said array (11) not covered by said cold stretchable plastic film (21) remain exposed to the environment.

3. A unit (10) according to claim 1 wherein said cold stretchable plastic film (21) is disposed adjacent said top face (15), said bottom face (16), said front face (17), said back face (18) and said side faces (19, 20) of said array (11) and sealed to form a closed unit.

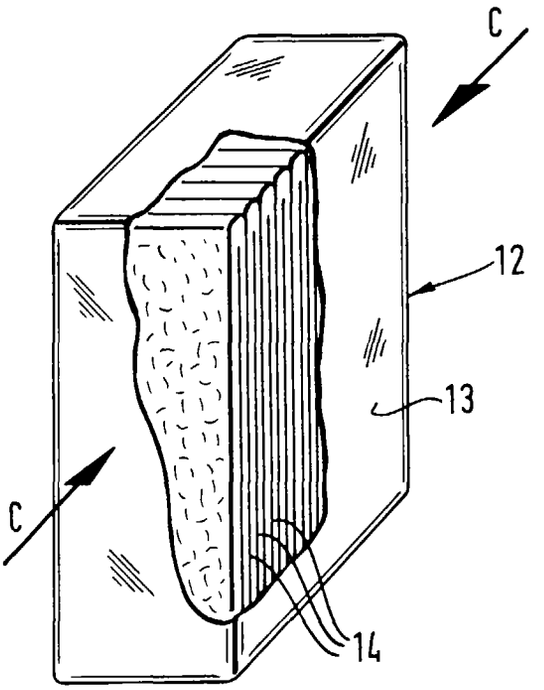

Fig. 1

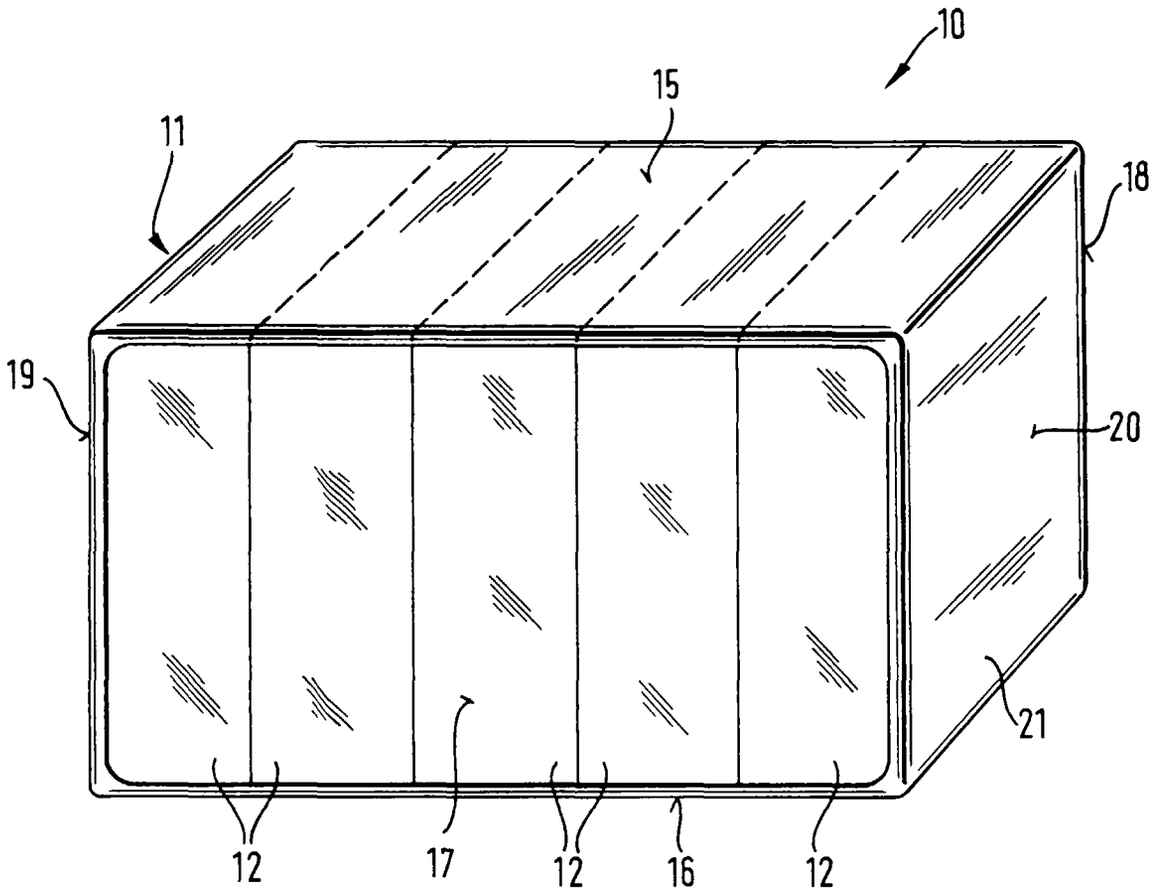

Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 10 6865

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	US-A-4 555 017 (BLACKMORE PHILLIP W) 26 November 1985 * column 2, line 16 - column 3, line 3; figures *	1-3	B65D71/00 B65D85/16
X	US-A-5 350 063 (BERDAN II CLARKE) 27 September 1994 * column 2, line 55 - column 4, line 11; figures *	1-3	
X	EP-A-0 072 302 (SAINT GOBAIN ISOVER) 16 February 1983 * column 8, line 26 - column 9, line 26; figures 8,9 *	1-3	
A	GB-A-2 183 215 (MOY INSULATION LIMITED) 3 June 1987 * page 1, line 130 - page 2, line 108; figures *	1-3	
A	US-A-4 793 490 (EVERT DANIEL D) 27 December 1988 * column 2, line 36 - column 4, line 65; figures *	1-3	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
BERLIN	11 September 1996	Olsson, B

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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E : earlier patent document, but published on, or after the filing date
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L : document cited for other reasons

& : member of the same patent family, corresponding document

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