The present invention relates to a stack (1) of web material for hygiene products, for use in a dispenser, comprising at least one continuous web material (2,3) being Z-folded about transverse folding lines (4), thereby providing panels having a length (L) along said folding lines, and a width (W) perpendicular to said folding lines, said panels being piled on top of each other to form a height (H) of said stack, such that said stack outlines a rectangular parallelepiped having said length (L), width (W) and height (H), and forming six outer surfaces, namely a top and a bottom surface (5,6), being parallel to the panels of said stack (1), two side surfaces (7,8), comprising the longitudinal edges of the web material (2,3), and a front and a back surface (9,10), comprising the folded edges of the web material. The height (H) of the stack is greater than 17 cm.
STACK OF Z-FOLDED WEB MATERIAL

TECHNICAL FIELD
The present invention relates to a stack of web material for hygiene products, for use in a dispenser, comprising at least one continuous web material being Z-folded about transverse folding lines, thereby providing panels having a length along said folding lines, and a width perpendicular to said folding lines, said panels being piled on top of each other to form a height (H) of said stack.

BACKGROUND
Dispensers with web material, such as paper towels, napkins and similar hygiene products are often used in public lavatories as a convenient way of providing a supply of towels in washrooms and other facilities. Similar dispensers with web material are provided for supplying hygiene products intended for object wiping, e.g. for cleaning.

The web material may either be provided as a rolled web or as a stack of folded web. The rolls are often heavy and there is a friction and resistance for unrolling the paper. In addition, an arresting force is required in order to stop rotation once a towel has been dispensed. Consequently, there is a need for a strong paper in these rolls in order to withstand these forces. On the contrary, the web material arranged in folded stacks does not need to have great physical strength which usually is inconsistent with the desired characteristic of softness.

Dispensers in public lavatories are often designed with a lock, which in order to prevent pilferage and waste, only can be opened by an attendant. Thus, the products may run out before the next servicing and products may not always available to the user when needed. More frequent servicing means a higher labor cost which often is undesirable.

The selection of dispensers is often limited and they are only found in a few fixed sizes, which thus limits the design of the hygienic products as well. As easily understood, a larger dispenser requires less frequent servicing than a smaller one.
The dispenser is normally hanged on a wall or placed on the floor of the lavatory. To allow refill, the dispenser comprises an opening mechanism to provide access to a storage space of the dispenser for containment of a stack of web material.

It is preferred that the refilling of web material should not be heavy or difficult for the attendant to perform. Conventionally, refill packages are provided, each refill package comprising a stack of web material and a wrapping, which maintains the integrity of the stack during transport and storage thereof. For refill of the dispenser, the wrapping is removed from the stack, where after the stack is introduced into the storage space of the dispenser. Hence, each package is opened and fed to the dispenser by the attendant. Accordingly, conventional packages of web material are provided in sizes that are not too heavy and which easily can be gripped by the attendant, such that the integrity of the stack may be maintained manually while introducing the stack into the storage space of the dispenser.

In a dispenser, the web material will generally run from a storage space for containing the stack of folded material, to a dispensing opening. Hence, the dispenser will define a web path along which unfolded web material runs from said storage space to said dispensing opening.

In particular when it is desired to enable storing of a relatively large amount of web material in the dispenser, it has been proposed to arrange the storage space and the web path such that the web material is fed from the top of the stack.

Large-type dispensers may be provided with relatively large storage spaces, which may contain a number of such stacks of web material. Generally, in such dispensers, adjacent stacks are adhered to each other via their respective end panels, so that an end panel of each stack pulls along an end panel of the next stack. To this end, adhesive tape or glue is applied to the outer panel(s) of the stacks. Refill of a large dispenser with the presently available stacks of web material may hence involve the unwrapping, introduction and subsequent adhesion of several stacks of web material. Accordingly, the refill of a large dispenser may be rather time-consuming.

Thus, there is a continuing need for an improved product refill procedure.

SUMMARY OF THE INVENTION
In accordance with the present invention there is provided a stack of web material for hygiene products, for use in a dispenser, comprising at least one continuous web material being Z-folded about transverse folding lines, thereby providing panels having a length (L) along said folding lines, and a width (W) perpendicular to said folding lines, said panels being piled on top of each other to form a height (H) of said stack. Accordingly, said stack outlines a rectangular parallelepiped having said length (L), width (W) and height (H), and forming six outer surfaces, namely two side surfaces, comprising the longitudinal edges of the web material, and a front and a back surface, comprising the folded edges of the web material. Moreover, the height of said stack is greater than 17 cm.

By "continuous web material" is meant a material which may be continuously fed for example when arranged in an appropriate dispenser. The web material may be integral, and intended to be severed into individual products upon actuation of a user, e.g. by a cutting blade or edge arranged in an appropriate dispenser. Alternatively, the continuous web material may be provided with weakening lines, such as perforation lines, along which the web material is to be separated to form individual products. Such separation can take place automatically inside a dispenser, or be performed manually.

The height of a stack may be defined using conventional measurement when the stack is resting freely on its bottom surface. For the measurement, the stack shall be free from any packaging material, and it shall not be actively compressed.

As mentioned in the above, stacks may be transported and stored in a package, including a stack and a wrapper. In such a package, the stack may be compressed such that the height of the stack is reduced while restrained by the wrapper. Naturally, such a stack may have a greater height when resting freely, uncompressed, without the wrapper than in the packaged, compressed condition.

For measuring the height of a stack which has been packaged in a compressed condition, the wrapper is to be removed from the package, and the stack is to be allowed to rest on its bottom surface for about half an hour before performing the height measurement. If the stack risks becoming unstable when resting on its bottom surface, it may be supported so
as to ensure that it stays in an upright position during the rest period, and during the
subsequent height measurement. For example, the stack may be positioned such that its
front and/or back surface leans against a wall.

Moreover, should the stack be uneven (for example, some stacks might bulge along the
length of the stack, at the centre width thereof, ) the relevant height to measure is the
maximum height of the stack.

Z-folded continuous web material is conventionally provided in stacks being intended for
larger dispensers, and hence the stacks are to be handled as outlined previously in the
background section of the application.

A stack as proposed herein departs from the previous convention, namely: that the sizes
available for such stacks are limited by the need for manually maintaining the integrity of
the stack, during introduction thereof into a dispenser. This convention implies that the
height may not be greater than what is conveniently graspable by an attendant, preferably
using one hand only.

A stack having a height of at least 17 cm, as is proposed herein, is not conveniently
graspable with one hand by all attendants. As will be explained in the below, neither is the
proposed stack intended for such handling.

Hence, a stack is now available, which may contain more web material than previous
stacks. Accordingly, fewer stacks are required to fill e.g. an existing storage space of a
large-type dispenser, as compared previous stacks. This means that the refill procedure
may be performed in fewer steps, and that fewer adhesions between stacks need to be
created. This reduces the time required by an attendant to perform the refill of a
dispenser.

That fewer adhesions are necessary to perform the refill procedure also implies that the
adhesions or connections between web material portions fed out from a dispenser
including the present stacks will be distributed more scarcely. Accordingly, the risk that a
user is disturbed by the presence of such an adhesion or connection between webs is
diminished. Moreover, the required amount of adhesion material is reduced.
Advantageously, at least one of the top and bottom surfaces of the stack may be provided with a connector for enabling connection of said stack to another, similar stack. Such connectors could be adhesive, e.g. in the form of an adhesive area, optionally initially covered by a release paper, a self-adhering adhesive (which would adhere only to a similar adhesive provided on an adjacent stack), an adhesive tape, or similar. Alternatively, such connectors could be mechanical, such as in the form of hook-loop or hook-hook connections.

Albeit hand sizes differ between persons, a height greater than 17 cm may still be defined as being too big to be graspable with one hand by many individuals. However, having departed from the need for manual grasping of the stacks, even greater heights may be provided. The height of the stack may be greater than 20 cm, preferably greater than 22 cm, more preferred greater than 25 cm, most preferred greater than 30 cm.

The volume enclosed by said rectangular parallelepiped shape may advantageously be at least 2.6 dm³, preferably 3.7 dm³, most preferred 4.3 dm³. It will be understood that larger volumes are now available than with prior art stacks.

The continuous web material may have a total length of at least 45 m, preferably at least 60 m, most preferred at least 75m.

The stack may comprise at least 640, preferably at least 800, most preferred at least 1000 panels.

The continuous web material may be provided with weakening lines, preferably perforation lines, dividing said web material into individual sheets.

A stack in accordance with the above may advantageously comprise at least 160, preferably at least 200, most preferred at least 250 individual sheets. Accordingly, connection between stacks is required at each 160th (or 200th or 250th) sheet only.

Advantageously, the parallelepiped shape of the stack is such that the front and back surfaces are the largest outer surfaces of the stack. The front and back surfaces are the outer surfaces including the folded portions of the web material in the stack. Moreover, as will be described in the detailed description, a new method for handling the stacks during refill of a dispenser is envisaged, in which the stack is to rest at least partly on the front or
back surface. For this new handling, it is believed to be advantageous having stacks where the front and back surfaces are the largest.

Advantageously, the front and back surfaces may each have an area being at least 1.5 times, preferably at least 2 times larger than the maximum area of any one of the top, bottom or side surfaces of the stack.

Advantageously, the height (H) of the stack may be greater than 0.5 x the length (L) of the stack, preferably greater than 0.75 x the length (L) of the stack, most preferred greater than the entire length (L) of the stack.

Preferably, the height (H) is greater than both the length (L) and the width (W) of the stack.

When the stack comprises weakening lines dividing the web into individual products, a separation strength of the weakening lines may be in the range 1-30 N, preferably 3-20 N, most preferred 3-10 N.

In an embodiment, the stack may comprise a first web material divided into individual sheets by means of lines of weakness, and a second web material divided into individual sheets by means of lines of weakness, said first and second webs being interfolded with one another so as to form said stack, and the first and the second webs are arranged such that the lines of weakness of the first web and the lines of weakness of the second web are offset with respect to each other along the webs.

Moreover, in said embodiment the first web material and the second web material may be joined to each other at a plurality of joints along said webs, preferably said joints are regularly distributed along the webs. Joints between the first and the second web serve the purpose of hindering the webs from becoming asynchronous during feeding of the webs in a dispenser. With the stack as proposed herein, more web material, i.e. longer web lengths may be provided in one single stack. Accordingly, there might be an increased risk that the two webs in a stack become asynchronised during feeding thereof from the stack. With appropriately distributed joints between the two webs, any such risks may be avoided or diminished.
Also, there is provided a stack of web material for hygiene products, for use in a
dispenser, comprising at least one continuous web material being Z-folded about
transverse folding lines, thereby providing panels having a length along said folding lines,
and a width perpendicular to said folding lines, said panels being piled on top of each other to form a height of said stack, such that said stack outlines a rectangular
parallelepiped having said length, width and height, and forming six outer surfaces, namely
- a top and a bottom surface being parallel to the panels of said stack,
- two side surfaces, comprising the longitudinal edges of the web material (2,3), and
- a front and a back surface, comprising the folded edges of the web material,
wherein the height (H) of the stack is greater than 0.75 x the length (L) of the stack,
preferably greater than the entire length (L) of the stack.

The relative dimensions between the eight and length of a stack as suggested above are possible as a result of the new intended use of the stack, where manual maintaining of the stack's integrity during loading thereof into a dispenser is no longer necessary. Such a stack may be combined with all of the features and advantages in the above.

In a second aspect of the invention, there is provided a package of web material for hygiene products, for use in a dispenser, comprising at least one continuous web material being Z-folded about transverse folding lines, thereby providing panels having a length along said folding lines, and a width perpendicular to said folding lines, said panels being piled on top of each other to form a height of said stack, such that said stack outlines a rectangular parallelepiped having said length, width and height, and forming six outer surfaces, namely a top and a bottom surface, being parallel to the panels of said stack, two side surfaces, comprising the longitudinal edges of the web material, and a front and a back surface, comprising the folded edges of the web material, and a wrapper extending at least over said height direction, so as to maintain the integrity of the stack during transport and storage thereof, wherein said package has a height of more than 17 cm.

With "wrapper" is meant any type of packaging material for a single stack, which maintains the integrity of the stack. Advantageously the wrapper may encircle the stack,
and preferably the front, back, top and bottom surfaces of the stack. Preferably, the wrapper may be in the form of a wraparound strip encircling the stack.

Generally, it is desired that the wrapper conforms to the shape of the stack, such that the volume required to store and transport the stack is not considerably increased by the presence of the wrapper.

The height of the package shall be measured on the package as is, when the wrapper is still present to maintain the integrity of the stack. If the height of the package should differ slightly when measured at different locations over the panels, the maximum height is the measure which is to be considered.

It will be understood, that when the package has a height of at least 17 cm, the stack contained in the wrapper will also have a height of at least 17 cm. If the stack is compressed in the wrapper, it might be that the height of the stack is actually greater than that of the package.

Advantageously, the wrapper may be configured to be removable from the integrity of the stack. In other words, when the wrapper has been removed, an entire stack remains.

Preferably, the wrapper is configured to be removable from the integrity of the stack while the stack is resting on an outer surface thereof, preferably the front or back surface.

Moreover, there is provided a package comprising a stack of web material for hygiene products, for use in a dispenser, comprising at least one continuous web material being Z-folded about transverse folding lines, thereby providing panels having a length along said folding lines, and a width perpendicular to said folding lines, said panels being piled on top of each other to form a height of said stack, such that said stack outlines a rectangular parallelepiped having said length (L), width (W) and height (H), and forming six outer surfaces, namely
- a top and a bottom surface, being parallel to the panels of said stack,
- two side surfaces, comprising the longitudinal edges of the web material, and
- a front and a back surface, comprising the folded edges of the web material, and
a wrapper extending at least over said height direction, so as to maintain the integrity of the stack during transport and storage thereof, wherein the height (H) of the package is greater than than 0.75 x the length (L) of the package, preferably greater than the entire length (L) of the package.

Such a package may be combined with all of the features and advantages as indicated in the above.

Preferably, the stack included in the proposed packages is a stack as described in the above.

In another aspect of the invention, there is provided a method for loading stacks in a dispenser including a housing having a storage space for storing at least two stacks, said storage space comprising at least a portion of an initial stack,

comprising:
providing a stack as described in the above,
positioning said stack on a support surface, such that the stack rests on one of its outer surfaces facing said support surface; and
interconnecting said stack with the initial stack, while the stack remain resting on said support surface.

Advantageously, the stack may be provided in a package as described in the above, and the method comprises: removing the wrapper from the package while it rests on said support surface, prior to interconnecting said stacks.

Generally, a method for loading a stack in a dispenser including a housing having a storage space for storing said stack is proposed, comprising positioning said package on a support surface, such that the stack rests on one of its outer surfaces facing said support surface, and removing the wrapper of said package, while the package is resting on said support surface.

Advantageously, the outer surface upon which the stack is resting is a back, front or side surface of the stack, preferably the back or front surface of the stack.
Preferably, the storage space is arranged in said dispenser such that the web is to be fed from the top side of the stack.

Preferably, at least one of the top and bottom surfaces of each of said stacks is provided with a connector, and the interconnection is made via the connectors.

In another aspect, there is proposed the use of a stack in accordance with the above in a dispenser including a housing having a storage space for said stack, preferably said storage space being arranged in the dispenser such that web material is fed from the top side of the stack.

In another aspect, there is proposed a compound stack comprising a plurality of stacks as described in the above, said stacks being interconnected via interconnections, and said compound stack comprising an interconnection at less than every 640th panel, preferably every 800th panel, most preferred every 1000th panel.

Moreover, there is provided a dispenser comprising a housing having a storage space including at least one stack as described in the above, preferably said storage space being arranged in the dispenser such that web material is fed from the top side of the stack.

Also, there is provided a dispenser comprising a housing having a storage space including a compound stack as described in the above, preferably said storage space being arranged in the dispenser such that web material is fed from the top side of the stack.

The present invention will now be further described using exemplary embodiments as depicted in the enclosed drawings wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 illustrates an embodiment of a stack of web material;

Fig. 2 illustrates an embodiment of a package including a wrapper and a stack;

Fig. 3 illustrates another embodiment of a package including a wrapper and a stack;

Figs. 4a to 4c illustrate a method for opening a package including a wrapper and a stack as in Fig. 2;
Figs 6-7 illustrate embodiments of joint regions of a wrapper;
Figs 8a and 8b illustrate the opening of an embodiment of a wrapper;
Figs 9a and 9b illustrate the opening of another embodiment of a wrapper;
Figs 10a and 10b illustrate an embodiment of a stack of web material comprising connectors;
Fig. 11 illustrates another embodiment of a stack of web material comprising a connector;
and
Fig. 12 illustrates an embodiment of a stack of web material;
Fig. 13 illustrates an embodiment of a dispenser;
Figs 14a to 14d illustrate an embodiment of a method for refilling a dispenser.

Like reference numbers denote like feature in Figs. 1-12. In Fig. 13 and in Fig. 14a to 14d, however, other reference numbers are used.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 1 together with Fig. 12 illustrate an embodiment of a stack 1 of web material for hygiene products, for use in a dispenser. The stack 1 comprises at least one continuous web material 2, 3 being Z-folded about transverse folding lines, thereby providing panels having a length L along said folding lines, and a width W perpendicular to said folding lines. The panels are piled on top of each other to form a stack, having a height H.

Accordingly, said stack outlines a rectangular parallelepiped having said length L, width W and height H. The parallelepiped will have six outer surfaces:
- A top surface 5 and a bottom surface 6, both being parallel to the panels of said stack 1.
- Two side surfaces 7, 8, which are generally formed by the longitudinal edges of the Z-folded web material.
- A front surface 9 and a back surface 10, which are generally formed by the folded edges of the Z-folded web material.

As explained in the above, with "continuous web material" is meant a material which may be continuously fed for example when arranged in an appropriate dispenser. Preferred web materials are in particular such that are suitable for forming absorbent tissues for personal use, e.g. for wiping the hands of a user after wash, for napkins, or for object wiping purposes.
The term "web material" is herein to be understood to include tissue paper materials, nonwoven materials, and materials being a mixture of tissue paper and nonwoven materials.

The term "tissue paper" is herein to be understood as a soft absorbent paper having a basis weight below 65 g/m² and typically between 10 and 50 g/m². Its density is typically below 0.60 g/cm³, preferably below 0.30 g/cm³ and more preferably between 0.08 and 0.20 g/cm³. The tissue paper may be creped or non-creped. The creping may take place in wet or dry condition. The tissue paper may be made by TAD or atmos-methods. The fibres contained in the tissue paper are mainly pulp fibres from chemical pulp, mechanical pulp, thermo mechanical pulp, chemo mechanical pulp and/or chemo thermo mechanical pulp (CTMP). The tissue paper may also contain other types of fibres enhancing e.g. strength, absorption or softness of the paper. These fibres may be made from regenerated cellulose or synthetic material such as polyolefins, polyesters, polyamides etc.

The term "nonwoven" is applied to a wide range of products which in term of their properties are located between the groups of paper and cardboard on the one hand and textiles on the other hand. As regards nonwovens a large number of extremely varied production processes are used, such as airlaid, wetlaid, spunlaced, spunbond, meltblown techniques etc. The fibres may be in the form of endless fibres or fibres prefabricated with an endless length, as synthetic fibres produced in situ or in the form of staple fibres. Alternatively, they may be made from natural fibres or from blends of synthetic fibres and natural fibres.

The web material of the multi-ply web according to the invention may be recycled flexible material, newly-produced material or a combination thereof. Similar stacks as the one described in Fig. 1 may be provided comprising one single continuous web material, or several interfolded continuous web materials.

When the web material is continuous, the continuous web material may be integral, such that it may be torn or cut into individual products at selected locations, e.g. in a dispenser. Alternatively, the web material may comprise weakening lines, along which the web is intended to be severed for formation of individual products.
Fig. 12 illustrates an embodiment, where the stack comprises two webs 2, 3 of material, which are interfolded. In this embodiment, the first and the second web material 2, 3, are each divided into individual sheets by lines of weakness 12. Moreover, the first and the second webs 2, 3 are arranged such that the lines of weakness of the first web and the lines of weakness of the second web are offset with respect to each other along the webs.

A stack 1 in accordance with this embodiment has the advantage that the webs 2, 3 may be automatically fed in a dispenser, requiring only the force from a user pulling one of the webs 2 to accomplish automatic feeding of the other web 3.

When the stack comprises weakening lines dividing the web into individual products, a separation strength of the weakening lines may advantageously be in the range 1-30 N, preferably 3-20 N, most preferred 3-10 N. (The separation strength may be determined in accordance with a method as described below.)

Advantageously the weakening lines may be perforation lines. The geometry of the perforations may be selected to provide suitable strength in accordance with the web material and the dispenser to be used.

The perforation lines may be formed by alternating bonds and slots. It has been found that a remaining bonded length, being the total bond length/(total bond length + total slot length) is between 4% and 50%, preferably between 4% and 25%, most preferred between 4% and 15%, is suitable for many relevant applications. The total bond length/(total bond length + total slot length) may be used as an indication of the strength of the perforation line. It is desired to form perforation lines which are strong enough to enable feeding of the web material from the stack in a suitable dispenser, but which are also weak enough to enable separation of the sheets. In this context, it is known that other parameters will also influence the strength of the perforation line, such as the web quality, and the size, shape and distribution of the slots and tabs. The above-mentioned measure may therefore be useful for guiding the person skilled in the art when selecting suitable perforation lines.

In the embodiment illustrated in Fig. 12, the weakening lines 12 of each one of the webs 2, 3, always appear at the same distance from the folded edges 4 of the stack 1.

Accordingly, the distance between two consecutive weakening lines 12 is evenly divisible
with the distance between two consecutive folding lines 4 (\(=\) the width \(W\) of the stack 1). In other words: (the distance between two consecutive weakening lines 12) / (the distance between two consecutive folding lines 4) = an integer greater than zero.

Alternatively, the distance between two consecutive weakening lines 12 could be selected so as not to be evenly divisible with the distance between two consecutive folding lines 4. In this case, the weakening lines 12 will appear at various distances from the folding lines 4, as seen from the side surfaces 7, 8 of the stack 1. This might be preferred, since such a stack 1 may avoid experiencing problems due to irregularities in the panels originating from the presence of the weakening lines 12, and being multiplied over the height of the stack. In particular, such problems may become pronounced for stacks 1 having relatively great heights and/or including a relatively large number of panels. By securing that the weakening lines 12 will become distributed over the width of the stack 1, any irregularities are also distributed, and the stability of the stack 1 may be improved.

Moreover, the distance between consecutive weakening lines 12 being other than evenly divisible with the width \(W\) of the stack 1 enables the length of the products to be selected freely, without limitations involving considerations of the width \(W\) of the stack. The width \(W\) of the stack 1, as well as the length \(L\) must usually be selected in accordance with the size of a storage space in a housing of a dispenser from which the web material 2,3 is to be dispensed.

In this context, it has also been found to be advantageous if the weakening lines 12 are distributed along the web such that essentially no weakening line 12 will coincide with a folding line 4 in the stack. This is because a weakening line, in particular a perforation line, being simultaneously a folding line might give rise to a crease in the web material which is not smoothed out as much as other folding lines when the web is unfolded to be fed through a dispenser. Hence, such a crease could give rise to unwanted irregularities when feeding the web material. In particular when two or more webs are used, such a crease in one web might result in that web becoming asynchronised with the other web(s).

The above descriptions regarding the weakening lines are equally applicable to stacks 1 including one single, two, or more continuous material webs.
Moreover, in the embodiment of Fig. 12, the first web material 2 and the second web material 3 are joined to each other at a plurality of joints 13 along said webs 2,3. Preferably, said joints 13 are regularly distributed along the webs 2,3. Joints 13 between the first and the second web 2,3 serve the purpose of hindering the webs from becoming asynchronous during feeding of the webs in a dispenser.

This may be of particular importance when stacks are used including relatively long web lengths, that is for stacks having a relatively great height and/or including a relatively large number of panels. Where long web lengths run uninterrupted, there might be an increased risk that the two webs 2, 3 in a stack 1 become asynchronised during feeding thereof from the stack. This is particularly the case when the web is fed from the top of the stack, as seen when the stack is arranged in the dispenser. With appropriately distributed joints between the two webs, any such risks may be avoided or diminished.

The joints 13 could connect the material surfaces, i.e. the panel surfaces, of the webs 2, 3 to each other, or they could connect the longitudinal edges of the webs to each other. The joints 13 could be distributed in different numbers, sizes and patterns. Preferably, the joints 13 could be in the form of adhesive.

Fig. 1 illustrates an embodiment of a stack 1 having a height H greater than what is conventional in the art. Notably, the height H is greater than what is conveniently graspable by an attendant, using one hand only.

It is proposed that stacks may be provided having a height H greater than 17 cm. Also, stacks having heights greater than 20 cm, greater than 22 cm, greater than 25 cm, or greater than 30 cm may be preferred.

The height of a stack is to be measured at the maximum height thereof. In many cases, the stack may be regular, such that the same height is achieved wherever the measurement is made. If however, the stack is irregular (perhaps due to perforation lines being arranged directly over each other), the height should be measured at the maximum height of the stack.

If the stack has been compressed, it should be allowed to recover before the height is measured. To this end, it is suggested that any wrapper is removed from the stack, and
the stack is allowed to rest for half an hour on its bottom surface before the height measurement is performed. If the stack is irregular, the maximum height should be considered.

If the stack risks becoming unstable when resting on its bottom surface, it may be supported so as to ensure that it stays in an upright position during the rest period, and during the subsequent height measurement. For example, the stack may be positioned such that its front and/or back surface leans against a wall.

The volume enclosed by said rectangular parallelepiped shape may advantageously be at least 2.6 dm$^3$, preferably 3.7 dm$^3$, most preferred 4.3 dm$^3$. It will be understood that larger volumes are now available than with prior art stacks.

The total length of the web material in the stack may be at least 45m, preferably at least 60m, most preferred at least 75m.

The stack may comprise at least 640, preferably at least 800, most preferred at least 1000 panels.

A stack may advantageously comprise at least 160, preferably at least 200, most preferred at least 150 individual sheets.

Advantageously, the parallelepiped shape of the stack is such that the front and back surfaces 9,10 are the largest outer surfaces of the stack, as illustrated in the embodiment of Fig. 1. The front and back surfaces 9, 10 are the outer surfaces including the folded portions of the web material in the stack.

Fig. 1 illustrates an embodiment where the front and back surfaces 9, 10 may each have an area being at least 1.5 times, preferably at least 2 times larger than the maximum area of any one of the top, bottom or side surfaces of the stack.

(N.B with the area of a surface of the stack is meant the area of the corresponding surface of the parallelepiped shape outlined by the stack. Also, the volume of the stack is the volume of the parallelepiped shape outlined by the stack.)
Advantageously, the height (H) of the stack may be greater than 0.5 x the length (L) of the stack, preferably greater than 0.75 x the length (L) of the stack, most preferred greater than the entire length (L) of the stack.

Preferably, and as illustrated by the embodiments of the figures, the height (H) is greater than both the (L) and the width (W) of the stack.

A stack as described in the above may naturally be intended to completely fill a storage space of a designated dispenser. However, for larger dispensers, intended for use where large quantities of products are used, the stack may be intended for connection to other stacks to form a combined stack filling the storage space of a larger dispenser.

Connections between stacks may be accomplished e.g. by addition of adhesive to the top and/or bottom end of the stack, and attachment of another stack thereto.

However, manual attachment via adhesives is time consuming and therefore generally not preferred. Instead, the stack is advantageously provided with a connector on the top and/or bottom surface thereof.

The stack 1 illustrated in Fig. 1 comprises a connector 11 arranged on the top surface 5 of the stack.

Advantageously, at least one of the top and bottom surfaces of the stack may be provided with a connector for enabling connection of said stack to another, similar stack. Such connectors could be adhesive, e.g. in the form of an adhesive area, optionally initially covered by a release paper, a self-adhering adhesive (which would adhere only to a similar adhesive provided on an adjacent stack), an adhesive tape or similar. Alternatively, such connectors could be mechanical, such as in the form of hook-loop or hook-hook connections.

Mechanical connectors have the advantage of providing a secure connection between themselves, whilst not being prone to unwanted connection to other materials, such as to the material web itself. Hence, use of mechanical connectors facilitates the general handling of the stacks.
Accordingly, it is suggested to provide stack of web material for hygiene products, for use in a dispenser, comprising at least one continuous web material being Z-folded about transverse folding lines, thereby providing panels having a length along said folding lines, and a width perpendicular to said folding lines, said panels being piled on top of each other to form a height of said stack. The stack comprises a first connector for mechanically connecting a first end surface of said stack to another, similar stack, and a second connector for mechanically connecting a second end surface of said stack to another, similar stack. Moreover, the first connector covers a panel area smaller than the panel area covered by said second connector.

With first and second connector is meant e.g. a portion of material which potentially (if in contact with another connector) may contribute to the interconnection of the two stacks. Hence, when discussing the panel area covered by the connector, it is the panel area over which connection properties are found which should be measured. Any support materials or the like, not displaying mechanical connection properties should not be included in "the panel area covered by the connector".

The connectors are to be connectors for mechanically interconnecting the end surfaces of the stacks to other, similar stacks, as is required when the stacks are to be used in a dispenser having a large storage space housing several stacks.

Preferred mechanical connectors may be openable and reclosable, which provides the possibility of correcting the position of the stack, if an attendant has unintentionally performed an unsuitable first interconnection between two stacks.

In many dispensers, particularly of the larger kind, the web material is to be run along a web path and through a number of devices before being fed to a user. Such devices could include various rollers, cutters, perforation cutters, and the like. Mechanical connectors may be designed such that they may pass these various devices without hindering the web, and without leaving residues on the devices themselves.

It is suggested herein to provide a stack having a first connector which covers a smaller panel area than the second connector. Generally, connectors covering larger areas are advantageous because with large connectors, the stacks may easily be positioned so as to abut each other, and to interconnect.
However, connectors covering a smaller panel area are useful in that less material will result in decreased costs for the stack. Moreover, depending on the properties of the selected connector material, there is a risk that a user being served with a product including such a connector material will perceive the product as having a lesser quality. A reduced amount of material diminishes the risk that the user will experience this problem. A problem with small connectors is however that the positioning of the stacks to be interconnected might be difficult and time consuming for an attendant.

Having a first connector with a smaller panel area than the second connector allows for minimisation of said first connector. Easy interconnection between stacks may still be achieved since the larger second connector will provide for a large connection surface.

The first and second connectors may be of the hook and hook type, or of the hook and loop type.

If the first and second connectors are different when it comes to properties that might be perceived as disturbing to a user, e.g. abrasiveness or stiffness, it is preferred that the first connector is formed of the most disturbing (e.g. abrasive or stiff) material, so as to minimise the presence thereof in the stack. Accordingly, when the first and second connectors are of the hook and loop type, it is generally preferred that the first connector is a hook material.

Figs. 10a and 10b illustrate an embodiment of a stack having a first and a second mechanical connector, where the area of the first connector 11a is less than the area of the second connector 11b. As illustrated in Fig. 10a, the first connector 11a is in this case arranged on the top surface 5 of the stack, and as illustrated in Fig. 10b, the second connector 11b is arranged on the bottom surface 6 of the stack 1. However, the opposite arrangement is naturally also possible.

Advantageously, the first connector may cover a panel area being less than 50% of the panel area covered by the second connection means, preferably less than 30% most preferred less than 20%. In the embodiment illustrated in Figs. 10a and 10b, the area of the first connector 11a is about 25% of the area of the second connector 11b.
Each one the first and second connector may advantageously be symmetrically arranged in view of the width of the stack, preferably centrally arranged. When the first and second connectors are symmetrically arranged in view of the width of the stack, it is possible to turn the stacks in either way in this direction, and still achieve interconnection between the stacks.

In the illustrated embodiment of Figs 10a and 10b, the first and second connectors 11a and 11b are symmetrically arranged in view of the width of the stack. Moreover, in this case they are centrally arranged in view of the width of the stack.

For similar reasons, at least one of the first and second connectors is preferably symmetrically arranged in view of the length extension (L) of the stack, preferably centrally arranged.

For example, at least one, or both, of the first and second connectors 11a, 11b may be diagonally arranged between two diagonally opposite corners of the top or bottom surface of the stack 1.

Advantageously, at least one of the first and second connectors, preferably both, extends along essentially the entire length (L) of the stack. This feature is advantageous for reasons of production, where a piece of material may conveniently be attached all over the length of the stack.

In the illustrated embodiment of Figs. 10a and 10b, both connectors 11a, 11b extend along the entire length of the stack 1. Hence, they are naturally symmetrically arranged in view of the length extension L of the stack 1.

Fig. 11a illustrates an alternative embodiment, where the first connector 11a, in this case arranged on the top side 5 of the stack 1, does not extend over the entire length L of the stack. Instead, the connector 11a comprises a smaller piece of material, being centrally arranged as seen both in the length direction, and in the width direction of the stack.

The embodiment of a first connector 11a as illustrated in Fig. 11a may for example be combined with a second connector as depicted in Fig. 10b. In this case, the first connector 11a has an area being less than 20% of the area of the second connector 11b.
In another variant, at least one of the first and second connectors, preferably both, extends along the majority of the length of the stack, leaving the side portions of the web free from connector. In this case, the connector may extend over more than 75% of the entire length, but less than 90% of the entire length. This variant may be advantageous in particular if the stack is intended for a particular dispenser being sensitive to added material at the edges of the web, perhaps if a relatively thick connector material is used.

At least one of the first and second connectors may consist of a continuous piece of connector material. In the illustrated embodiments, both connectors 11a, 11b consist of a continuous piece of material.

Alternatively, at least one of the first and second connectors comprises a plurality of pieces of connector material, intermittently arranged to said stack. Numerous arrangements are conceivable, with material pieces of different sizes and shapes, and arranged in various patterns.

Advantageously, at least one, preferably both, of said connectors comprises connector material being adhesively attached to said stack. The connector material may be glued to said stack during production thereof, or the connector material may be provided as a sticker material being attached to the stack.

For example, the first connector may have an extension in the width direction of the stack of less than 3 cm, preferably less than 1.5 cm, most preferred less than 0.5 cm.

The first connector may cover a panel area of less than 120 cm², preferably less than 60 cm², most preferred less than 30 cm².

The second connector may have an extension in the width direction of the stack of less than 8.5 cm, preferably less than 6 cm, most preferred less than 5 cm.

The second connector may cover a panel area of less than 120 cm², preferably less than 60 cm², most preferred less than 30 cm².
When the stack 1 comprises at least two webs 2, 3, e.g. as depicted in Fig. 1, the attachment of said connector 11 to the stack 1 may simultaneously accomplish interconnection of the first and second webs 2, 3 at said connector 11.

Alternatively, the two webs 2, 3 could be interconnected adjacent said connector 11 such that both webs 2, 3 of the stack will be fed when the web of the other, interconnected stack 1 is pulled.

Interconnection of the first and second webs 2, 3 at the connector 11 may be accomplished in many different manners.

In accordance with the above, a stack is now available, which may contain more web material than previous stacks. Accordingly, fewer stacks are required to fill e.g. an existing storage space of a larger dispenser, than with previous stacks. This means that the refill procedure may be performed in fewer steps, and that fewer adhesions between stacks need to be created. This reduces the time required by an attendant to perform the refill of a dispenser.

When connectors as proposed herein is combined with stacks as described in the above, having relatively large heights, relatively many panels and/or relatively long web lengths therein, the refill procedure is facilitated not only in that the procedure of connecting the stacks to each other is easy to perform, but also because the number of connections to be performed for filling a designated storage space of a dispenser is diminished, as compared to the procedure when using prior art packages and stacks.

That fewer adhesions are necessary to perform the refill procedure also implies that the adhesions or connections between web material portions fed out from a dispenser including the present stacks will be distributed more scarcely. Accordingly, the risk that a user is disturbed by the presence of such an adhesion or connection between webs is diminished. Moreover, the required amount of adhesion material is reduced.

For example, connectors may be present scarcer than at every 640th panel, preferably every 800th panel, most preferred every 1000th panel. Besides from reducing the number of connection operations to be performed, this also reduces the likelihood that a user shall be supplied with a product including a connector.
In an embodiment, there is provided a stack of web material for hygiene products, for use in a dispenser, comprising at least one continuous web material being Z-folded about transverse folding lines, thereby providing panels having a length along said folding lines, and a width perpendicular to said folding lines, said panels being piled on top of each other to form a height of said stack and said stack comprising a first connector for mechanically connecting a first end surface of said stack to another, similar stack, and a second connector for mechanically connecting a second end surface of said stack to another, similar stack, wherein said first connector and second connector each covers an area of less than 120 cm², preferably less than 60 cm², most preferred less than 30 cm².

It has been realised, that with mechanical connectors, relatively small areas of connection are needed to provide sufficient connection strength.

The shear force between the first connector and the second connector, when interconnected, reflects the strength of the interconnection. The first and second connectors should, when connected, be able to resist the forces involved when the web of the interconnected stacks is pulled, such as when the interconnected web is drawn through a designated dispenser.

To ensure the proper feeding of the interconnected web, the interconnection of the first and second connectors should resist a shear force greater than the force required to pull a product of the web from the dispenser.

Moreover, if the web is provided with weakening lines, dividing the web into individual sheets, it is preferred that the interconnection between the first and second connectors is stronger than the force required to rupture the web along the weakening lines. Accordingly, it is ensured that the web breaks at the weakening lines rather than at the interconnection between the connectors.

In yet another embodiment, there is provided a stack of web material for hygiene products, for use in a dispenser, comprising at least one continuous web material being Z-folded about transverse folding lines, thereby providing panels having a length along said folding lines, and a width perpendicular to said folding lines, said panels being piled on top
of each other to form a height \((H)\) of said stack. Said first end surface is provided with a first mechanical connector, and said second end surface is provided with a second mechanical connector, said first and second connectors being adapted for mechanical interconnection of the first end surface of the stack to a second end surface of another, similar stack, and/or of the second and surface of the stack to a first end surface of another, similar stack via said connectors, wherein said first connector and second connector, each have a height of less than 1 mm, preferably less than 0.75 mm, most preferred 0.5 mm.

The height of the connector is to reflect the height added to the web material at the location of the connector. Accordingly, the height of the connector should include e.g. the thickness of any backing material and the hook/loop size, if a hook or loop material is used. It is generally desired to use relatively small heights, to ensure that the presence of the connectors is not perceived as disturbing to a user.

It is understood, that the various embodiments of stacks including connectors may be combined with each other and/or with features described in relation to any one of the embodiments.

Advantageously, a stack as described in relation to Fig. 1 (or Figs. 10a, 10b or 11) may be provided in a package for maintaining the integrity of the stack during transport and storage thereof. Such a wrapper should extend at least over said height \((H)\), so as to maintain the integrity of the stack during transport and storage thereof.

The term "wrapper" is to include various types of packages which may have different shapes, be made out of different materials etc. Many types of wrappers are known in the art.

Advantageously, the wrapper may be made by polymer materials or starch based materials. If desired, the wrapper may be made by recyclable material.

It is preferred that the wrapper is configured to be removable from the integrity of the stack.

Preferably, the wrapper is configured to be removable from the integrity of the stack while the stack is resting on an outer surface thereof, preferably the front or back surface.
Fig. 2 illustrates an embodiment of a package comprising the stack of Fig. 1, and a wrapper 14. Hence, when referring to the sides of the stack in the description of the package of Fig. 2, reference may be made to Fig. 1. The wrapper 14 is removable from the stack while the package 1 is resting on one of its outer surfaces, in this case the back surface 10.

To this end, the wrapper could be a lid arranged over the front surface of the stack, and surrounding at least the top and bottom surface thereof. Such a lid could be removed while the stack is resting on its back surface. Another example of a wrapper could be a sticker or tape arranged over e.g. the front surface of the stack. Such a sticker or tape could be removed while the stack is resting on its back surface.

The above mentioned examples of wrappers could be included in packages preferably having also other parts. With a wrapper essentially covering only one side or half of the stack, there might be a need for an additional package portion, such as a complementary lid, to be provided on the other half of the stack during transport and storage thereof. In such cases, any such additional package portions may be removed before the stack with the wrapper is introduced in a housing of a dispenser.

Preferably however, the wrapper is encircling said stack. A wrapper encircling the stack may provide sufficient stability and protection for being the only packaging part of the complete package. In other words, the package may consist of the stack and the wrapper.

Figs 2 and 3 both illustrate embodiments where the wrapper is encircling the stack. Moreover, in these embodiments, the wrapper 14 extend over the bottom 5 and top 6 surfaces, and the front 9 and back 10 surfaces of the stack. This is believed to provide good stability to the package, and may moreover be suitable from a manufacturing point of view.

In Fig. 2, the wrapper 14 extends over the complete bottom, top, front and back 5, 6, 9, 10 surfaces of the stack 1. The end surfaces 7, 8 are not covered by the wrapper 14.

The embodiment of Fig. 3 differs from the one in Fig. 2 in that the wrapper 14 is narrower, and extends only over a portion of the bottom, top, front and back surfaces 5, 6, 9, 10 of
the stack 1. Accordingly, this embodiment provides an opportunity to save wrapper material.

In the illustrated embodiments, the wrapper 14 is free from connection to the web material of said stack 1. This ensures that the wrapper 14 may easily be removed from the integrity of the stack 1.

However, possibly, there could be an initial week connection between the wrapper 14 and the web material. Such a connection should however be easily breakable upon removal of the wrapper 14 from the stack, without risk of the integrity thereof being destroyed in that web material is pulled from the stack.

In the embodiments of Figs 2 and 3, the wrapper comprises an opening feature, in this case including a gripper 15. Hence, the package may be opened by pulling the gripper 15 such that the wrapper 14 opens and may be removed from the stack. To this end, a one hand grip and pull is all that is necessary to remove the wrapper from the stack.

In Figs 2 and 3, the wrapper 14 is formed by a wrap-around strip encircling the stack 1 so as to extend over the outer surface 10 on which the package is to rest during removal of the wrapper 14. Accordingly, a portion of the wraparound strip will be located underneath the stack 1 before the wrapper 14 is removed. As will be described in the below, for opening the package the wrap-around-strip is removed from the stack by allowing a portion of the strip to slip underneath said outer surface 10 while the stack 1 remains resting on said outer surface 10.

Figs 4a-4c illustrate a method for removing the wrapper 14 of the package in Fig. 2, or the package in Fig. 3, from the stack 1.

Fig. 4a illustrates a first step of positioning the package such that it is resting on an outer surface thereof, in this case the back surface 10. Hence, the package is resting on an outer surface which corresponds to the folded edges of the stack. Moreover, the package is resting on an outer surface being one of the largest surfaces of the stack. The front surface 9, where the wrapper 14 is provided with an opening feature including the gripper 15, is directed upwards. The gripper 15 may be gripped and pulled as indicated by the arrow in Fig. 4a, to open the package.
Fig. 4b illustrates the situation when the gripper 15 has been pulled, causing the wrapper to open such that a portion of the front surface of the stack 1 is revealed. Continued pulling of the gripper 15 in the direction of the arrow in Fig. 4b will result in removal of the wrapper 14 from the stack 1.

Fig. 4c illustrates the situation during continued pulling of the gripper 14. It is illustrated how the portion of the wrapper opposite the gripper 15 has been drawn from its initial location covering a portion of the front surface 9 of the stack 1, over the top/bottom surface of the stack 1, and finally underneath the stack 1. Hence, a portion of the wrapper 14 will slide between the back surface 10 of the stack and a support surface on which the package is resting. Continued pulling in the direction of the arrow will result in the final portion of the wrapper 14 sliding underneath the stack 1 such that the wrapper 14 is finally completely removed from the stack 1.

As illustrated in Fig. 4a-4c, this procedure for removal of the wrapper 14 from the stack 1 may be performed in one single movement by pulling the gripper 15 with a single hand.

In use, the procedure is to be performed when the package is resting on a support surface forming part of a storage space of a dispenser (or possibly on some surface being designed such that the stack may be pushed or slid into the storage space without need for manually maintaining its integrity).

Preferably, the outer surface on which the package is resting during removal of the wrapper is the front or the back surface of the package. The front and back surfaces of the package are the surfaces adjacent or generally formed by the folded edges of the web material of the stack. Without being bound by theory, it is believed that the placement of the package on one of these surfaces is favourable since the stability of the stack seems to be improved by this position. Hence, the risk that the stack tips over or the like, and becomes disintegrated during removal of the wrapper is diminished.

The method for opening a package as presented herein may advantageously be used in a method for loading a dispenser including a housing having a storage space for storing said stack. To this end, it is envisaged to

- Provide a package comprising a stack and a wrapper,
Position said package on a support surface of said storage space, such that the package rests on the outer surface and abutting said support surface, and
Opening said package while the package is resting on said support surface.

Hence, when the wrapper is removed from the stack, the stack is already present in a storage space of the dispenser, and there is no need for further handling thereof which necessitates manual maintaining of the stack's integrity. However, the stack could be further moved or fed inside the dispenser.

The method is particularly useful for dispensers having a storage space being designed to store more than one stack. That is for dispensers intended to hold relatively large volumes of material. In this case, the method may advantageously comprise connecting said stack to another, similar stack provided in said storage space.

This enables the package to be introduced, e.g. to a storage space of a dispenser, positioned on a support surface therein, and the wrapper to be removed while the package rests with one of its outer surfaces abutting said support surface. Accordingly, the need for manually maintaining the integrity of the stack during insertion of the stack in the dispenser is removed.

This in turn implies that it is possible to provide packages having other dimensions than previous packages, in particular packages having a height greater than what may conveniently be held by one hand of the attendant.

Advantageously, the wrapper may be of a polymer based material, or of a starch based material. PP, PE and PVA materials, and mixtures and/or combinations thereof, are examples of suitable polymer materials. Paper materials, advantageously coated or calendared to provide a smooth surface, may also be preferred. Generally, the wrapper material should have sufficient drapability and strength so as to conveniently be wrapped around the stack. Moreover, for use in a method for removal of the wrapper as described herein, it is advantageous to provide a wrapper with an outer surface being sufficiently smooth, such that the removal of the wrapper including the sliding of a wrapper portion underneath the stack, is not hindered by friction between the wrapper and the stack.
and/or underlying support surface. Also, the wrapper material should be sufficiently strong to enable pulling thereof without risk of breaking the material.

A force required to pull the wrapper from the stack in this manner will depend on several parameters, including the properties of the web material and the wrapper material, as well as on the properties of the support surface on which the stack rests during removal of the wrapper. Also, the inclination of the support surface, the side upon which the stack is resting, and the weight of the stack might influence the force.

However, for a package being positioned on a smooth, horizontal support surface, such as in a dispenser, and resting on its front or back side, the maximum force required during pulling of the wrapper from the stack may advantageously be 6 - 20 N, preferably 8 - 12 N.

As mentioned in the above, and as illustrated in Figs. 2 and 3, the wrapper may be formed by a wraparound strip arranged to encircle said stack.

With "wraparound strip" is meant a strip of material which is arranged to encircle the stack. As will be described in the below, it is preferred that the wraparound strip encircles the entire stack, such that the end portions of the strip is joined in a joining region, advantageously in an overlapping relationship. However, one could imagine embodiments where a wraparound strip encircles the majority of the stack, but where a separate joining portion is arranged to connect the end portions of the strip and to span over a portion of the stack. For opening of the wrapper, the joining portion may then be removed from the wraparound strip.

Such strips may easily be designed to accomplish the tasks of maintaining and optionally also of protecting the stack during transport and storage thereof. Moreover, they are preferable from a manufacturing point of view, since they may be produced relatively easily, using standard equipment and requires relatively small amounts of material.

The wraparound strip may be provided with a closure, such as an adhesive closure, closing the strip around said stack. Moreover, the wraparound strip may comprise an opening feature enabling predetermined opening of the strip.
In a first embodiment, the predetermined opening is accomplished in that the closure closing the strip is openable. Accordingly, the opening said wrapper using the opening feature implies braking said closure.

Advantageously, a gripper may be arranged in or adjacent the closure, such that initial pulling of the gripper implies breaking of the bond, and continued pulling of the gripper results in complete removal of the wraparound strip from the stack.

Fig 2 illustrates an embodiment of a package where the wrapper 14 is designed as a wraparound strip forming a joint region 18, where a first end of the strip is attached to a second end of the strip using via a closure 19. A gripper 15 is arranged adjacent the first end of the strip enabling gripping of the wrapper 14 for removal thereof from the stack.

In Fig. 2, the gripper 15 is formed by a separate piece of material, arranged in connection to the joint region 18.

In Fig. 3, the gripper 15 is formed by a free end of the wrapper material, extending from the joint region 18 so as to be graspable.

Figs. 5 to 7 describe embodiments for forming a joint region joining the two ends of a wraparound strip, e.g. a joint region 18 such as indicated in Fig. 2, including a gripper 15.

Fig. 5 illustrates an embodiment where the joint region 18 comprises a first end 16 of strip material overlapping a second end 17. The length O over which the first end 16 and the second end 17 of strip material overlaps may advantageously be between 1 and 7 cm, preferably between 2 and 5 cm.

In Fig. 5, the first end 16 and second end 17 are joined by an adhesive closure 19 in the form of intermittent glue dots in a linear shape. The adhesive closure 19 is arranged at a distance from the outermost border of the first end 16 of the strip, such that an outermost end of the first end 16 of the strip forms a flap 15 being graspable for opening of the wrapper 14. Hence, the flap 15 is formed by strip material.
For better visibility, in Figs 5 to 7, the closure 19 is shown as present between the first end 16 and the second end 17. In reality, the material of the wraparound strip would hinder the closure 19 from being viewed.}

Fig. 6 illustrates an embodiment where the joint region comprises a first end 16 of strip material overlapping a second end 17. The first end 16 and second end 17 are joined by an adhesive closure 19a, 19b in the form of two areas of intermittent glue dots in linear shapes. A first linear shape of intermittent glue dots is arranged at a distance from the outermost border of the first and 16 of the strip, similar to what is shown in Fig. 5. A second linear shape of intermittent glue dots is arranged to fasten the outermost edge of the first end 16 of the strip to the underlying second end of the strip 17. However, an portion of the outermost edge of the first end of the strip 16 is free from adhesive, and hence form a flap 15 under which a user may introduce a finger for gripping the flap 15 and opening the package. In this embodiment, both glued areas 19a, 19b may be accomplished using the same type of adhesive. Alternatively, the second glued area 19b, fastening the outermost edge of the first end 16 of the strip may comprise a relatively weak adhesive, whose function is mainly to initially fasten the flap 15 so that it does not protrude from the wrapper surface. In this case, the first area 19a may provide the necessarily strength to safely fasten the wraparound strip around the stack 1. Hence, also in this embodiment, the flap 15 is formed by strip material.

Fig. 7 illustrates another embodiment, where a joint region comprises a first end 16 of strip material overlapping a second end 17. The first and second ends 16, 17 are again joined by an adhesive closure 19, for example in the form of intermittent glue dots arranged in a linear shape. In this case, a separate piece of material is introduced over the first end 16 and attached thereto, so as to provide a flap 15 for opening the wraparound strip. Hence, in this embodiment, the flap 15 is formed by a separate piece of material.

It will be understood that numerous variants for forming said joint region 18 and flap 15 are possible. For example, the closure may have many forms and shapes. Notably, it may be arranged to form at least one continuous glue line, or two continuous glue lines of which the outer may be attached to said flap.
An openable closure is a closure which may be opened without rupturing the wrapper material. In the above-mentioned examples, the openable closure is an openable adhesive closure, comprising a peelable adhesive. Alternatively, an openable adhesive closure could be accomplished using a peelable adhesive tape.

Instead of using an openable adhesive closure, the closure could be e.g. an openable welded closure, being welded with heat, induction or ultrasound.

In all embodiments, the flap may initially be fastened to the second end of the strip material, preferably using a relatively weak connection to the underlying strip material. The initial fastening should break relatively easily such that a user may grip and pull the flap.

As is understood from the described embodiments, the first end and the second end of the strip may be arranged to overlap each other in said joint region. Preferably said overlap is over a length as measured along the length of the strip between 1 and 7 cm, preferably between 2 and 5 cm.

The gripper may have a free length as measured along the length of the strip of about 1-5 cm, preferably about 2-4 cm.

It is proposed herein, that when a sticky adhesive closure is used, the closure should be arranged to have a stronger adhesion to said first end of the strip than to the second end of the strip, thereby allowing the strip to be removed from the stack by pulling said gripper while the package is resting on an outer surface thereof over which said wrapper initially extends, allowing said second end of the strip to slide underneath said outer surface of the stack.

That the adhesive closure is arranged to have a stronger adhesion to said first end of the strip than to the second end of the strip implies that, upon breaking said adhesive bond, substantially all of the adhesive will remain on the first end of the strip, and virtually none on the second end of the strip.

Figs. 8a and 8b illustrate an embodiment, where a joint region 18 comprises a second end 17 of the strip underlying a first end 16 of the strip, and being joined by an adhesive
closure, in this case formed by two glue lines 19. A flap 15 formed by a portion of the first end 16 of the strip extends beyond the adhesive closure 19 so as to be graspable by a user. When the flap 15 is grasped and pulled in the direction of the arrow of Fig. 8a, the adhesive closure 19 will follow the first end of the strip 16, leaving the second end 17 substantially free from adhesive, as illustrated in Fig. 8b.

Accordingly, when the strip is to be removed in accordance with a method such as described in relation to Figs. 4a to 4c, the second end 17 may slide underneath the outer surface 10 of the stack 1, without being hindered by or leaving residues of adhesive during the removal of the wrapper 14 from the stack 1.

In the above description, the adhesive closure comprises a glue joint. However, it is also contemplated to use an adhesive tape to provide said closure.

Advantageously, the adhesive closure may comprise a peelable glue. Such a peelable glue could advantageously be a hotmelt adhesive, for example Dispomelt 8638E as provided by Henkel.

In order to ensure that the adhesive stays on the first end 16 of the strip, and is released from the second end 17, the first and/or second end may be surface treated in various manners. For example, the second end may be surface treated to become smoother, so as to facilitate release of the adhesive from the smoothened surface. Material surfaces may be smoothened by various known measures, such as silicone application or calendaring.

If a non-sticky adhesive is used, the second end 17 of the strip might bear some residues of the non-sticky adhesive - however, such residues should not be hindering for the end 17 to slip underneath the stack.

In the above examples, the wraparound strip is closed by an adhesive closure 19, and the gripper 15 is arranged such that adhesive closure 19 breaks upon pulling the gripper 15, resulting in opening of the package.

In another variant, the wraparound strip is closed by a closure 19, but the wraparound strip is also provided with a transverse weakening portion being arranged to break upon
pulling of the gripper 15. In such a variant, the weakening portion is weaker than the adhesive closure 19, such that the opening of the wrapper 14 will take place at the weakening portion. The breaking of the weakening portion hence accomplishes a predetermined opening of the wrapper.

In such an arrangement, it is preferred that the weakening portion is arranged between a first portion of the strip comprising the closure and the gripper, and a second portion comprising only strip material. Accordingly, the strip is allowed to be removed from the stack by pulling said gripper while the package is resting on an outer surface thereof, over which said wrapper initially extends, allowing said second portion of the strip to slide underneath said outer surface of the stack.

Figs 9a and 9b illustrate such an embodiment. As in Figs. 8a and 8b, a joint region 18 comprises a second end 17 of the strip underlying a first end 16 of the strip, and being joined by an adhesive closure, in this case formed by two glue lines 19. A flap 15 formed by a portion of the first end 16 of the strip extends beyond the adhesive closure 19 so as to be graspable by a user. In this embodiment however a weakening portion 20 is arranged in said wraparound strip.

Advantageously, such a weakening portion may be a perforated portion.

The wraparound strip is hence divided into two portions, a first portion 21a comprising the joint region 18, including second end 17 of the strip, the adhesive closure 19, the first end of the strip 16 and the gripper 16, and a second portion 21b including only strip material. Hence, when the gripper 15 is gripped and pulled, the weakening portion 20 breaks, resulting in that the joint region 18 will follow the gripper 15 away from the stack 1. The second portion 21b of the strip remains, and will be pulled underneath the stack 1 as explained in relation to Figs. 4a to 4c above.

Also in this case, it is ensured that the portion of the strip, which is to slide underneath the outer surface of the stack, is free from adhesive as well as from joints etc, which could hinder the second portion from sliding underneath the stack.
Advantageously, the gripper may be provided with a visual indicia for facilitating visual perception thereof. The indicia could for example be a contrasting colour or figure, being clearly discernible from the reminder of the package.

Alternatively, or in addition to said indicia, the gripper and/or the wrapper may be provided with a visual indicia indicating the pulling direction for opening and removing the wraparound strip. Such an indicia could e.g. be an arrow or other symbol indicating the pulling direction for opening the strip. In Fig. 2, an indicia 22 in the form of an arrow is provided on the wrapper 14.

Alternatively, or in addition to the other indicia, the wrapper may be provided with a visual indicia indicating a feeding direction for correct feeding of the package into a designated dispenser. Such an indicia is useful in particular when the stack is provided with end connectors, said end connectors being different on the top and bottom of the stack. In this case, the connectors will only serve to interconnect the stacks if properly positioned. Accordingly, the attendant may benefit from the aid of an indicia indicating the proper direction of the stack for interconnection to another, similar stack.

The stacks and packages as described in the above, enables efficient loading of stacks into a dispenser e.g. for replenishment thereof.

In a dispenser, the web material may be contained in a storage space, from which the material is drawn via a web path to a dispensing outlet of the dispenser. Advantageously, the storage space and path are arranged such that the web material is fed from the top of the stack contained in the storage space.

For initial set-up of such a dispenser, a leading end of a first stack of web material must usually be threaded through the dispenser, along the web path, and to the dispensing outlet. After initial threading, the web material may be drawn from the dispenser.

It is desired to replenish the dispenser with additional web material before the dispenser is completely empty. This is because the replenishment may then be made by interconnecting new web material to the web material remaining in the storage space. Hence, re-threading of the dispenser may be avoided.
Accordingly, in a typical situation, a dispenser to be replenished with web material comprises a housing having a storage space, where at least a portion of an initial, or remaining stack is present.

With stacks as described in the above, it is suggested to load such stacks in a dispenser including a housing having a storage space for storing at least two stacks, said storage space comprising at least a portion of an initial stack by providing a stack as described in the above, positioning said stack on a support surface, such that the stack rests on one of its outer surfaces facing said support surface; and interconnecting said stack with the initial stack, while the stack remains resting on said support surface.

To this end, it is advantageous if a support surface of the dispenser may be provided which supports the stack at least in a vertical direction, and having an area large enough to support more than one stack at the time. On such a support surface, the stack may be arranged, preferably resting on a front or back surface thereof, and conveniently connected to the remaining stack. Several stacks may be arranged after one another on the support surface, and still the connection may easily be performed.

In order to provide a horizontally extending support surface having room for more than one stack, the dispenser may for example be provided with a pivotable storage space which may be swung from an initial, vertically extending position, to a generally horizontal loading position. A vertical wall of the storage space extending along the height of the dispenser in its use position, may thus form a horizontal support surface when in its swung out state.

After loading and interconnection of the stacks using the generally horizontal support surface, the storage space including the stacks may be swung back to a vertical position, where the previously horizontal support surface could form a vertical wall of the storage space. In this manner, a convenient horizontal support surface may be accomplished and, when in use, the dispenser will not need more space (area of the floor) than other dispensers.

A suitable dispenser could be a dispenser for dispensing a sheet of web material from a stack of folded web material. Such a dispenser may comprise: a housing arranged to be positioned along a vertical direction, a dispensing arrangement including a dispensing
opening for the web material in the housing, and a web material storage section inside the housing arranged to hold and support the stack of folded web material. The web material storage section comprises, seen along the vertical direction, an upper end portion and opposite thereto a lower end portion. The web material is arranged to be lead to the dispensing arrangement from the upper end portion and the stack of folded web material is arranged to be supported at the lower end portion. The web material storage section comprises a displaceable portion. The displaceable portion comprises the lower end portion, wherein the lower end portion, seen along the vertical direction, is arranged substantially underneath the upper end portion when the displaceable portion is arranged in a dispensing position. The displaceable portion is displaceable from the dispensing position to a tilted loading position, in which tilted loading position the lower end portion is positioned beside and below the upper end portion, seen along the vertical direction.

Fig. 13 illustrates an embodiment of a dispenser 2 capable of providing a horizontally extending support surface having room for more than one stack. The dispenser 2 comprises a housing 4. The housing 4 is arranged to be positioned along a vertical direction 12. The housing 4 comprises a door 6. A dispensing opening 8 is provided in the housing 4 for dispensing the at least one sheet of web material. The dispenser 2 is arranged for dispensing web material from a stack of folded web material. The stack has been omitted in Fig. 13 for clarity reasons. The door 6 is arranged to be opened inter alia for replenishing the dispenser 2 with stacks of folded web material. The dispenser 2 comprises a dispensing arrangement 14 comprising the dispensing opening 8 and a serrated edge 80 for tearing off the at least one sheet from a tail of web material. The tail of web material extends from the stack of folded web material to the dispensing opening 8. A web material storage section 16 is provided inside the housing 4. The web material storage section 16 is arranged to hold and support the stack of folded web material.

The web material storage section 16 comprises, seen along the vertical direction 12, an upper end portion 18 and an opposite lower end portion 20. The web material is arranged to be lead to the dispensing arrangement 14 from the upper end portion 18 and the stack of folded web material is arranged to be supported at the lower end portion 20. For supporting the stack at the lower end portion 20, the web material storage section 16 comprises at a bottom element 22. Side elements 24 are provided to support the stack of folded web material along the vertical direction 12.
The web material storage section 16 comprises a displaceable portion 26. The displaceable portion 26 is displaceable from a dispensing position to a tilted loading position. In Fig. 13 the displaceable portion 26 is illustrated in the tilted loading position. In this position, the displaceable portion 26 forms a support surface upon which a stack may be placed on its front and/or back surface for removal of a wrapper and/or for connection to a previous stack.

The displaceable portion 26 comprises the lower end portion 20 of the web material storage section 16. When the displaceable portion 26 is arranged in the dispensing position, the lower end portion 20, seen along the vertical direction 12, is arranged substantially underneath the upper end portion 18. In the dispensing position, the dispensing opening 8 is arranged above the lower end portion 20, seen along the vertical direction 12. In the tilted loading position of the displaceable portion 26, the lower end portion 20 of the web material storage section 16 is positioned beside and below the upper end portion 18 of the web material storage section 16, seen along the vertical direction 12.

Naturally, other options for forming support surfaces having room for more than one stack are possible,

However, the interconnection while the stack is resting on a support surface might also be performed using a support surface intended for only one stack at the time.

Advantageously, the stack may be provided in a package as described in the above, and the method comprises: removing the wrapper from the package while it rests on said support surface, prior to interconnecting said stacks.

Generally, a method for loading a stack in a dispenser including a housing having a storage space for storing said stack is proposed, comprising positioning said package on a support surface, such that the stack rests on one of its outer surfaces facing said support surface, and removing the wrapper of said package, while the package is resting on said support surface.

Advantageously, the outer surface upon which the stack is resting is a back, front or side surface of the stack, preferably the back or front surface of the stack.
Preferably, the storage space is arranged in said dispenser such that the web is to be fed from the top side of the stack.

5 Preferably, at least one of the top and bottom surfaces of each of said stacks is provided with a connector, and the interconnection is made via the connectors.

Figs. 14a - 14e illustrate a method of replenishing another dispenser 2 with a stack 96 of folded web material as described in the above. Only the displaceable portion 26 of the dispenser 2 in the tilted loading position has been shown for clarity reasons. A stack 96 of folded web material, which has been placed in the dispenser 2 to replenish the same, forms part of a compound stack of folded web material inside the dispenser 2.

Fig. 14a illustrates a stack 96 of folded web material held together by a wraparound strip 98 ready to be placed in the displaceable portion 26 via the loading opening 62 to abut against the support surface 61. The loading opening 62 is arranged in the displaceable portion 26 such that the stack 96 of folded web material is inserted in a direction transverse to a longitudinal extension of the displaceable portion 26. Fig. 14b illustrates the stack 96 of folded web material placed in the displaceable portion 26 abutting with a creased side of the package 96 against the support surface 61. The stack 96 is thus supported in the vertical direction 12 by the support surface 61. Figs. 14c-14d illustrate the wraparound strip 98 being removed from the stack 96. The wraparound strip 98 is removed by pulling on the flap 99. The wraparound strip 98 is removed via the recess 64 in the lower end portion 20. Fig. 14e illustrates the stack 96 being pushed upwardly in the displaceable portion 26. During pushing, the stack 96 slides along the support surface 61. The projection members 72 of the supporting arrangement 70 may prevent the stack 96, now part of a compound stack of folded web material in the dispenser 2, from sliding back towards the loading opening 62. The projection members 72 of the supporting arrangement 70 hold a panel of web material at a lower end of the stack 96 against the remainder of the stack 96. A further stack of folded web material may be placed in the dispenser 2 via the loading opening 62.

Panel end surfaces 102, 104 of the stack 96 and the further stack are provided with a connector 94 for attaching the web material of the two packages to each other. Thus, a
continuous web material may be provided between the two stacks, and thus also in the compound stack in the dispenser 2.

In another aspect, there is proposed the use of a stack in accordance with the above in a dispenser including a housing having a storage space for said stack, preferably said storage space being arranged in the dispenser such that web material is fed from the top side of the stack.

In another aspect, there is proposed a compound stack comprising a plurality of stacks as described in the above, said stacks being interconnected via interconnections, and said compound stack comprising an interconnection at less than every 640th panel, preferably every 800th panel, most preferred every 1000th panel.

Preferably, said interconnections could be in the form of connectors as described in the above.

A compound stack is the result of interconnecting a plurality of stacks. In particular, using stacks as described in the above, compound stacks may be accomplished having relatively scarcely distributed interconnections.

Moreover, there is provided a dispenser comprising a housing having a storage space including at least one stack as described in the above, preferably said storage space being arranged in the dispenser such that web material is fed from the top side of the stack.

Also, there is provided a dispenser comprising a housing having a storage space including a compound stack as described in the above, preferably said storage space being arranged in the dispenser such that web material is fed from the top side of the stack.

Numerous alternatives and variants are possible and may be envisaged by the person skilled in the art, in view of the above description.

Determination of separation strength of weakening lines
Definitions:
Fmax(N) - Maximum force recorded during testing
MD - Machine Direction
Weakening line - e.g. a perforation line

The maximum force separating the two individual sheets of a web, joined via a weakening line, is measured with a tensile strength tester.

Crosshead speed 50 mm/min
Clamp distance 100 mm
10N cell
Upper clamp with low weight
The width of the clamps may be selected to fit the samples.

Sample preparation:
- Cut samples to the length of 150 mm, with the weakening line in the middle of the length direction. (One sheet will extend approximately 75 mm upwards from the weakening line, and the other sheet will extend approximately 75 mm downwards from the weakening line.)
- The sample width shall be the entire product width, and hence include the entire weakening line. Measure 10 samples in the machine direction.
- The samples shall be conditioned for 4 h at 50±2% rh and 23±1°C, in accordance with ISO-187 standard.

Procedure
- Prepare the tensile testing apparatus according to the apparatus instruction.
- Adjust the length between the clamps to 100 mm and zero the equipment in the starting position.
- Please the first web of the sample in the upper clamp and the second in the lower clamp.
- Start the tensile testing apparatus.
- Repeat the test procedure for the remaining samples.

NB! Disregard samples which break elsewhere than along the perforation.
Calculation and expression of results

The software of the tensile strength tester records the highest peak force detected during a test run of a sample. This maximum force (N) is used as a measure of the separation strength of the weakening line of the sample. A mean value of the maximum force (N) of 10 samples is regarded as a representative value of the separation strength of the weakening line of the samples.

N.B. The samples are to be similar. Hence, they comprise similar web materials and weakening lines. The resulting measure is to be representative of the selected combination of web materials and weakening line.
CLAIMS

1. A stack (1) of web material for hygiene products, for use in a dispenser, comprising
at least one continuous web material (2, 3) being Z-folded about transverse folding
lines (4), thereby providing panels having a length (L) along said folding lines, and
a width (W) perpendicular to said folding lines,
said panels being piled on top of each other to form a height (H) of said stack,
such that said stack outlines a rectangular parallelepiped having said length (L), width
(W) and height (H), and forming six outer surfaces, namely
- a top and a bottom surface (5,6), being parallel to the panels of said stack (1),
- two side surfaces (7,8), comprising the longitudinal edges of the web material
(2,3), and
- a front and a back surface (9,10), comprising the folded edges of the web material,
and
characterised in that the height (H) of the stack is greater than 17 cm.

2. A stack of web material in accordance with claim 1, wherein at least one of the
top and bottom surfaces (5, 6) of said stack (1) is provided with a connector
(11) for enabling connection of said stack (1) to another, similar stack.

3. A stack of web material in accordance with claim 1 or 2, wherein the front and
back surfaces (9, 10) are the largest outer surfaces of the stack (1).

4. A stack of web material in accordance with claim 3, wherein the front and back
surfaces (9, 10) each have an area being at least 1.5 times, preferably at least
2 times larger than the maximum area of any one of the top, bottom or side
surfaces (5, 6, 7, 8) of the stack.

5. A stack of web material in accordance with any one of the previous claims,
wherein the height (H) is greater than 20 cm, preferably greater than 22 cm,
more preferred greater than 25 cm, most preferred greater than 30 cm.

6. A stack of web material in accordance with any one of the previous claims,
wherein the height (H) of the stack is greater than 0.5 x the length (L) of the
stack, preferably greater than $0.75 \times$ the length ($L$) of the stack, most preferred greater than the entire length ($L$) of the stack.

7. A stack of web material in accordance with any one of the previous claims, wherein the height ($H$) of the stack is greater the length ($L$) and greater than the width ($W$).

8. A stack of web material in accordance with any one of the previous claims, wherein the volume enclosed by said rectangular parallelepiped shape is at least $2.6 \, \text{dm}^3$, preferably $3.7 \, \text{dm}^3$, most preferred $4.3 \, \text{dm}^3$.

9. A stack in accordance with any one of the previous claims, wherein the total length of the continuous web material in the stack is at least $45 \, \text{m}$, preferably at least $60 \, \text{m}$, most preferred at least $75 \, \text{m}$.

10. A stack in accordance with any one of the previous claims, wherein said continuous web material ($2, 3$) is provided with weakening lines ($12$), preferably perforation lines, dividing said web material ($2, 3$) into individual sheets.

11. A stack in accordance with claim 10, wherein a separation strength of the weakening lines ($12$) is in the range $1-30 \, \text{N}$, preferably $3-20 \, \text{N}$, most preferred $3-10 \, \text{N}$.

12. A stack in accordance with claim 10 or 11, wherein said stack ($1$) comprises a first web material ($2$) divided into individual sheets by means of weakening lines ($12$), and a second web material ($3$) divided into individual sheets by means of weakening lines ($12$), said first and second webs ($2, 3$) being interfolded with one another so as to form said stack ($1$), and the first and the second webs ($2, 3$) are arranged such that the weakening lines ($12$) of the first web ($2$) and the weakening lines ($12$) of the second web ($3$) are offset with respect to each other along the webs ($2, 3$).

13. A stack in accordance with claim 12, wherein said first web material ($2$) and said second web material ($3$) are joined to each other at a plurality of joints.
(13) along said webs, preferably said joints (13) are regularly distributed along
the webs (2, 3).

14. A stack in accordance with any one of the previous claims, wherein said stack
comprises at least 160, preferably at least 200, most preferred at least 250
individual sheets.

15. A stack in accordance with any one of the previous claims, wherein the stack
comprises at least 640, preferably at least 800, most preferred at least 1000
panels.

16. A stack (1) of web material for hygiene products, for use in a dispenser,
comprising
at least one continuous web material (2, 3) being Z-folded about transverse folding
lines (4), thereby providing panels having a length (L) along said folding lines, and
a width (W) perpendicular to said folding lines,
said panels being piled on top of each other to form a height (H) of said stack,
such that said stack outlines a rectangular parallelepiped having said length (L), width
(W) and height (H), and forming six outer surfaces, namely
- a top and a bottom surface (5,6), being parallel to the panels of said stack (1),
- two side surfaces (7,8), comprising the longitudinal edges of the web material
(2,3), and
- a front and a back surface (9,10), comprising the folded edges of the web material,
and
characterised in that the height (H) of the stack is greater than than 0.75 x the
length (L) of the stack, preferably greater than the entire length (L) of the stack.

17. A stack in accordance with claim 16 in combination with any one of the claims
2 to 5, or 7 to 15.

18. A package comprising a stack
of web material for hygiene products, for use in a dispenser, comprising
at least one continuous web material (2, 3) being Z-folded about transverse folding
lines (4), thereby providing panels having a length (L) along said folding lines,
and a width (W) perpendicular to said folding lines, said panels being piled on top of each other to form a height (H) of said stack, such that said stack outlines a rectangular parallelepiped having said length (L), width (W) and height (H), and forming six outer surfaces, namely
- a top and a bottom surface (5,6), being parallel to the panels of said stack (1),
- two side surfaces (7,8), comprising the longitudinal edges of the web material (2,3), and
- a front and a back surface (9,10), comprising the folded edges of the web material,

and

a wrapper (14) extending at least over said height direction (H), so as to maintain the integrity of the stack (1) during transport and storage thereof, characterised in that said package has a height of more than 17 cm.

19. A package comprising a stack of web material for hygiene products, for use in a dispenser, comprising at least one continuous web material (2, 3) being Z-folded about transverse folding lines (4), thereby providing panels having a length (L) along said folding lines, and a width (W) perpendicular to said folding lines, said panels being piled on top of each other to form a height (H) of said stack, such that said stack outlines a rectangular parallelepiped having said length (L), width (W) and height (H), and forming six outer surfaces, namely
- a top and a bottom surface (5,6), being parallel to the panels of said stack (1),
- two side surfaces (7,8), comprising the longitudinal edges of the web material (2,3), and
- a front and a back surface (9,10), comprising the folded edges of the web material,

and

a wrapper (14) extending at least over said height direction (H), so as to maintain the integrity of the stack (1) during transport and storage thereof, characterised in that the height (H) of the package is greater than than 0.75 x the length (L) of the package, preferably greater than the entire length (L) of the package.
20. A package in accordance with claim 18 or 19, wherein said wrapper (14) is configured to be removable from the integrity of the stack (1).

21. A package in accordance with claim 20, wherein said wrapper (14) is configured to be removable from the integrity of the stack (1) while the stack is resting on an outer surface thereof, preferably the front or back surface (9,10).

22. A package in accordance with any one of the claims 18 to 22, wherein the stack is a stack in accordance with any one of the claims 1 to 17.

23. Method for loading stacks in a dispenser including a housing having a storage space for storing at least two stacks, said storage space comprising at least a portion of an initial stack, comprising:
   - providing a stack in accordance with any one of the claims 1 to 17,
   - positioning said stack on a support surface, such that the stack rests on one of its outer surfaces facing said support surface;
   - interconnecting said stack with the initial stack, while the stack remain resting on said support surface.

24. Method according to claim 23, wherein said stack is provided in a package in accordance with any one of the claims 20 to 22, and the method comprises: removing the wrapper from the package while it rests on said support surface, prior to interconnecting said stacks.

25. Method for loading a stack in a dispenser including a housing having a storage space for storing said stack comprising:
   - providing a package in accordance with any one of the claims 20 to 22,
   - positioning said package on a support surface, such that the stack rests on one of its outer surfaces facing said support surface
   - removing the wrapper of said package, while the package is resting on said support surface.

26. Method according to any one of the claims 23 to 25, wherein the outer surface upon which the stack is resting is a back, front or side surface of the stack, preferably the back or front surface of the stack.
27. Method according to any one of the claims 23 to 26, wherein the storage space is arranged in said dispenser such that the web is to be fed from the top side of the stack.

28. Method according to any one of the claims 23 to 27, wherein at least one of the top and bottom surfaces of each of said stacks is provided with a connector, and the interconnection is made via the connectors.

29. Use of a stack in accordance with any one of the claims 1-17 in a dispenser including a housing having a storage space for said stack.

30. A compound stack comprising a plurality of stacks in accordance with any one of the claims 1 to 17, said stacks being interconnected via interconnections, and said compound stack comprising an interconnection at less than every 640th panel, preferably every 800th panel, most preferred every 1000th panel.

31. A dispenser comprising a housing having a storage space including at least one stack in accordance with any one of the claims 1-17, preferably said storage space being arranged in the dispenser such that web material is fed from the top side (5) of the stack (1).

32. A dispenser in accordance with claim 31, comprising a compound stack in accordance with claim 30.
Fig. 12
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A47K, B65B, B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic database consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search
11-06-2013

Date of mailing of the international search report
12-06-2013

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Tommy Blomberg

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International Patent Classification (IPC)

A47K 10/16 (2006.01)
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