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(54) A tablet dispenser

(57) The present invention provides a package (10) for detergent tablets (1). Said package dispenses these detergent tablets one by one without complicated operations and avoiding any jams of said detergent tablets blocking the dispensing of further tablets. This is achieved by limiting the internal width (W) of the storage chamber (18) of said package to a width which is smaller than the largest dimension of said tablets. In this manner, said tablets are ordered into rows in said storage chamber.

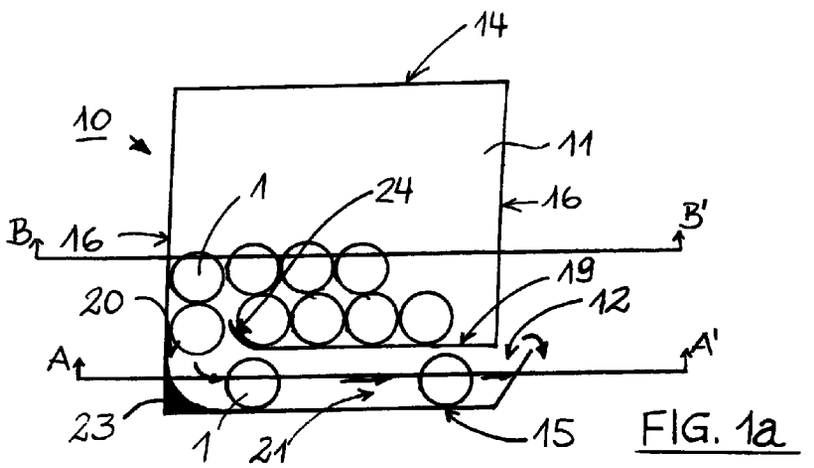

FIG. 1a

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Description

Field of the Invention

The present invention relates to a container and dispenser for tablets.

Background of the Invention

Detergent compositions formed in non particulate solids such as bars or tablets or briquettes are known in the art. In the following, the term "tablet" will refer to any form of non particulate solids. The tablet provides a number of advantages to both the consumer and the manufacturer. Indeed, said tablet prevents spillage of the detergent composition. Furthermore, said tablet eliminates the need for the user to estimate the dosage of detergent composition required and ensures that the correct dosage of detergent composition per wash cycle is used by the user.

The detergent tablets available on the market are generally sold packed in containers in a loose way or individually wrapped in bags. Other possible containers enable to dispense tablets one by one from said package. For example, EP-A-573 859 describes a package for pharmaceutical tablets in which tablets fall singularly into a child resistant sliding drawer. Said drawer has to be pulled out from said package to reach said tablet. Another example is EP-A-045 241 which discloses a package for tablets comprising a funnel leading said tablets to a zig-zagged labyrinth. Said zig-zagged labyrinth is made of a height which is equal to the smallest height of a tablet. This limitation of the dimension avoids jams of tablets which may avoid a further dispensing of tablets. Consequently, said tablets are conveyed one after another to the dispensing opening passing through said zig-zagged labyrinth.

We found that to get a tablet out of the packages as described in both documents above is a quite complicated manoeuvre. Indeed, in '241 said package has to be turned upside down several times before getting a tablet out of said package. Whereas in '859 a drawer has to operated. Furthermore, the packaging of the latter document has a complicated construction, since a drawer has to be incorporated into a container. We further found that especially users of detergent tablets consider these packages as being too complicated to be operated. Indeed, these users rather prefer a package which allows a facilitated one-by-one dispensing of detergent tablets out of said package.

It is therefore an object of the present invention to provide a package for detergent tablets which dispenses said detergent tablets one by one without complicated operations and avoiding any jams of said detergent tablets blocking the dispensing of further tablets.

Summary of the Invention

The present invention provides a package containing and dispensing tablets (1) comprising the following:

(a) a storage chamber (18) in which a plurality of said tablets are stored inside said package;

(b) a tunnel (21) further comprising a dispensing opening (12);

(c) an end wall (19) dividing said storage chamber from said tunnel, said end wall comprising an aperture (20) through the thickness of said end wall interconnecting said storage chamber and said tunnel and introducing said tablets one by one from said storage chamber into said tunnel;

Said storage chamber is further characterised in that the internal width (W) of said storage chamber is limited to a width which is smaller than the largest dimension of said tablets. In this manner, said tablets are ordered into one or more rows in said storage chamber.

Brief Description of the Figures

Figure 1a is a cross sectional side view of an embodiment of the package according to the present invention.

Figure 1b is a cross section along the line A-A' of the embodiment of Figure 1a. Figure 1c is another cross section along the line B-B' also of the embodiment of Figure 1a.

Figure 2a is a cross sectional front view of another embodiment of the package according to the present invention.

Figure 2b is a cross section along a plane defined by the line A-A' of the embodiment of Figure 2a. Figure 2c is another cross section along a plane defined by the line B-B' also of the embodiment of Figure 2a.

Figure 3a is a cross sectional front view of a further embodiment of the package according to the present invention.

Figure 3b is a cross section along a plane defined by the line A-A' of the embodiment of Figure 3a. Figure 3c is another cross section along a plane defined by the line B-B' also of the embodiment of Figure 3a.

Figures 4a and 4b are perspective front views of a detergent tablet which may be used in any of the embodiments of packages according to the present invention.

Figures 5a to 5c a cross sectional side views of another embodiment of the package according to the present invention.

Detailed Description of the Invention

In the following any form of non particulate solids

such as bars or tablets or briquettes will be encompassed by the term "tablet" (1). Pharmaceuticals in tablet form are, for example, tablets according to the present invention. Preferably, said tablet is made of a detergent composition, specifically a detergent composition for washing of laundry or dish. Said tablet may have any shape or dimension. Preferably, said solid, non particulate tablet is symmetrical to ensure the uniform dissolution of said tablet in the wash liquor or in other specific environments.

According to the present invention the detergent tablet (1) may comprise any ingredients known in the art. Such ingredients may include surfactants, suds suppressers, beaches, chelants, builders, enzymes, fillers and perfumes.

According to the present invention the detergent composition of the tablet (1) is prepared in its granular or particulate form and then formed into tablets of the desired shape and size by any one of the methods known in the art. Suitable methods include compression, extrusion and casting. The detergent composition may be homogeneously distributed throughout the tablet or may comprise distinct layers of certain detergent ingredients. Preferably, the shape of said detergent tablet is cylindrical, as shown, for example, in Figure 4a. In this case the dimensions of said detergent tablet are defined by the diameter (d) and by the height (h). Usually, detergent tablets have a cylindrical shape with the diameter being greater than the height of said tablet. Another possible shape of said tablet is rectangular, as shown, for example in Figure 4b. In this case the dimensions of this detergent tablet are defined by the length (L), by the width (w) and by the height (h). Usually, in a rectangular tablet the length is the greatest dimension and the width is equal to the height.

Figure 1a shows in a cross sectional view a package (10) according to the present invention. Said package comprises a hollow body (11) and a dispensing opening (12), said hollow body being defined by a top wall (14), a bottom wall (15) and a side wall (16). Preferably, the external shape of said hollow body may be substantially rectangular. The inside of said hollow body comprises a storage chamber (18), an end wall (19) with a aperture (20) and a tunnel (21). Said end wall divides said storage chamber from said tunnel, whereby only said aperture connects said storage chamber with said tunnel.

Said storage chamber (18) is filled with said detergent tablets (1) between said bottom wall (15) or said end wall (19) and said top wall (14). The internal dimension of said storage chamber (18) is such that said tablets are orderly spaced one to each other. This is achieved according to the present invention by limiting the internal width (Fig. 1b, W) of said storage chamber to a width which is smaller than the largest dimension of said tablets. The "internal width" is hereinafter defined to be shortest distance between adjacent walls in a direction along the drawn line (5) in Figure 1b.

For example, when said tablet (1) has a cylindrical-type of shape as described above, such a detergent tablet may only enter into said storage chamber, if said tablet is placed onto said bottom wall (15) or said end wall (19) standing on the surface having the smallest dimension, i.e. its height (Fig. 4a, h). This means that said tablet can never lay on the surface defining the diameter (d) of said tablet. Consequently, said tablets are ordered in a row, as shown, for example, in Figure 1b or Figure 5a. As hereinafter referred to, a "row of tablets" is meant to be a row of tablets standing upon said bottom wall (15) or said end wall (19) or upon another row of tablets whereby each tablet stands on the part of said tablet having the smallest dimension, i.e. on the height (h) for the tablets defined before. Therefore, the internal width is a distance perpendicular to said row.

We found that this way of positioning said tablets (1) reduces the friction forces acting onto said tablets. Reducing the friction forces permits an easy dispensing of tablets from said package avoiding that tablets block each other from exiting said package. This is particularly important when the tablets are big and/or heavy where the friction forces between said tablets are substantially high. For example, friction forces between tablets may influence the dispensing of said tablets from the package when the largest dimension of the tablet is greater than 1 cm and/or the weight of the tablet is greater than 10 g. The roughness of the external surfaces of said tablets also contributes to increase the friction forces between said tablets.

The friction forces between said tablets (1) are reduced in the package according to the present invention. Indeed, only the smallest surface of a tablet interacts with other tablets and/or with said bottom or end wall. Furthermore, when said tablet is cylindrically shaped as described before, said tablet is able to roll towards said aperture (20) which further reduces the friction. Therefore, said tablet in said storage chamber cannot block other tablets contained in said storage chamber from passing through said aperture (20) to reach said tunnel (21).

In a particular embodiment of the present invention said tablets (1) are orderly held in said storage chamber in one row within its internal width (W). Other single rows may be placed on top of the lowest row starting from the row standing on said bottom (15) or end wall (19) until said storage chamber is filled up. In another preferred embodiment of the present invention said storage chamber may contain more than one row of tablets parallel to each other within the internal width (W), when the diameter (d) or the length of said tablet is greater than twice the height of said tablet. Indeed, said storage chamber may contain, for example, two parallel rows of tablets within the internal width (W), as shown in Figure 1b. Also in this case, the diameter (d) or the length of a tablet is greater than the width (W) of said storage chamber, said width (W) being now equal or slightly greater than twice the height of a tablet. Again, these double rows of tablets are placed each over another filling up said storage chamber starting from

said bottom or end wall (19). We found that when said tablets are placed inside said storage chamber, said tablets automatically get ordered in these single or double rows. Indeed, the tablets are forced into one of the rows by the weight of the tablets of the above rows. The same applies for more than two parallel rows of tablets when the diameter of the tablet (d) is greater than n-times the height (h) of said tablet, n being greater or equal to 2.

As a preferred option, when two or more rows of tablets (1) are to be placed inside said storage chamber, said storage chamber comprises preferably at least one divider (22), as shown in Figures 2a and 3a. Said divider is perpendicular to the direction drawn by line (25) in Figure 2b. Said storage chamber may comprise more than one divider to contain several rows of tablets. The width (w) between said side wall (16) and said divider or between each divider is smaller than the largest dimension, i.e. the diameter or the length, of said tablet. Consequently, said dividers divide the parallel rows of tablets from each other. In this manner, the friction between parallel rows is reduced to achieve an easy and readily dispensing of said tablets. For each divided part of said storage chamber, said end wall (19) comprises a aperture (20) such that all tablets of any row or within any divided part are able to reach said tunnel (21).

Said end wall (19) comprises at least an aperture (20) through the thickness of said end wall. Said aperture has the dimension corresponding to a tablet (1) contained in said package (10), i.e. the length of said aperture is about equal to the diameter (d) of said tablet and the width of said aperture is about equal to the height (h) of said tablet. Consequently, only a single tablet is able to pass through said aperture. When said storage chamber comprises said dividers (22), said end wall comprises an aperture (20) for each divided row of tablets, as shown for example in Figures 2b and 3b. Said aperture for each divided row may be further made by having a single aperture through the thickness of said end wall along the entire width of said storage chamber from side wall to the opposite side wall. Another possibility is to have different apertures in different parts of said end wall, as shown for example on Figure 2b.

As a preferred option said end wall further comprises a barrier wall (24), as shown in Figure 1a. Said barrier wall prevents the tablets (1) of the row (2) in Figure 1b to unnecessarily jam at said aperture. As another preferred option, said barrier wall may also continue into said storage chamber such that also the tablets above the rows (1) and (2) in Figure 1b may not unnecessarily jam around said aperture. We found that this barrier wall may further improve the dispensing of detergent tablets from said package (10).

As a further preferred option, said package may comprise also an inclined or curved ramp (23). Said ramp is located between said aperture (20) of said end wall (19) and said tunnel. The inclination or curvature of said ramp is directed towards the interior of said tunnel, as shown in Figure 1a. Said curved ramp further facilitates the guiding of said tablets (1) into said tunnel (21). Indeed, said tablets roll on said ramp into said tunnel, instead of falling substantially vertically into said tunnel without said ramp. This curved ramp further contributes in an easy passage of detergent tablets into said tunnel and eventually towards said dispensing opening (12). We found that for a facilitated guiding of cylindrical tablets, for example, the radius of the curved ramp should be greater than the radius of the tablet, whereby the radius r is equal to half times the diameter (d). Preferably, the curved ramp has a radius between about 1 and about 3 times the radius of the tablet, more preferably, between about 2 and about 2.5 times the radius of the tablet.

The tunnel (21) is a passage within said package which conveys the tablets one by one towards the dispensing opening (12). Said dispensing opening may be located in the lower portion of said package near the bottom wall (15) when said package stands in its upright position. Alternatively, said dispensing opening may be located near the upper portion of said package near the top wall (14) when said package stands in its upright position. When said dispensing opening is located in the lower portion of said package near the bottom wall, as shown, for example, in Figure 1a, said tunnel is located between said end wall (19) of said storage chamber and said bottom wall (15) of said hollow body (11). In this case, the tablets are conveyed towards said dispensing opening along a direction parallel to said bottom wall.

When said dispensing opening is located in the upper portion of said package near the top wall, the tunnel may be located along a side wall (16) of said hollow body (11), as shown, for example, in Figure 5a. In other words, said tunnel is located between the end wall (19) and said side wall, the end wall being perpendicular to said bottom wall (15). In this case the rows of tablets are placed inside said package one over another with the first row standing on the innermost surface of said bottom wall. Furthermore, the tablets are conveyed towards said dispensing opening along a direction perpendicular to said bottom wall. As a preferred option, said tunnel of Figure 5a may be delimited by an L-shaped end wall (19'), as shown in Figure 5b. Consequently, said tunnel further extends at least partially parallel and along the bottom wall.

In an alternative embodiment of the present invention, the tunnel may be also located along the top wall (14) with the end wall being parallel to said bottom wall, but located in the upper portion of said package. Again, said tunnel may be delimited by an inverted L-shaped end wall (19"), whereby said tunnel extends at least partially perpendicular to said bottom wall. As preferred options, said barrier wall (24) and said inclined or curved ramp (23) can be foreseen also when said dispensing opening is located in the upper portion of said package. Said ramp starts opposite said aperture (20) of said end wall (19). The inclination or curvature of said

ramp is directed again towards the interior of said tunnel, as shown in Figures 5a to 5c. Further inclined or curved ramps can be foreseen along the tunnel indicated with the reference number (23') in Figures 5b and 5c.

As described before, said aperture (20) interconnects said storage chamber with said tunnel and conveys said tablets (1) into said tunnel from said storage chamber. The dimension of said tunnel corresponds to the dimensions of the tablets. This means that, for example, the height of said tunnel is about equal to the diameter (d) of said tablet and the width of said tunnel is about equal to the height (h) of said tablet, or vice versa. The length of said tunnel is the distance separating said aperture to said dispensing opening (12). Preferably, said tablets stand on the surface having the smallest dimension, i.e. on its height, as in the storage chamber to reduce the friction forces as discussed above. The shape of said tunnel may be straight, as shown in Figure 1c or 3c, or bent, like in Figure 2c.

When said storage chamber comprises said dividers (22), said package may preferably comprise a tunnel (21) for each row of divided tablets (1). This means, for example, as illustrated in Figure 3c, said package comprises three independent tunnels separated from each other. Another possibility having only a single tunnel is shown in Figure 2c. Said tunnel is bent or diagonal with respect to the drawn line (25). As illustrated in Figure 2b, said apertures (20) are located on said end wall in different positions with respect to each other, but always along said tunnel. This allows the introduction of said tablets in said single tunnel, even if said tablets are in different divided rows of said storage chamber.

At the end of said tunnel (21), said tunnel comprises a dispensing opening (12). Consequently, the tablets (1) being in said tunnel can be conveyed towards said dispensing opening and exit said package through said dispensing opening. Said dispensing opening has at least the same dimension as said tunnel. Preferably, said dispensing opening is located opposite to said aperture (20) at the end of the tunnel (21). To get one tablet out of said package, said package has to be tilted in such a manner that the tablets in said tunnel are conveyed through said tunnel towards said dispensing opening by the action of the force of gravity. The exiting tablet makes space in said tunnel for another tablet coming through said aperture from said storage chamber.

Said dispensing opening may preferably comprise a closure. Said closure allows to close said dispensing opening such that said tablets (1) located in said tunnel (21) may be prevented to fall outside said package when said package is not in use. Said closure may be chosen by any person skilled in the art. A preferred closure is a cover hinged to said package which enables the opening and closing of said dispensing opening.

As a preferred option, said top wall (14) of said storage chamber (19) comprises a refilling opening. Said refilling opening allows to refill said storage chamber with new detergent tablets (1) once said package is emptied. Therefore, the dimension of said refilling opening corresponds at least to the dimension of a tablet. As a preferred option, said refilling opening is closed by a closure.

As a further preferred option, said storage chamber (18) and said tunnel (21) can be separated parts which can be put or connected together to form the package (10) according to the present invention. In the case of the package of Figure 1a, for example, said tunnel with said end wall (19) and said aperture (20) may be put on the storage chamber opposite said top wall (14) as a lid after said storage chamber has been filled or refilled. In this case said end wall (19) with said aperture (20) is preferably part of said storage chamber. As an alternative option, said end wall with said aperture may be opened like a lid such that said storage chamber can be filled and/or refilled with said tablets (1). Another possibility is to completely replace an empty storage chamber with a tablets filled storage chamber. In this case, said end wall with said aperture may be part of the storage chamber or said tunnel. The same principle can be correspondingly applied to the packages of Figure 5a to 5c.

As a further preferred option, said refilling opening and/or said dispensing opening (12) may be provided with a child resistant closure. Said child resistant closure is adapted to prevent the removal of said tablet (1) through said openings by infants and children. In particular, as used herein, the wording "child resistant closure" refers to any mechanism whereby access to the tablet is reduced so that the tablet cannot be readily removed, especially by infants and children. An example of a child resistant closure is a closure on which the user has to apply a double or coordinated action on said closure to open said closure. For example, such child resistant closures are press-and-turn or press-and-pull closures known by the person skilled in the art.

Preferably, said container (10) is made of thermoplastic material. Such thermoplastic materials have been extensively described in the art and include vinyl chloride based resins, polymers and co-polymers derived from olefins, acrylic polymers and co-polymers, polyethylene, polypropylene, polystyrene, polyethylene terephthalate, polyethylene terephthalate glycol, or mixtures thereof. Said container can be made of single or multi-layer extrusion of such materials. It can also comprise recycled thermoplastic materials. A preferred thermoplastic material used herein is polyethylene. Preferably said package is made of low cost thermoplastic material such as polypropylene and formed by injection moulding.

Claims

1. A package containing and dispensing tablets (1) comprises the following:

   (a) a storage chamber (18) in which a plurality

of said tablets are stored inside said package;

(b) a tunnel (21) further comprising a dispensing opening (12);

(c) an end wall (19) dividing said storage chamber from said tunnel, said end wall comprising an aperture (20) through the thickness of said end wall interconnecting said storage chamber and said tunnel and introducing said tablets one by one from said storage chamber into said tunnel;

characterised in that the internal width (W) of said storage chamber is limited to a width which is smaller than the largest dimension of said tablets, whereby said tablets are ordered into one or more rows in said storage chamber.

2. A package according to claim 1 characterised in that said storage chamber (18) comprises dividers (22) separating parallel rows of tablets (1) from each other.

3. A package according to claim 2 characterised in that end wall (19) comprises more than one aperture (20) through the thickness of said end wall.

4. A package according to any of claims 2 and 3 characterised in that said package comprises more than one tunnel (21) connected to different parallel rows separated by said dividers (22).

5. A package according to any of the preceding claims characterised in that said end wall (19) comprises a barrier wall (24).

6. A package according to any of the preceding claims characterised in that said tunnel (21) further comprises an inclined or curved ramp (23).

7. A package according to any of the preceding claims characterised in that said dispensing opening (12) is located opposite to said aperture (20).

8. A package according to any of the preceding claims characterised in that said dispensing opening (12) comprises a closure.

9. A package according to claim 8 characterised in that said closure of said dispensing opening (12) is a child resistant closure.

10. A package according to any of the preceding claims characterised in that said storage chamber (18) comprises a refilling opening.

11. A package according to claim 10 characterised in that said refilling opening further comprises a closure.

12. A package according to claim 11 characterised in that said closure of said refilling opening is a child resistant closure.

13. A package according to any of the preceding claims characterised in that said storage chamber (19) and said tunnel (21) are separated parts which can be connected together to form said package (10).

14. A package according to claim 13 characterised in that said end wall (19) is part of said tunnel (21), or said end wall (19) is part of or connected to said storage chamber.

15. A package according to any of the preceding claims characterised in that said tablets (1) are made of a detergent composition.

16. A package according to any of the preceding claims characterised in that said tablets (1) have a cylindrical shape.

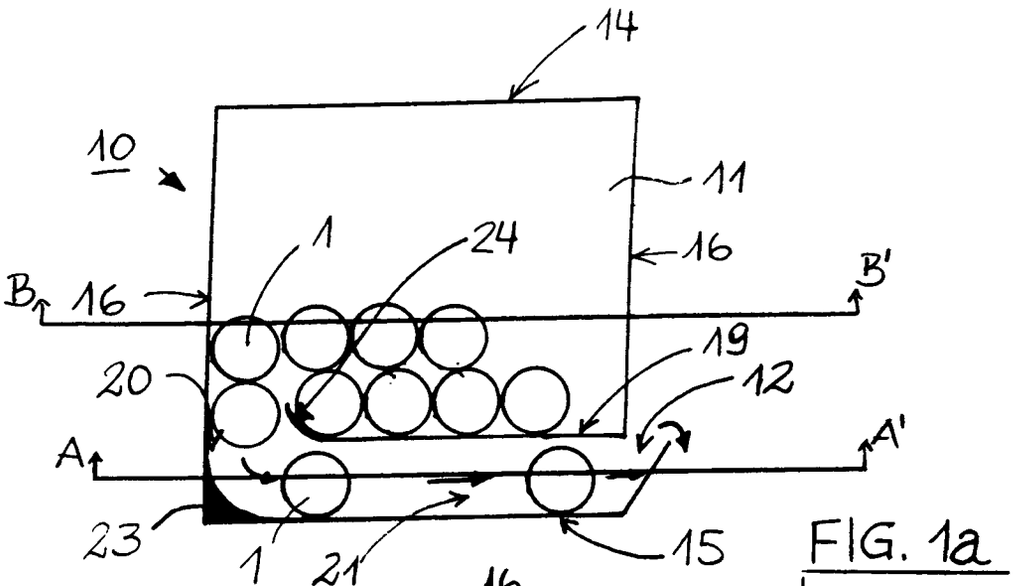

FIG. 1a

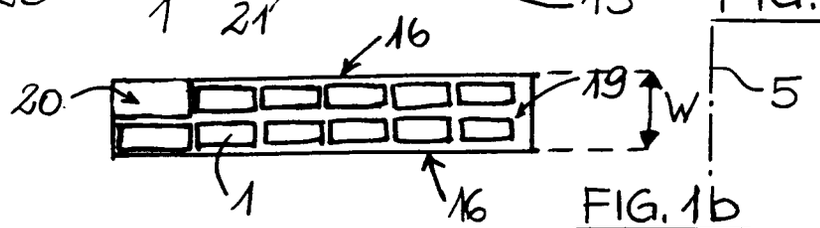

FIG. 1b

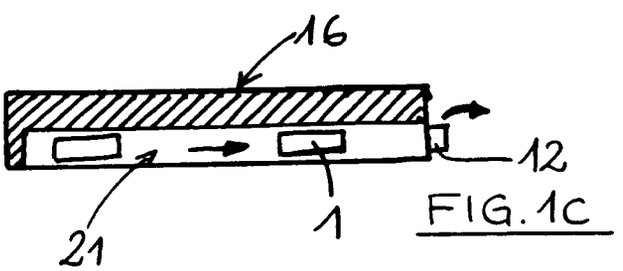

FIG. 1c

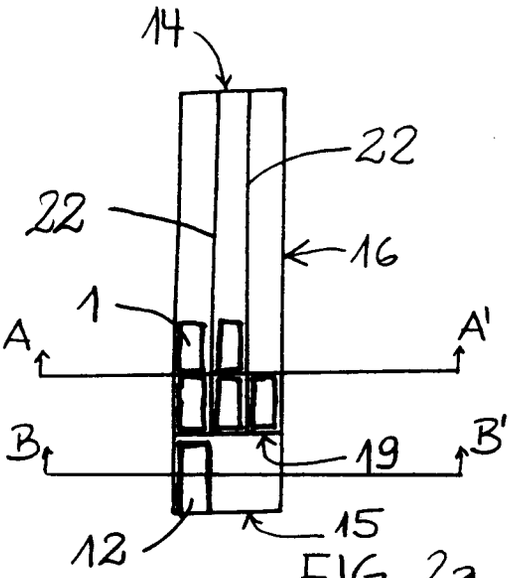

FIG. 2a

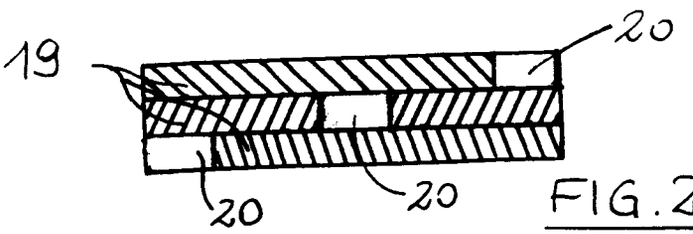

FIG. 2b

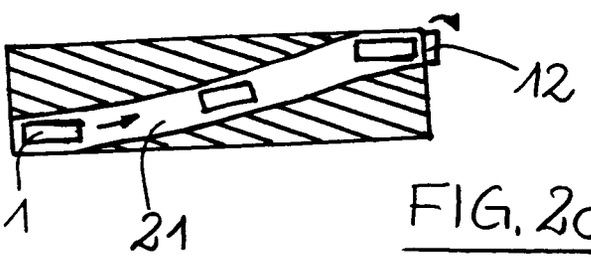

FIG. 2c

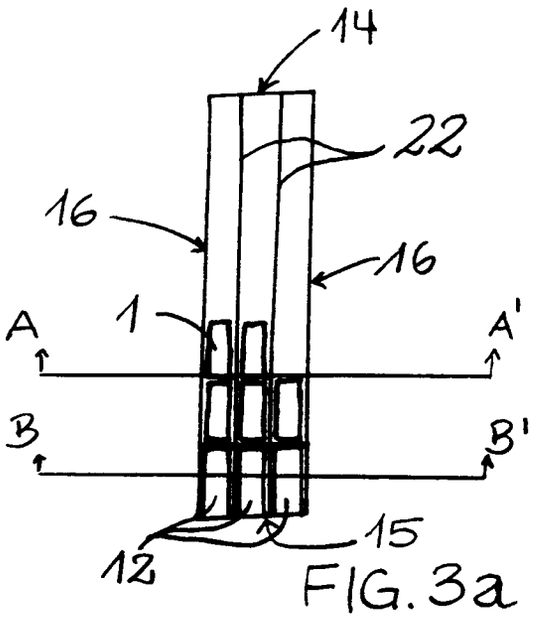

FIG.3a

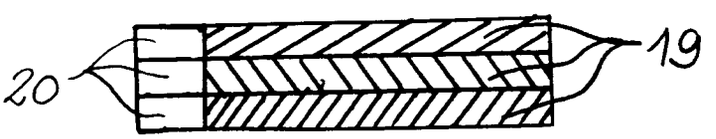

FIG.3b

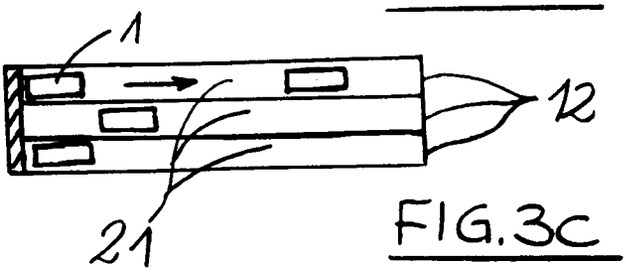

FIG.3c

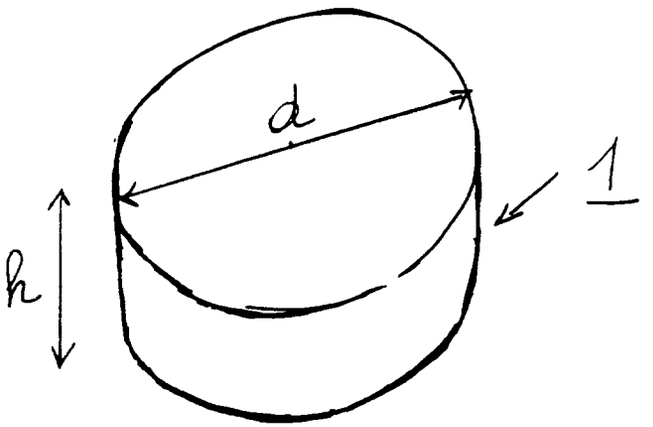

FIG. 4a

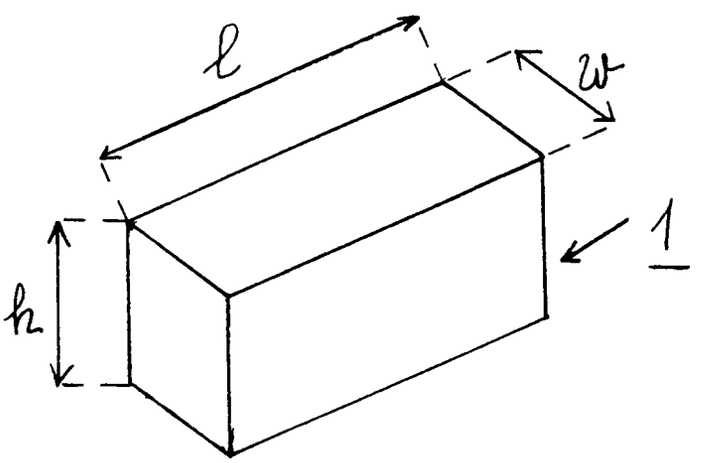

FIG. 4b

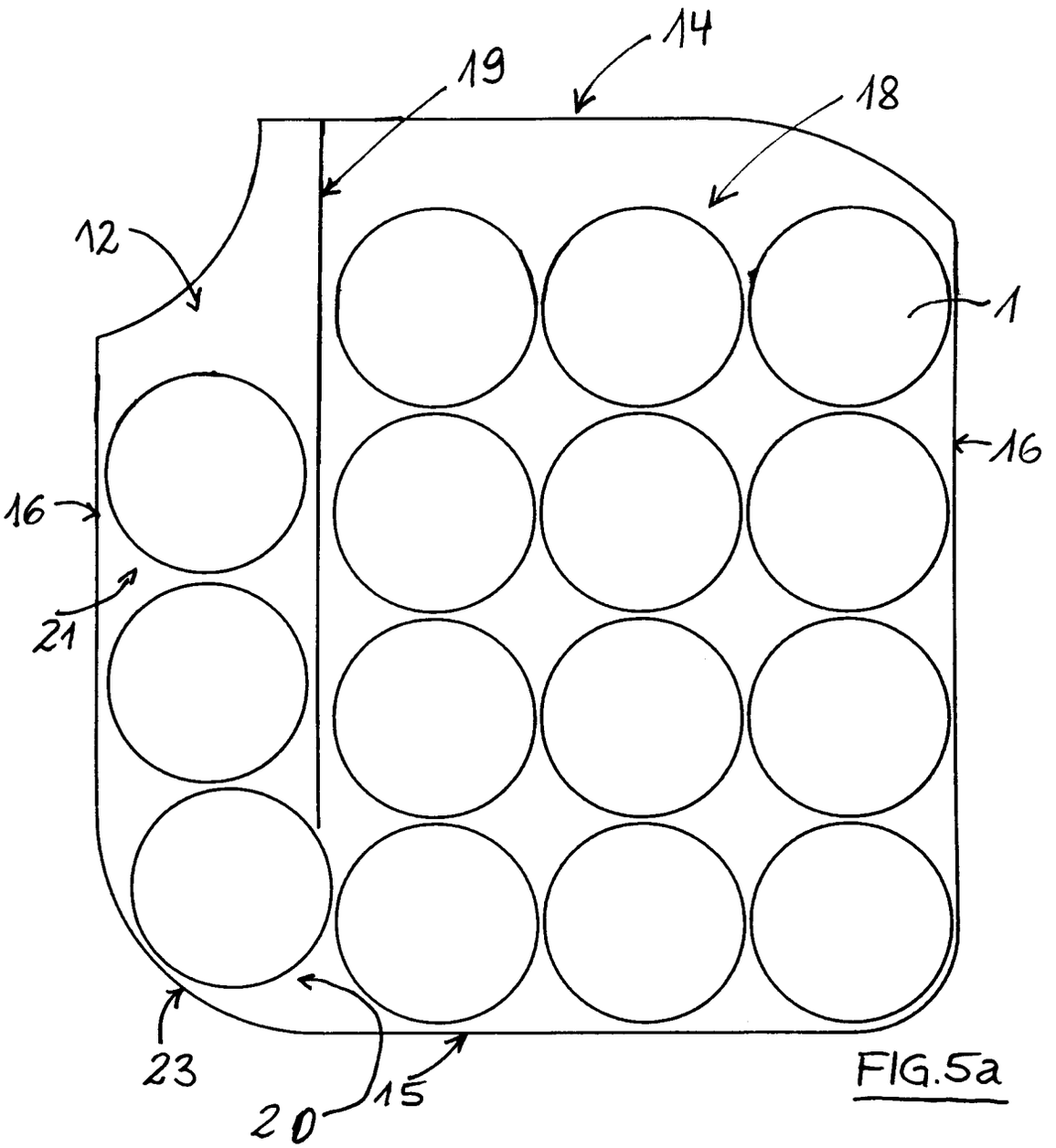

FIG.5a

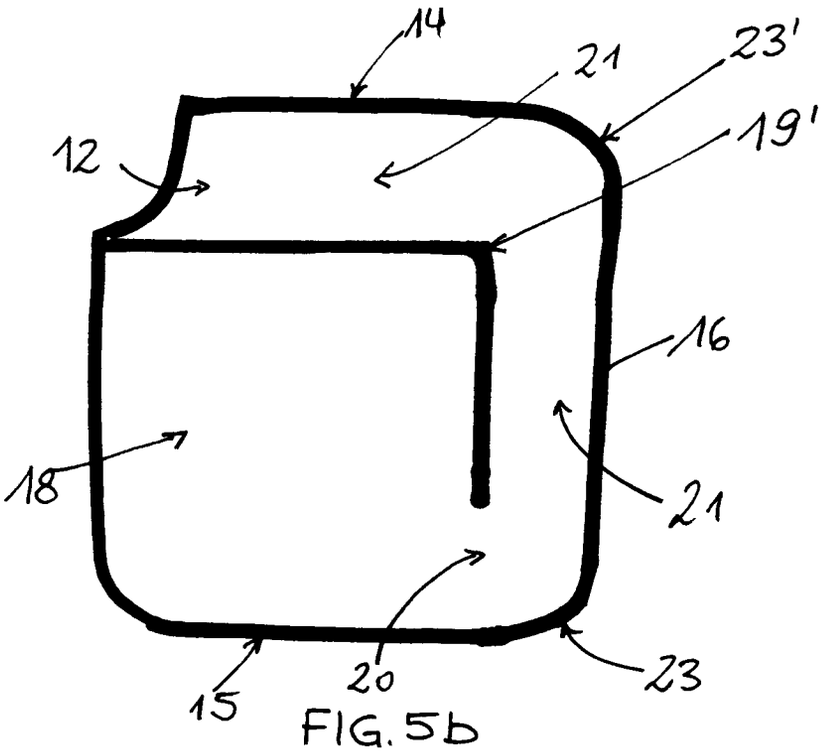

FIG. 5b

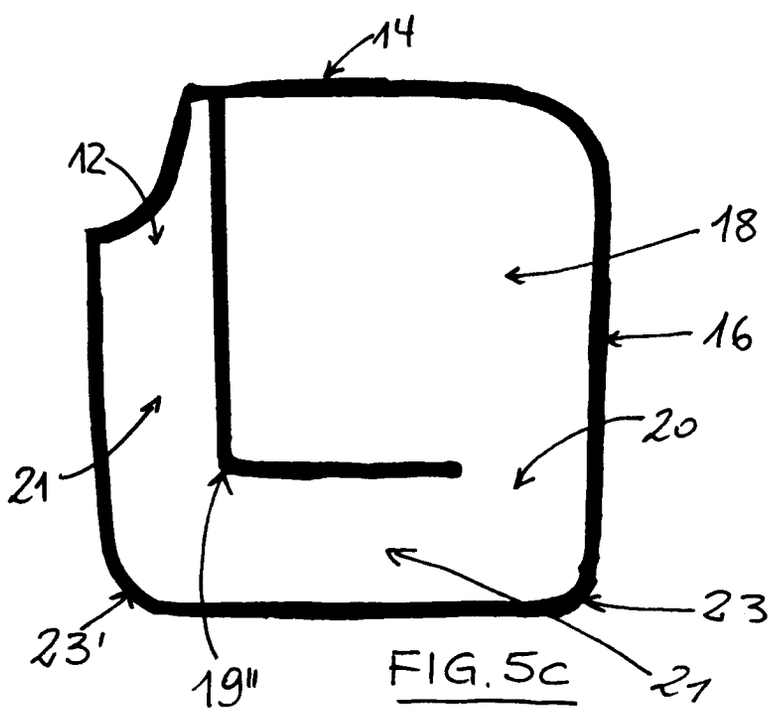

FIG. 5c

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 8919

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB-A-893 778 (HICKLING) * the whole document *	1,7,8,16	B65D83/04
X	DE-A-37 41 960 (WISCHERATH) * the whole document *	1-4,7,8, 10,11,16	
X	FR-A-989 125 (NICOLLE) * page 2, column 1, line 53 - page 3, column 1, line 27 * * page 3, column 2, line 24 - line 37 * * page 3, column 2, line 54 - page 4, column 1, line 25; figures 1-20 *	1,7,8, 10,11,16	
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TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 December 1996	Martens, L

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