In a bulk package system the stack of plates having a height \( H_{\text{plate}} \) is contacted and stabilized by an internal packaging structure with a height \( H_{\text{int}} \) which is higher than the stack to aid in protection of the plate from forces from above. A separate external packaging structure is provided with a height \( H_{\text{ext}} \) being equal or larger than \( H_{\text{int}} \). Forces acting upon the external packaging structure caused by e.g. collisions are not transferred to the stack of plates. The external packaging structure is assembled after the internal packaging structure.
FIELD OF THE INVENTION

The present invention relates to a solution for packaging flat articles in bulk. More specifically the invention is related to a bulk packaging for printing plates.

BACKGROUND OF THE INVENTION

Printing plates have always been manufactured at a relative small number of places and sent to customers worldwide. The plates can be sent in small numbers to printers using small packages but when a large number of plates are needed, it is desirable to send them in large packages, called "bulk packages", to the printing plants. These large packages however pose specific problems due to their specific content and properties.

These bulk packages are characterized by
- relative large weight, which may vary between 200 and up to 1000 Kg,
- their sensitivity to damage. When a stack of plates comes into collision with a hard obstacle the side edges of the plates can be deformed making the plate unusable.
- certain types of plates are also pressure sensitive, which means that when pressure is exerted upon the stack of plates, the plates would also be damaged and give unsatisfactory printing results.
- It is to be avoided that plates in a stack move relatively to each other as this can lead to "scuff marks".
- For all types of plates, it is desirable to shield them from dust, while other types also need shielding from light.

During shipment these bulk packages however encounter conditions which are not ideal. Pallets are often bumped into by other goods during handling, often a considerable inclination of the pallet occurs so that gravity can make the stack of plates move sideways. Even stronger forces can act upon the pallet when it is e.g. put down on the floor while a pallet truck is still moving, thereby causing a rapid deceleration of the pallet by friction of the floor.

All these factors can cause movement or deformation of the stack of plates if they are not sufficiently protected by the packaging system. In extreme cases the printing plates do even become exposed to the environment.

Several types of bulk packaging have been used in the past.

According to JP10194351 a stack of printing plates is prevented from slipping by packing it with several layers of corrugated cardboard. The stack is protected from slipping due to the packaging but any collision of the outside of the package with an obstacle will cause deformation and possible damage as the plates are in direct contact with the outer shell of the package.

JP2002-145316 also provides a stack of plates on a pallet but without special outer packaging.

JP2002-211502 uses filling pieces between the stack of printing plates and the outside of the package. Filling pieces always makes a connection between the outer package to the stack of plates so that a movement of the package due to a external force will also cause deformation of the stack of plates. The protection to direct impact is very low.

Systems have been tried wherein a rigid box is provided to place the plates inside, but this is not handy as the stacking of plates inside the box is difficult and can not be easily automated.

It would be also desirable that for packaging the numerous sizes and types of printing plates only a limited number of packaging constructions are required.

Up to now no economical viable package is available that combines:
- good immobilization of the stack of plates
- protection to direct impact of the stack of plates
- protection to avoid deformation of the stack of printing plates due to deformation of the outer shell of the package.
- avoidance of direct pressure on the stack of plates.
- compatibility with different sizes of plates.
- use of environmentally safe or economically cheap recyclable packing products.

SUMMARY OF THE INVENTION

The above-mentioned advantageous effects are realized by a bulk package system having the specific features set out in claim 1. Specific features for preferred embodiments of the invention are set out in the dependent claims 2 to 12.

A method for making a bulk package for printing plates is claimed in claim 13.

Further advantages and embodiments of the present invention will become apparent from the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 clarifies the mounting procedure of the two layered bottom plate to the pallet.
Fig. 2 shows the mounted bottom plate on the pallet.
Fig. 3 gives a detail of the structure of the bottom plate of Fig. 1.
Fig. 4 shows the stack of plates on the bottom plate.
wherein the heights of the different relate in the manner:

\[ \text{H}_{\text{ext}} \geq \text{H}_{\text{int}} > \text{H}_{\text{plate}} \]

**Fig. 5** depicts the stack of plates with the internal packaging structure.

**Fig. 6** shows the internal packaging structure which is immobilized to the bottom plate.

**Fig. 7** shows the package with mounted corner pieces on the corners of the bottom plate.

**Fig. 8A to 8D** give details on how the corner pieces are made and how they can be attached to the bottom plate.

**Fig. 9** gives the package with the mounted casing inside the corner pieces and possible extra edge pieces.

**Fig. 10** gives the completed bulk packaging system.

**DETAILED DESCRIPTION OF THE INVENTION**

[0011] The detailed description is given with reference to Figures 1 to 9 of which details are given in the further described example.

[0012] A improved bulk packaging system can be provided by a packaging system comprising:

- A bottom plate 1 for supporting the stack of printing plates 2, the stack of printing plates 2 having a height \( H_{\text{plate}} \) above the bottom plate 1,
- an internal packaging structure 3 contacting and stabilizing the stack of printing plates 2, the internal packaging structure 3 having a height \( H_{\text{int}} \) above the bottom plate 1,
- an external packaging structure 4 separate from the internal packaging system 3 separate and having a height \( H_{\text{ext}} \)

wherein the heights of the different relate in the manner:

\[ \text{H}_{\text{ext}} \geq \text{H}_{\text{int}} > \text{H}_{\text{plate}} \]

[0013] In order to more exactly define the properties of this packaging system, some definitions have to be given:

- **Bottom plate 1**: The plate carrying and in direct contact with the stack of printing plates 2, this bottom plate 1 can itself be carried by e.g. a pallet 5 for easy transportation of the package.
- **Stack of printing plates 2**: any stack or combined stack of flat articles or unpackaged plates, with or without interleave sheets, one or more stack of boxes containing these flat articles or printing plates. Block of flat items which has to be packaged. The plates may be of any kind, e.g. thermal lithographic printing plates, flexographic printing plates etc.
- **Height of the stack of printing plates \( H_{\text{plate}} \)**: this is the height of the stack of plates 2 above the bottom plate 1 without taking into account relative thin foils or packing layers to shield the stack 2 from dust or light.

Internal packaging structure 3: The rigid structure of the package directly in contact with the stack 2. Contacting and stabilizing: Being in direct contact with the stack of plates 2, possible with only some packing foil in between, and holding the stack 2 to keep the shape avoiding deformation and movement of the items in the stack 2 to each other. The aim is to keep the block of plates together.

Height of the internal packaging structure \( H_{\text{int}} \): height of the uppermost rigid part of the internal packaging structure 3 above the bottom plate 1, normally the internal packaging structure 3 also rests upon the bottom plate 1.

Separate: This indicates that the external packaging structure 4 is not in direct contact with the internal packaging structure, unless through bottom plate 1.

Height of the external packaging structure \( H_{\text{ext}} \): height of the uppermost rigid part of the external packaging structure 4 above the bottom plate 1 but without taking into account the cover 6 or the thickness of the cover 6 if the cover has a constant thickness.

If the thickness of the cover is not equal by using e.g. extra filling pieces under the upper layer of the cover at the location of the external packaging structure, then the thickness of these filling pieces is to added as being a part of \( H_{\text{ext}} \).

[0014] The above described packaging system has a lot of advantages:

- By providing a separate internal and external packaging structures 3, 4 certain functions of the package system are split up.
- The internal packaging structure 3 has a double goal:
  - to stabilize the stack of plates 2 when sideway forces act upon the stack due to movements.
  - to protect the upper side of the stack 2 from possible forces from above. All forces acting upon the cover 6 should be diverted from the stack 2.
  - The only goal of the external packaging structure 4 is to form the outer shell and protect the stack of plates 2 from external impact and dust.
  - As the internal and external structures 3, 4 are separate, no forces acting upon the sides are transferred from the external to the internal structure. Even a deformation of the external structure 4 does not imply a deformation of the internal structure 3.

[0015] Regarding the conditions of the heights of the different elements of the packing system, certain tolerances are to be taken into account especially when relative soft materials, such as cardboard, are used. Due to the fact that cardboard material is not totally rigid, it is possible that when placing a flat cardboard piece hori-
The condition $H_{\text{ext}} > H_{\text{int}}$ implies that the stack of plates 2 is better protected from impact from above as the internal packaging structure 3 is always higher than the stack 2. If the cover 6 of the packaging system would be depressed by a weight or force, the internal packaging structure 3 will be met first and the stack of plates 2 is protected from these forces. Preferably the uppermost side of the internal packaging structure 3 does not come into contact with the top side of the stack of plates 2, so when the internal packaging structure 3 is depressed, no forces are transferred to the stack of plates 2.

When taking the tolerance value into account one can say that $H_{\text{int}}$ has to be more than 5mm higher than $H_{\text{plate}}$.

The condition $H_{\text{ext}} > H_{\text{int}}$ combines 2 possible cases:

- the internal packaging structure 3 is lower than the external height $H_{\text{ext}}$ which gives even a better isolation of the internal packaging structure 3 from external forces, or
- the internal packaging structure 3 has the same height as the external structure 4 one and contributes in supporting the cover 6 of the total package.

Dependent upon the different parameters, the size of the package, the size of the plates and the materials and thicknesses and the layout of the different structures, it has to be decided what is best to protect the plates 2. These parameters determining if the internal structure 3 is to be made as high as the external structure 4 or kept lower.

Again taking into account the tolerances mentioned above, this means that

- in the first possible case that $H_{\text{ext}} > H_{\text{int}} + 5\text{mm}$ and that
- in the case $H_{\text{ext}} = H_{\text{int}}$, in fact $H_{\text{ext}}$ is situated between $H_{\text{int}} - 5\text{mm}$ and $H_{\text{int}} + 5\text{mm}$.

Height differences are compensated by the difference of impression of the cover of the package by the internal and external structure of the packaging system so that within these tolerances the internal and external height can be considered to be identical.

For the packaging structure and used materials as in the example given later on it has been found that it is preferable that $H_{\text{ext}} = H_{\text{int}}$ so that the internal structure 3 also supports the cover 6 of the package.

Regarding the relation of $H_{\text{int}} > H_{\text{plate}}$ it is preferable that $H_{\text{int}} > H_{\text{plate}} + 5\text{cm}$ which provides a better protection of the stack of plates 2 from pressure from above.

The internal packaging structure 3 usually a combination of one or more rigid parts 7 and a more flexible, possible adhesive parts 8. Important is that the internal packaging structure 3 can be easily build around the stack of plates 2. A preferred embodiment of the internal packaging structure 3 consists of 4 cardboard corner supports 7 which are strapped to the stack of plates 2 using layers of stretch foil 8 to bind the supports 7 and the stack of plates 2 together. Also other methods can be used, e.g. a adhesive foil could be used, etc...

It is also preferred that the stack of plates 2, together with the internal packaging structure 3 is immobilized relative to the bottom plate 1. This can be done in several ways:

- The stack of plates 2 can be immobilized by an adhesive means between the bottom plate 1 and the stack 2, e.g. double sided adhesive tape can be used of any type of appropriate glue.
- A preferred way of immobilization is the mounting of immobilization means 9 such as pads 9 along the sides of the stack of plates 2 or the internal packaging structure 3. Due to ecological and waste management reasons the immobilization means or pads 9 are preferably made of multilayered cardboard which is glued, using a cold glue, to the bottom plate 1, but alternative materials such as plastics or wood can be used which can be attached using diverse methods such a glue, staples, nails,...

Also other kind of immobilization means can be used, such as straps for attaching the stack of plates 2 to the bottom plate 1.

Preferably the stack 2 or internal packaging structure 3 is not immobilized to the cover 6 of the package as a deformation of the outer shell of the package implies a sideways movement of the cover 6 which would then result in sideway forces acting upon the top of the internal structure 3 resulting in possible deformation of the stack 2.

The aim is that the cover 6 can slide over the top of the internal structure 3 with limited forces acting upon the internal structure 3.

If it is desired that the cover of the package can not slide over the top side of the internal packaging struc-


ture, several solutions are available:

- a possible but impractical method is providing pads or edges inside of the cover 6 of the package abutting the internal packaging structure 3.
- Adhesives could be used to glue the cover 6 to the internal packaging structure 3.
- The internal packaging structure 3 could be fitted with special devices having hooks or pins to penetrate the cardboard of the cover 6.
- More practical is that the condition $H_{\text{ext}} = H_{\text{int}}$ is fulfilled including a the above mentioned tolerance wherein $H_{\text{int}}$ is about 5mm higher than $H_{\text{ext}}$. Due to higher load on the standing cardboard edges, the imprint into the cover will at rather large, thereby hampering the cover 6 to slide over the internal packaging structure 3.

[0027] To enable the easy stacking of plates and an easy building of the internal packaging structure 3 and application of immobilization means 9, it is preferred that the external packaging structure 4 is put in place after the building of the stack 2 and the internal packaging structure 3. The presence of an external structure 4 before stacking the plates and building the internal structure 3 would greatly hamper this stacking of plates and building of the internal packaging structure 3.

[0028] We have developed a dedicated outer packaging structure 4 which can be put in place after all internal handling is finished.

[0029] The external packaging structure 4 according an embodiment of the invention comprises:

- One or more separate edge pieces 10, 11 attached to the bottom plate 1 for defining the contour of the outer packaging structure 4.
- A integral outer casing 12 placed on the bottom plate 1 and in contact with the edge pieces 10, 11 for forming the lateral outer envelope of the bulk package system.
- A cover 6 for closing the top side of the bulk package.

[0030] The edge pieces 10, 11, separate from the bottom plate 1 and internal packaging structure 3 are preferably corner pieces 10 for defining the lower corners of the external packaging system 4.

[0031] These edge pieces 10, 11 have to be attached to the bottom plate 1. This can be done by mounting them on top of the bottom plate 1 in various ways, using glue, staples or other means, but in a preferred embodiment the edge pieces 10, 11 are provided with one or more mounting flaps 13 on the bottom side which is to be adhered to the underside of the bottom plate 1. This again can be done using glue or other means but preferably the mounting flaps 13 are provided with a double sided adhesive tape 14 which can easily "activated" during assembly of the external package structure by removing the protective layer 15. This tape 14 provides an easy and clean attachment process compared to e.g. glue which could easily contaminate other parts of the package as gluing is often a rather "messy" process. The form and method of mounting the corner pieces is given in Fig. 8a to 8D.

[0032] In order to allow the easy mounting of the corner pieces 10 and other edge pieces 11 under the bottom plate 1, this plate preferably have a special structure. As can be seen in Fig. 8D, the upper layer 16 of the bottom plate 1 has the size of the pallet 5 while a lower layer 17 is smaller and leaves an opening 18 at the side between the upper layer 16 of the bottom plate 1 and the pallet 5 in order to allow insertion of the mounting flaps 13 of the edge pieces 10, 11 under the top layer 16 of the bottom plate 1.

[0033] The corner pieces 10 need not to be as high as the final height of the external package structure 4 but can be made as high is this is preferred. The size of the corners pieces 10 has to be chosen arbitrarily depending upon expected content of the package, way of sending, etc...

To form the lateral outer envelope of the bulk package, the external packaging structure 4 also comprises an integral outer casing 12. Integral means that the casing 12 consists of a single piece, i.e. that when the package is completed the usually four sides of the casing form a single unit. Usually the casing 12 is made in advance by folding a strip of cardboard into a frame and closing the frame by joining the ends using tape, glue, staples or other means.

This casing 12 will form the lateral outer envelope of the bulk package and determines the height of the external packaging structure 4.

[0034] The size of the casing 12 normally corresponds with the size of the bottom plate 1 an when the casing 12 is put on top of the bottom plate 1 it is put into contact with the edge pieces, being the corner pieces 10 and/or the elongated edge pieces 11 and will be held in place and is restricted in movement by these edge pieces 10, 11. The casing 12 normally need not to be attached to the bottom plate 1 or the corner pieces 10.

[0035] The casing 12 can just be put on top of the bottom plate 1 without further fastening it to the bottom plate 1 or the edge pieces 10, 11. The weight of the casing 12, preferably made of a thick cardboard material helps to keep the edge pieces 10, 11, i.e. corner pieces 10 in place under the bottom plate 1 by pressing upon the bottom plate 1 which clamps the edge pieces 10, 11 to the pallet 5, further fastening the edge pieces 10, 11.

[0036] As the printing plate sizes may be very large, it is sometimes possible that the sides of the casing 12 bulge outward due to the relative great length over which the sides of the casing 12 are not guided by the corner pieces 10.

This can be solved by extra edge pieces 11 along the sides of the casing 12 where extra support is needed. These side pieces 11 however will not, in contradiction with the corner pieces 10, hold their shape and will need
to be fixed not only to the bottom plate 1, by the mounting flap 13, but also to the casing 12 itself. This can be done by double sided tape 14 or other means. If further attachment of the casing 12 to the edge pieces 10, 11 is required, also the corner pieces 10 can be attached to the casing 12. This provides an even more sturdy package construction.

[0037] This however poses a problem when the package is unpacked and the casing 12 has to be removed from the pallet 5. The elongated edge pieces 11 are usually attached to the casing 12 using a system having a high bondage strength and it is not easy to separate the casing 12 and the bottom plate 1. A solution to this problem is to incorporate a tear strip mechanism 19 in the edge pieces 11 right above the bottom plate 1 and under the attachment area of the edge piece 11 to the casing. The tear strip mechanism 19 consists of a small strip, usually made of plastic, or string, having a high tensile strength, which is glued on the inside of the edge piece 11. At one end a loose piece of the strip or string is available to hold or of the cardboard is cut in advance to facilitate tearing of the cardboard and when the end is pulled outward the strip or string, which has a higher tensile strength than the cardboard, rips trough the cardboard, thereby separating the bottom plate 1 from the casing 12. This way the package can be easily disassembled.

[0038] To finalize the bulk package system a cover 6 is provided to close the assembled box and further shield the plates from the environment and external forces. In the case that the internal package structure 3 has the same height as the external package structure 4, the cover 6 will not only be supported by the casing 12 at the edge but also by the internal packaging structure 3 which is located more inwards the package.

As mentioned above the cover is preferably not attached to the internal packaging structure but can safely be taped or strapped to the casing.

[0039] Concerning the material used for the bulk package system, it can be said that it is desirable that materials are used which are common to the packaging industry, although also other types of materials could be used.

A major advantage of the packaging system according to the invention is that the system allows for a good and sturdy packaging of printing plates in bulk using a packaging substantially consisting of cardboard. This does mean that the main constituents are made out of cardboard but some materials, e.g. the pads 9 or fastening means 9 may comprise other materials. Often glue, tapes of all kinds and staples are used to build, shape and assemble cardboard pieces to a single part which is then used in the package. The fact that the bulk package consists mainly of cardboard is a considerable advantage to the manufacturer and the printing shops which are the customers. Cardboard recycling is a widespread common practice and is not expensive compared to recycling of foam and other synthetic materials.

[0040] Is has been found that printing plates can be stacked to a height of about 1200 mm. When the package of plates 2 is lower, it is possible to stack more that one pallet 5 with the bulk package on top of each other till the total height is about 1200 mm. Preferable to avoid deformation of the cover 6 of the lower bulk package, the cover 6 itself is covered by a multiplex wooden plate 20 which can be send back to the manufacturing plant together with the pallets. Other types of plates, such as plastic plates, can be used and even a honeycomb cardboard plate may be used to distribute the load of the upper pallet over the lower pallet.

[0041] In production an easy method for forming such a package can be used comprising the following steps:

- providing a bottom plate 1, preferably on a pallet 5, for supporting the stack of printing plates 2.
- putting a stack of printing plates 2, having a height Hplate on the bottom plate 1,
- stabilizing the stack of printing plates 2 by an internal packaging structure 3 in contact with the stack of printing plates 2 and having a height Hint > Hplate,
- immobilizing the stack of printing plates 2 relative to the bottom plate 1,
- attaching separate edge pieces 10,11 to the bottom plate 1 for defining the contour of an outer packaging structure 4,
- placing an integral outer casing 12, having the height Hext > Hint > Hplate, on the bottom plate 1, the casing 12 being in contact with and restricted in movement by the edge pieces 10,11, for forming the lateral envelope of the bulk package,
- closing the bulk package by providing a cover 6.

[0042] A practical example is given hereafter illustrated with the drawings of the general description, it is not the intention that measurements are reproduced exactly:

[0043] A pallet 5 having a size 900x700mm is used as a base for the bulk packaging system.

[0044] As shown in Fig. 1 and 2 on a pallet a composite bottom plate 1 is mounted using a double sided adhesive tape. The bottom plate 1 consists of:

- an upper single flute cardboard piece 16, having a thickness of about 3mm, having the size of the pallet 5, 900 x 700 mm which is glued on top of a
- a lower double flute cardboard piece 17, 800 x 400 mm, about 7mm thick.

The lower piece 17 is centered regarding the edges of the pallet 5 and the edges of the upper cardboard piece 16 in order to leave space 18 of at least 50 mm to 150 mm at the side of the pallet 5 under the edges of the upper plate 16.

[0045] A double stack 2 of plates is mounted on the pallet 5 using a guided automatic stacking machine, delivering smaller plate boxes containing plates of about 400x 600 mm. The stack 2 is made until a total of about
3000 plates are present on the bottom plate 1, the plates having a weight of about 300Kg. The stack of plates 2 is made to have a height of about 550mm.

[0046] In contact with the stack of plates, 4 cardboard corners supports 7 are mounted. These corners are made of triple flute cardboard, have sides of 250mm and are 600 mm long and put on the bottom plate 1 so that the height of the internal package structure 3 will also be 600 mm.

The cardboard corners 7 are strapped to the stack of plates 2 using stretch foil 8 thereby forming the stack of plates 2 into a single block. As the cardboard corners 7 are about 50 mm higher than the stack of plates 2, the stack 2 is protected from forces from above.

[0047] To immobilize the stack of plates 2 together with the internal packaging structure 3 cardboard pads 9, made of triple flute cardboard having a thickness of 13mm, are glued along the side edges of the stack 2 using cold glue. These pads 9 are sufficiently high and long for fix the stack 2 and to withstand forces, generated by accelerations of tilting of the pallet 5, which try to move the stack 2 sideways.

[0048] After packaging of the plates four corner pieces 10 and two linear edge pieces 11 are attached to the underside of the bottom plate 1 using mounting flaps 13 with double sided adhesive tape 14. The corner pieces 10 and edge pieces 11 are made of double flute cardboard material. The corner pieces 10 have sides which are 300 mm long and have mounting flaps 13 of 50mm. The height of the 4 corners 10 is about 100 mm. Both linear edge pieces 11 are 500 mm long and 100 mm high and have also a mounting flap 13 of 50 mm. The elongated edge pieces 11 are provided with a tear strip mechanism 19 to allow easy disassembly of the package afterwards.

[0049] Because of the double flute cardboard layer which is the lower layer 17 of the bottom plate 1, the mounting flaps 13 can be easily slid under the upper layer 16 of the bottom plate 1 and by removing the protective layer 15 of the double sided tape 14 on the mounting flaps 13, the edge pieces 10,11 are attached to the bottom plate 1.

[0050] A fitting casing 12 made of triple flute cardboard is put in between the corner pieces 10. The casing 12 has the size of the pallet 5 i.e. 900 x 700 mm and has a height of 600 mm

[0051] The weight of the casing 12 helps to fix the bottom plate 1 to the mounting flaps 13 of the corner and edge pieces 10,11.

[0052] In a next step both linear edge pieces 11 are attached to the casing 12 to give extra support to the casing 12 an thus preventing bulging of the casing 12. The double sided adhesive tape 14 used is only provided above the tear strip mechanism 19 of the edge pieces 11.

[0053] To close the package a double flute cardboard cover 6 is provided of the size of the pallet 5 and having an edge of about 155 mm. In order to allow stacking of different pallets a 8mm multiplex wooden plate 20 is put on top and the bulk package combination is strapped, using plastic straps 21, plural times to the pallet 5.

[0054] Tests were made with a bulk package according to the invention:

- A finished bulk package was stored in a 26° tilted position over a long period of time. This resulted in only a slight deformation of the glued cardboard pads, which had a thickness of 13 mm and which were glued along the side of the stack of plates, without allowing much movement of the stack. No damage to the plates was present.

- A horizontal drop test was also performed. Two or more pallets of different sizes were stacked on top of each other and were transported by a pallet truck. While reversing at a speed of about 6 to 9 Km/h, the forks of the truck were dropped to the ground thereby bringing the lowermost pallet suddenly in contact with the ground forcing a rapid deceleration of the stack. The floor was a rough, unpolished industrial concrete floor having a high friction value. This tested a possible extreme rough handling of the stack during transport. As a result the upper pallets were displaced, i.e. slid, over the lower ones and both the package of the lowermost and the intermediate bulk package sustained slight to considerable deformation but the external packaging structure was kept intact, no plate were exposed to the environment and no damage could be found on the 3 stack of plates inside the packages.

[0055] While the present invention will hereinafter be described in connection with a preferred embodiment thereof, it will be understood that it is not intended to limit the invention to this embodiment.

[0056] Instead of different corner and edge pieces, a single large edge piece could be used which is wrapped around and under the bottom plate and is closed by adhering beginning and end edges.

[0057] Another possible attachment means that could be used, especially when reusable packages are made is velcro™ which exists in various forms. When provided with an adhesive backside, these strips can be easily mounted in advance and closing of the package can be done easily.

[0057] Having described in detail preferred embodiments of the current invention, it will now be apparent to those skilled in the art that numerous modifications can be made therein without departing from the scope of the invention as defined in the appending claims.
PART LIST

[0058]

1. Bottom plate
2. Stack of plates
3. Internal packaging structure
4. External packaging structure
5. Pallet
6. Cover
7. Rigid part of internal packaging structure
8. Flexible part of internal packaging structure
9. Immobilization means or pads
10. Edge pieces (type corner pieces)
11. Edge pieces (type elongated edge piece along the sides)
12. Casing
13. Mounting flaps
14. Double sided adhesive tape
15. Protective layer of adhesive tape
16. Upper layer of the bottom plate
17. Lower layer of the bottom plate
18. Opening between upper layer of bottom plate and pallet
19. Tear strip mechanism
20. Multiplex plate.
21. Straps

Claims

1. A bulk package system for packaging a stack of printing plates, comprising:
   - a bottom plate for supporting the stack of printing plates, having a height \( H_{\text{plate}} \) above the bottom plate,
   - internal packaging structure contacting and stabilizing the stack of printing plates, the internal packaging structure having a height \( H_{\text{int}} \) above the bottom plate,
   - external packaging structure, separate from the internal packaging structure and forming the outer envelope of the bulk package system, the external packaging structure having a height \( H_{\text{ext}} \) above the bottom plate,

characterized in that the height \( H_{\text{ext}} \geq H_{\text{int}} > H_{\text{plate}} \)

2. A bulk package system according to claim one wherein \( H_{\text{ext}} = H_{\text{int}} \)

3. A bulk package system according to any of the preceding claims wherein \( H_{\text{int}} \geq H_{\text{plate}} + 5\text{cm} \).

4. A bulk package system according to any of the preceding claims wherein the external packaging structure comprises:
   - separate edge pieces attached to the bottom plate for defining the contour of the outer packaging structure,
   - an integral outer casing, having the height \( H_{\text{ext}} \), placed on the bottom plate, in contact with and restricted in movement by the edge pieces for forming the lateral outer envelope of the bulk package system,
   - a cover for closing the top side of the bulk package.

5. A bulk packaging system according to claim 5 wherein the edge pieces comprise corner pieces defining the lower corners of the external packaging system.

6. A bulk packaging system according to claim 4 or 5 wherein the edge pieces are attached to the bottom plate by adhering them to the underside of the bottom plate using fastening flaps.

7. A bulk packaging system according to any one of the claims 4 to 7 wherein some of the edge pieces are attached to the outer casing thereby connecting the casing to the bottom plate.

8. A bulk packaging system according to claim 7 wherein the edge pieces attaching the outer casing have a tear strip to enable easy separation of the outer casing from the bottom plate.

9. A bulk package system according to any of the preceding claims wherein the stack of printing plates is immobilized relative to the bottom plate.

10. A bulk packaging system according to claim 9 wherein immobilization is done by adhering cardboard pads, abutting the stack of plates, to the bottom plate.

11. A bulk packaging system according to claim 10 wherein the cardboard pieces immobilizing the stack of printing plates are adhered to the bottom plate by glue.

12. A bulk package system according to any of the preceding claims wherein the internal and external packaging structure substantially consists of cardboard material.

13. A method for making a bulk package containing printing plates comprising the steps of:
   - providing a bottom plate for supporting the stack of printing plates,
   - putting a stack of printing plates, having a
height $H_{\text{plate}}$ on the bottom plate
- stabilizing the stack of printing plates by an internal packaging structure in contact with the stack of printing plates and having a height $H_{\text{int}} > H_{\text{plate}}$
- immobilizing the stack of printing plates relative to the bottom plate,
- attaching separate edge pieces to the bottom plate for defining the contour of an outer packaging structure,
- placing an integral outer casing, having the height $H_{\text{ext}} \geq H_{\text{int}} > H_{\text{plate}}$, on the bottom plate, the casing being in contact with and restricted in movement by the edge pieces, for forming the lateral envelope of the bulk package,
- closing the bulk package by providing a cover.
# Documents Considered to Be Relevant

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
<th>Relevant to claim</th>
<th>Classification of the Application (IPC)</th>
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<td>X</td>
<td>EP 0 995 691 A (FUJI PHOTO FILM CO LTD [JP]; FUJIFILM CORP [JP]) 26 April 2000 (2000-04-26) * paragraphs [0048], [0053] - [0057], [0065] - [0075]; figures *</td>
<td>1,2,9,12</td>
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The present search report has been drawn up for all claims.

**Place of search**
The Hague

**Date of completion of the search**
16 November 2007

**Examiner**
Vigilante, Marco
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