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(54) **A FOLDABLE PACKAGE FOR USE IN A PARCEL DISTRIBUTION SYSTEM AND USE THEREOF**

(57) A foldable package (10) for use in a parcel distribution system, the foldable package (10) comprising

- a base (20), an opposite lid (30) and one or more walls (40) extending between the base (20) and the lid (30) defining an internal space (12), wherein the lid (30) comprising
- a closable opening (32) for enabling access to the internal space (12), the closeable opening (32) being closable by one or more fasteners (50);

- a tag pocket (14) for storing a tag (16), wherein the foldable package (10) has
- an open state (100), where the internal space (12) is accessible through the closeable opening (32); and
- a closed state (200), where the closeable opening (32) is closed by the one or more fasteners (50) and the internal space (32) is inaccessible;

wherein the one or more walls (40) are collapsible such that the internal space (32) is variable between

- a minimum volume, where the distance between the base (20) and lid (30) are minimized; and
- a maximum volume, where the distance between the base (20) and lid (30) are maximized; while the foldable package (10) is in the closed state (200).

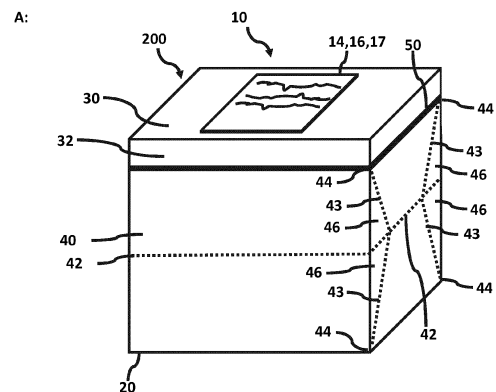


Fig. 1

Description

Field of the Invention

[0001] The present invention relates to a foldable package for use in a parcel distribution system for transportation of items to a recipient. The present invention includes the use of the foldable package in a parcel distribution system. The foldable package being reusable in the parcel distribution system without the need for recycling one or more parts.

Background of the Invention

[0002] The number of parcels globally is increasing year by year and presently cardboard is used for constructing the parcels as it is a relatively cheap material with proper material properties for transportation. However, the material is in general used once before part of the cardboard is recycled.

[0003] Thus, the carbon footprint stemming from cardboard use in the parcel distribution industry is too high and there is an increased focus on finding alternative solutions.

[0004] LivingPackets proposes a collapse package of expanded polystyrene including a computer with additional features in an attempt to offset the increased costs of the package. The package has single fixed volume during transportation and thus in most cases there will be additional costs simply due to the transportation of air.

[0005] Returnity (US) proposes various reusable bags and packages which can be reused a multiple number of times. The bags or packages have a transportation state with a fixed volume and if the item to be shipped is smaller than the box, then there will be additional costs simply due to the transportation of air.

[0006] Limeloop also proposes various reusable packages which can be reused a multiple number of times. The package has a transportation state with a fixed volume and if the item to be shipped is smaller than the box, then there will be additional costs simply due to the transportation of air.

[0007] These packages are to be reused several times and rarely will the item or items to be shipped match. In many cases, these packages must be used more than 20 times to be able to compete with the cost of cardboard. Furthermore, CO₂-wise, the most efficient distribution system would be a decentralized system where the reusable packages are not required to return to the sender but instead can flow freely between various couriers, recipients and senders. In such a decentralized system the item and package will rarely fit, and thus there will be a greater waste due to transportation of air.

[0008] Thus, there is a need for an item-adaptable, foldable package which can be reused a number of times before repair or recycling. Thereby, transportation costs can be reduced compared to the prior art solutions.

Object of the Invention

[0009] It is an object of the invention to provide a foldable package which can be reused a number of times while adapting to the item to be shipped inside the foldable package.

Description of the Invention

[0010] An object of the invention is achieved by a foldable package for use in a parcel distribution system. The foldable package comprises a base, an opposite lid and one or more walls extending between the base and the lid defining an internal space. The lid comprises a closable opening for enabling access to the internal space, the closeable opening being closable by one or more fasteners. The foldable package comprises a tag pocket for storing a tag.

[0011] The foldable package has

- an open state, where the internal space is accessible through the closeable opening; and
- a closed state, where the closeable opening is closed by the one or more fasteners and the internal space is inaccessible.

[0012] The one or more walls are collapsible while the foldable package is in the closed state, such that the internal space is variable between

- a minimum volume, where the distance between the base and lid is minimized; and
- a maximum volume, where the distance between the base and lid is maximized.

[0013] The closeable opening is closeable by one or more reversible fasteners, such that the foldable package can be reused several times without any additional work such as removal of an overlapping stamp or adhesive tape. The reversible fastener may be slide fasteners which allow several hundreds, if not thousands, of openings and closings before failure.

[0014] The foldable package has an open state where the one or more fasteners are not used or connected such that the internal space is accessible through the closeable opening. Thereby, a user can collect or place an item in the internal space. In the closed state, the closeable opening is closed by the one or more fasteners and the internal space is inaccessible. In some embodiments, the foldable package may be equipped with a one-use seal, which the recipient breaks before opening, however this is not required.

[0015] The closeable opening may be the lid, such that opening of the closeable opening is equivalent to opening the lid, which lid may be pivotally attached. The closeable opening may be a sub-part of the lid.

[0016] The present foldable package being special by the walls being collapsible, while the foldable package is

in the closed state, such that the internal space is variable between a minimum volume and a maximum volume. This reduces the cost of transportation as more packages can be stored in the same space compared to the prior art solution cited in the background of the invention. The cited prior art has, in most cases, a collapsed state where the purpose is to return the package without an item to the original sender. Thus, those solutions are not suitable for a decentralised package system where a foldable package may never return to the first sender of the package. These solutions are desperate to reduce volume to reduce the cost of returning the package. Furthermore, their solution requires twice as much handling as the package must be sent forth and returned.

[0017] The present invention minimizes the volume of the package at all stages due to the wall being collapsible, while the foldable package is in the closed state. Thus, the item stored in the internal space will at least partly support the lid during transportation.

[0018] In a preferred embodiment, the base comprises a planar base rigid element as it improves the stackability of the foldable package. In another preferred embodiment, the lid comprises a planar lid rigid element as it improves the stackability of the foldable package. In a most preferred embodiment, the base comprises a planar base element and the lid comprises a planar lid rigid element as this improves the stackability of the foldable package. Thus, the item stored in the internal space will at least partly support the lid during transportation, and this will be more plane in the case of the foldable package comprising the planar base rigid element and/or planar lid rigid element.

[0019] The lid and the base are preferably parallel when the distance is minimized or maximised. The shape of the foldable package between the two extremes may in some embodiments be rather uncontrollable thus in between the extremes the lid and the base may be parallel.

[0020] Thus, the package is preferably a mathematical cylinder with one or more walls, such as four walls.

[0021] The embodiment with four walls is preferably designed such that neighbouring walls are substantially perpendicular, and the opposite wall is substantially parallel.

[0022] The closeable opening may define an opening edge, which opening edge is complementary to a body edge, wherein the one or more fasteners are configured to keep the opening edge and the body edge together when the foldable package is in the closed state. At least one of the fasteners may be a slide fastener with teeth attached to the opening edge and the body edge, and the slide fastener including a slider for reversible forming and unforming a chain from the teeth.

[0023] In an aspect, each wall may include a main fold line substantially parallel to the other main fold lines and positioned at substantially the same height relative to the base, wherein two opposing walls further comprises angled fold lines extending from vertices towards or to the main fold line of said wall, thereby defining four right-

angled triangles. The main fold lines and angled fold lines define the collapse of the walls, such that the walls collapse inwardly unless manipulated during the collapse.

5 **[0024]** In an aspect, the four right-angled triangles may comprise complementary rigid plane elements positioned in pockets. The rigid plane elements will increase the control of the collapse since the rigid element will not fold when the elements will pivot inwardly. In the cases
10 where the item or items to be transported have a given width then the elements may collapse until the elements touch the item or items. Thereby, the collapsed foldable package will act as a cushion against impacts from the side.

15 **[0025]** The two opposite walls without angled fold lines may also comprise rigid plane elements in pockets above and/or below the main fold line.

[0026] In addition to the four right-angled triangles with rigid plane elements, the respective walls may also comprise a trapezoid shaped pocket above and below the main fold line of said wall. The trapezoid shaped pocket may also comprise one or more complementary rigid plane elements. Thereby, the wall will be rigid with the exception of the main fold lines and the angled fold lines,
20 this will further increase the control over the collapse, where the lid will collapse down towards or onto the item or items. The collapse also becomes more predictable i.e. the foldable package will collapse in the same manner.

[0027] In an aspect, each wall may include a main fold line substantially parallel to the other main fold lines and positioned at substantially the same height relative to the base, wherein two opposing walls comprise angled fold lines extending from vertices towards an end of the main fold line of said wall, thereby defining two opposing triangles having one triangle edge substantially being the edge of the package. The two opposing triangles may comprise complementary rigid plane elements positioned in pockets, each of said complementary rigid plane elements comprising a material weakness along a break line, said break lines being substantially in the same plane as the main fold lines.
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[0028] In this embodiment, the two opposing walls substantially have fold lines forming double "Y"-shapes towards each vertical edge of the wall. The break line made of a material weakness ensures a controlled collapse of the foldable package. The break line may be due to thinner material or due to a series of perforations weakening the rigid plane element.
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[0029] The two opposite walls without angled fold lines may also comprise rigid plane elements in pockets above and/or below the main fold line.
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[0030] In an aspect, the two opposing walls with the triangles may further include two trapezoid faces, the trapezoid faces being equipped with one or more rigid plane elements in pockets. This will further increase the controllability of the foldable package when the foldable package collapses. The collapse becomes more predictable i.e. the foldable package will collapse in the same
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manner.

[0031] In an aspect, the walls are made of a recyclable plastic or fabric. The recyclable plastic can be recycled to form new walls in another foldable package. Similarly, fabric such as cloth has excellent wear resistance and can be recycled. The before mentioned pockets can easily be formed in recyclable plastic, but it is very easy to form in fabric such as cloth.

[0032] The rigid elements in the pockets may be made of a different material than fabric such as a metal, or plastic, such as polystyrene, polycarbonate, Polyethylene Terephthalate, High-Density Poly-ethylen, Polyvinyl Chloride, Polypropylene or similar. Since the rigid elements are placed in pockets then the parts can easily be separated and reused without or with limited material mixing.

[0033] Preferably the lid and base are also made of the same recyclable plastic or fabric as the walls. Likewise, the planar base rigid element and the planar lid rigid element is made of metal, or plastic such as polystyrene, polycarbonate, Polyethylene Terephthalate, High-Density Polyeth-ylen, Polyvinyl Chloride, Polypropylene or similar.

[0034] In an aspect, the fold lines are defined by stitching. The stitching can be performed while forming the pockets by stitching together two layers of fabric or two layers of recyclable plastic.

[0035] In an aspect, wherein the one or more fasteners are chosen among

- one or more slide fastener; and/or
- one or more buttons; and/or
- hook and loop tape; and/or
- a permanent magnet interacting with other magnetic material.

[0036] All of the above-mentioned fasteners are reversible and can be locked and unlocked more or less indefinitely. The foldable package may comprise fasteners of different types.

[0037] The fasteners will in most cases have one part on the closeable opening and another part on the foldable package not forming part of the opening such as the lid, the base and/or the one or more walls. As an example, the hooks may be positioned on the closeable opening and the loops are positioned on another part on the foldable package or vice versa such that the opening edge and the body edge are kept together when the foldable package is in the closed state.

[0038] In an aspect, the foldable package includes one or more flaps extending between the closable opening and

- the lid, and/or
- the base, and/or
- the one or more walls,

wherein the one or more flaps includes at least one of the

fasteners. Thereby, the flaps can be used to close the closeable opening or provide an additional layer of protection in order to prevent an accidental opening of the package due to an impact from another package or element.

[0039] In an aspect, the one or more fasteners of the closable opening include a slide fastener, and the one or more flaps includes at least one flap configured to extend across the slide fastener. This enables that the slide or the slides of the slide fastener are kept in place by the flap during transportation, where the slide or slides are positioned below the flap or flaps. Tests have shown that hook and loop tape is particularly good at securing the slide or slides but a button or permanent magnet interacting with other magnetic material also works.

[0040] The flap may include hook and loop tape and permanent magnet interacting with other magnetic material where the fasteners are used together.

[0041] The flap will have either the hook or loop and engage the complementary part on the surface of the foldable package.

[0042] In an aspect, the at least one flap comprises hook or loops for engaging loops or hooks positioned on the lid or one of the walls.

[0043] In an aspect, the at least one flap comprises hook or loops for engaging loops or hooks positioned on the base, wherein the foldable package comprises

- a compressed state, where the closeable opening is closed by the one or more fasteners and the internal space is inaccessible and the at least one flap is connected to the base.

[0044] The compressed state can be used during storage of the foldable package or when sending items with a size only requiring the minimum volume or requiring close to the minimum volume such that the at least one flap may still reach the complementary part of the hook and loop. This is especially useful for the embodiment of the foldable package with rigid elements as the internal space will form a minimum volume as shown in figure 5.

[0045] In an aspect, the at least one flap comprises a width of 3.5 cm to 11 cm, or 5 to 9 cm, or 7-8 cm. Thereby, the at least one flap will be able to protect other fasteners such as slide fasteners or buttons or permanent magnet interacting or other magnetic material.

[0046] In an aspect, the foldable package includes a smart tag positioned inside the tag pocket. A smart tag comprising a processor, a computer-readable medium and a communication unit will add additional functionalities to the foldable package.

[0047] An object of the invention is achieved by use of a foldable package according to any of the claims 1 to 13 for distribution of an item in a parcel distribution system, wherein the item stored in the internal space supports the lid during transportation.

[0048] An object of the invention is achieved by use of a foldable package according to any of the preceding

claims 1 to 13 in a parcel distribution system, wherein the foldable package is in the compressed state during a return trip.

Description of the Drawing

[0049] Embodiments of the invention will be described in the figures, whereon:

- Fig. 1 illustrates two embodiments of the foldable package with different lids;
- Fig. 2 illustrates a foldable package in the open state;
- Fig. 3 illustrates two types of walls used in the foldable package;
- Fig. 4 illustrates images of the two types of walls of figure 3;
- Fig. 5 illustrates the internal space of the foldable package, when the volume is minimized;
- Fig. 6 illustrates the two embodiments of figure 1 with a flap;
- Fig. 7 illustrates a tag pocket on the lid;
- Fig. 8 illustrates a third embodiment of the foldable package with and without a flap; and
- Fig. 9 illustrates a foldable package in the compressed state.

Detailed Description of the Invention

Item	No
Foldable package	10
Internal space	12
Tag pocket	14
Tag	16
Smart tag	17
Base	20
Lid	30
Closable opening	32
Wall	40
Main fold line	42
Angled fold lines	43
Vertices	44
Right-angled triangles	46
Opposing triangles	48
Fastener	50
Slide fastener	52
Flap	60
Open state	100
Closed state	200
Compressed state	300

[0050] Fig. 1 illustrates two embodiments of the foldable package 10 with different lids 30.

[0051] Figure 1A discloses a foldable package 10, which comprises a base 20, an opposite lid 30 and four walls 40 extending between the base 20 and the lid 30 defining an internal space 12. The foldable package 10 is substantially box shaped. Only two walls 40 are shown, however the two not shown walls are substantially similar to the two shown walls 40. The four walls 40 are paired such that opposite walls are substantially similar.

[0052] The lid 30 comprises a closable opening 32 for enabling access to the internal space 12, the closable opening 32 being closable by one or more reversible fasteners 50 such as one or more slide fastener 52, and/or one or more buttons, and/or hook and loop tape, and/or a permanent magnet interacting with other magnetic material. The reversibility enables the package to be reused several times such as hundred or thousand times before the foldable package 10 must be recycled.

[0053] The lid 30 further comprises a tag pocket 14 for storing a tag 16 such as a smart tag 17 with a controller, processor for controlling a display or for reading sensor data or similar. The tag pocket 14 can be positioned on the outer side of the lid 30 or the inner side of the lid 30. If positioned on the inner side of the lid 30 then the lid 30 may comprise a transparent foil to make the tag 16 or smart tag 17 visually readable.

[0054] In the shown embodiment the closable opening 32 is closed and thus, the foldable package 10 is in the closed state 200. Figure 2 shows an embodiment of the foldable package, which could be identical to the embodiment shown in figure 1A, where the closable opening 32 is open and in that case the foldable package 10 is in an open state 100, where the internal space 12 is accessible through the closable opening 32. Thus, the foldable package 10 has the open state 100, where the internal space 12 is accessible through the closable opening 32; and the closed state 200, where the closable opening 32 is closed by the one or more fasteners 50 and the internal space 32 is inaccessible.

[0055] The four walls 40 are collapsible while the foldable package 10 is in the closed state 200 as shown in figure 3 and figure 4. Thereby, the internal space 32 is variable between a minimum volume, where the distance between the base 20 and lid 30 are minimized; and a maximum volume, where the distance between the base 20 and lid 30 are maximized. The volume of the foldable package is then decided by the one or more items stored inside the internal space 12. Each of the four walls 40 include a main fold line 42 substantially parallel to the other main fold lines 42 and positioned at substantially the same height relative to the base 20. Two opposing walls 40 further comprise angled fold lines 43 extending from vertices 44 towards or to the main fold line 42 of said wall 40, thereby defining four right-angled triangles 46. The figure 1A only shows one of the opposing walls.

[0056] The four right-angled triangles 46 comprise complementary rigid plane elements positioned in pock-

ets. The two trapezoid faces also comprise complementary rigid plane elements positioned in pockets. The two opposing walls 44 with a main fold line 42 may also comprise two complementary rigid plane elements positioned in pockets. This ensures that the foldable package 10 collapses in a controlled manner. In fact, the foldable package 10 will due to these features have a bias to collapse inwardly such that the foldable package 10 cross section does not increase.

[0057] The lid and the base may also include rigid plane elements positioned in pockets for making the foldable package 10 more rigid as this makes collapsing more controllable.

[0058] The walls 40 are made of a recyclable plastic or fabric such as cloth. Preferably the lid and base are also made of plastic or fabric such as cloth. The fold lines 43, 48 may be defined by stitching.

[0059] Figure 1B differs from the embodiment shown in figure 1A by the closeable opening 32 and one or more fasteners 50 are positioned at the top face of the foldable package 10. The embodiment of the foldable package 10 in Figure 1B has all the same features of figure 1A for the same reasons.

[0060] Fig. 2 illustrates a foldable package 10 in the open state 100 which foldable package comprises a base 20, an opposite lid 30 and four walls 40 extending between the base 20 and the lid 30 defining an internal space 12. The foldable package 10 is substantially box shaped. Only two walls 40 are shown, however the two not shown walls are substantially similar to the two shown walls 40. The four walls 40 are paired such that opposite walls are substantially similar.

[0061] The lid 30 comprises a closable opening 32 for enabling access to the internal space 12, the closeable opening 32 being closable by one or more reversible fasteners 50, such as one or more slide fastener 52, and/or one or more buttons, and/or hook and loop tape, and/or a permanent magnet interacting with other magnetic material. The reversibility enables the package to be reused several times such as hundred or thousand times before the foldable package 10 must be recycled.

[0062] The lid 30 further comprises a tag pocket 14 (not shown) for storing a tag 16, such as a smart tag 17 with a controller, processor for controlling a display or for reading sensor data or similar. The tag pocket 14 can be positioned on the outer side of the lid 30 or the inner side of the lid 30. If positioned on the inner side of the lid 30 then the lid 30 may comprise a transparent foil to make the tag 16 or smart tag 17 visually readable.

[0063] In the shown embodiment the closeable opening 32 is open and thus, the foldable package 10 is in the open state 100. Figure 1 shows an embodiment of the foldable package, which could be similar to the embodiment shown in figure 2, where the closeable opening 32 is closed and in that case the foldable package 10 is in a closed state 200, where the internal space 12 is inaccessible through the closeable opening 32. Thus, the foldable package 10 has the open state 100, where the

internal space 12 is accessible through the closeable opening 32; and the closed state 200, where the closeable opening 32 is closed by the one or more fasteners 50 and the internal space 32 is inaccessible.

[0064] Each of the four walls 40 include a main fold line 42 substantially parallel to the other main fold lines 42 and positioned at substantially the same height relative to the base 20. Two opposing walls 40 comprises angled fold lines 42 extending from vertices 44 towards an end of the main fold line 42 of said wall 40, thereby defining two opposing triangles 48 having one triangle edge substantially being the edge of the package 10, wherein the two opposing triangles 48 comprise complementary rigid plane elements positioned in pockets 49, each of said complementary rigid plane elements comprising a material weakness along a break line, said break lines being substantially in the same plane as the main fold lines 42. Thereby, the collapse becomes more controllable.

[0065] The two opposing triangles 48 comprises complementary rigid plane elements positioned in pockets. The two trapezoid faces also comprise complementary rigid plane elements positioned in pockets. The two opposing walls 44 with a main fold line 42 may also comprise two complementary rigid plane elements positioned in pockets. This ensures that the foldable package 10 collapses in a controlled manner. In fact, the foldable package 10 will due to these features have a bias to collapse inwardly such that the foldable package 10 cross section does not increase.

[0066] The lid and the base may also include rigid plane elements positioned in pockets for making the foldable package 10 more rigid as this makes collapsing more controllable.

[0067] The walls 40 are made of a recyclable plastic or fabric, such as cloth. Preferably the lid and base are also made of plastic or fabric, such as cloth. The fold lines 43, 48 may be defined by stitching.

[0068] Fig. 3 illustrates two types of walls 40 used in the foldable package 10. Figures 3A-3B disclose a wall with a main fold line 42 and the wall 40 further comprises angled fold lines 43 extending from vertices 44 towards the main fold line 42 of said wall 40, thereby defining four right-angled triangles 46. The four right-angled triangles 46 comprise complementary rigid plane elements positioned in pockets. The two trapezoid faces also comprise complementary rigid plane elements positioned in pockets. Thereby, the wall 40 can collapse from fig. 3A to fig. 3B and be manipulated back to figure 3A. This can be performed while the foldable package 10 is in the closed state 100.

[0069] Figures 3C-3D disclose a wall with a main fold line 42. The main fold line 42 defines two faces which comprise complementary rigid plane elements positioned in pockets. Thereby, the wall 40 can collapse from fig. 3C to fig. 3D and be manipulated back to figure 3C. This can be performed while the foldable package 10 is in the closed state 100.

[0070] Fig. 4 illustrates images of the two types of walls

40 of figure 3 from a perspective view while the foldable package 10 is in the closed state 200. The foldable package 10 comprises a base 20, an opposite lid 30 and four walls 40 extending between the base 20 and the lid 30 defining an internal space 12 (not shown). The foldable package 10 is substantially box shaped. The foldable package 10 comprises two opposing walls 40 as shown in figures 4A-B and two opposing walls 40 as shown in figures 4C-D. The lid 30 comprises a fastener 50 in the form of a slide fastener 52.

[0071] Figures 4A-4B disclose the wall 40 with a main fold line 42 and the wall 40 further comprises angled fold lines 43 extending from vertices 44 towards to the main fold line 42 of said wall 40, thereby defining four right-angled triangles 46 - the fold lines 42, 43 are shown with dotted lines. The four right-angled triangles 46 comprise complementary rigid plane elements positioned in pockets. The two trapezoid faces also comprise complementary rigid plane elements positioned in pockets. Thereby, the wall 40 can collapse from fig. 4A to fig. 4B and be manipulated back to figure 4A. This can be performed while the foldable package 10 is in the closed state 100.

[0072] Figures 4C-4D discloses a wall with a main fold line 42. The main fold line 42 defines two faces which comprise complementary rigid plane elements positioned in pockets. Thereby, the wall 40 can collapse from fig. 4C to fig. 4D and be manipulated back to figure 4C. This can be performed while the foldable package 10 is in the closed state 100.

[0073] Fig. 5 illustrates the internal space 12 of a foldable package 10, when the volume is minimized. The foldable package may be any of the embodiments shown in figures 1 to 4. The foldable package collapses inwardly and thus forms a smaller volume.

[0074] Fig. 6 illustrates the two embodiments of figure 1 with a flap 60. Thus, both embodiments may include all the features described for figure 1. In the shown embodiments, the flap 60 extend from the closeable opening 32 to one of the walls 40. The embodiments are each shown with one flap 60, however the foldable package can comprise two flaps 60, or three flaps 60 or more flaps 60. The flap 60 comprises at least one fastener 50 (not shown). The flap 60 may comprise one or more slide fasteners 52, and/or one or more buttons, and/or, hook and loop tape, and/or a permanent magnet interacting with other magnetic material or a combination.

[0075] It is implicit that in the case where the flap comprises hook and loop tape, the mating surface on the foldable package 10 will have the complementary part to the hooks or loops on the fastener 60.

[0076] In some embodiments the closeable opening comprises a slide fastener 32 - this may be the case for both embodiments. In this case the flap 60 may include at least one flap 60 configured to extend across the slide fastener 32. This allows the slide fastener to be protected by the flap during transportation and thereby the risk of being opened is lowered significantly. The flap 60 may have a width of 3.5 cm to 11 cm, or 5 to 9 cm, or 7-8 cm.

[0077] Fig. 7 illustrates a tag pocket 14 on the lid 30. Figure 7A discloses an embodiment of the lid 30 seen from the outside while figure 7B discloses internal space facing side of the lid 30. The lid 30 may include a flap 60 as shown.

[0078] The embodiment in figure 7A has a tag pocket 14 which may be fitted with a tag 16 or a smart tag 17. The tag 16 may be a paper or may be a paper with an adhesive. The smart tag 16 may comprise a processor, computer readable medium with one or more programs stored thereon. The smart tag 17 may include a display or a communication device for providing information to the recipient and/or the courier. This information may include the same information as a standard paper tag but it may also include additional information collected by one or more sensors.

[0079] Figure 7B discloses an embodiment wherein the tag pocket 14 is positioned on the internal space facing side of the lid 30. This is usually the solution when using a relative expensive smart tag 17 compared to the paper tag 16.

[0080] Fig. 8 illustrates a third embodiment of the foldable package 10 with (8A) and without a flap (8B). The third embodiment differs from the embodiments shown in figure 1 by the closeable opening 32 not being the entire lid 30.

[0081] Thereby the closeable opening 32 may include a flap 30 extending from the closeable opening 32 to another part of the lid 30 as shown. The flap 60 may comprise one or more slide fasteners 52, and/or one or more buttons, and/or, hook and loop tape, and/or a permanent magnet interacting with other magnetic material or a combination.

[0082] Fig. 9 illustrates a foldable package 10 in the compressed state 300. The foldable package 10 has a flap 60 extending from the lid 30 to the base 20. Thereby, the foldable package 10 is prevented from increasing the volume of the internal space.

[0083] The foldable package 10 may include two flaps 60, or three flaps 60, or more flaps 60 extending from the lid 30 to the base 20 when the foldable package 10 is in the compressed state 300.

[0084] The flap 60 may comprise one or more slide fasteners 52, and/or one or more buttons, and/or, hook and loop tape, and/or a permanent magnet interacting with other magnetic material or a combination. In this embodiment, the base 20 must have a complementary fastener to the flap 60.

[0085] All the previous disclosed embodiments may have a base 20 with a fastener complementary to the fastener on the flap 60. Thus all the previous disclosed embodiments may have a compressed state 300 in addition to the open state 100 and the closed state 200.

Claims

1. A foldable package (10) for use in a parcel distribu-

tion system, the foldable package (10) comprising

- a base (20), an opposite lid (30) and one or more walls (40) extending between the base (20) and the lid (30) defining an internal space (12), wherein the lid (30) comprising

- a closable opening (32) for enabling access to the internal space (12), the closable opening (32) being closable by one or more reversible fasteners (50);

- a tag pocket (14) for storing a tag (16), wherein the foldable package (10) has

- an open state (100), where the internal space (12) is accessible through the closable opening (32); and

- a closed state (200), where the closable opening (32) is closed by the one or more fasteners (50) and the internal space (32) is inaccessible;

wherein the one or more walls (40) are collapsible while the foldable package (10) is in the closed state (200), such that the internal space (12) is variable between

- a minimum volume, where the distance between the base (20) and lid (30) are minimized; and

- a maximum volume, where the distance between the base (20) and lid (30) are maximized.

2. A foldable package (10) according to claim 1, wherein each wall (40) includes a main fold line (42) substantially parallel to the other main fold lines (42) and positioned at substantially the same height relative to the base (20), and wherein two opposing walls (40) further comprise angled fold lines (43) extending from vertices (44) towards or to the main fold line (42) of said wall (40), thereby defining four right-angled triangles (46).

3. A foldable package (10) according to claim 2, wherein the four right-angled triangles (46) comprise complementary rigid plane elements positioned in pockets.

4. A foldable package (10) according to claim 1 or 2, wherein each wall (40) includes a main fold line (42) substantially parallel to the other main fold lines (42) and positioned at substantially the same height relative to the base (20), wherein two opposing walls (40) comprise angled fold lines (42) extending from vertices (44) towards an end of the main fold line (42) of said wall (40), thereby defining two opposing

triangles (48) having one triangle edge substantially being the edge of the package (10), wherein the two opposing triangles (48) comprise complementary rigid plane elements positioned in pockets (49), each of said complementary rigid plane elements comprising a material weakness along a break line, said break lines being substantially in the same plane as the main fold lines (42).

5. A foldable package (10) according to any of claims 1 to 4, wherein the two opposing walls (40) with the triangles (46, 48) further include two trapezoid faces, the trapezoid faces being equipped with one or more rigid plane elements in pockets.

6. A foldable package (10) according to any of claims 1 to 5, wherein the walls (40) are made of a recyclable plastic or fabric.

7. A foldable package (10) according to any of claims 2 to 6, wherein the fold lines (43, 48) are defined by stitching.

8. A foldable package (10) according to any of claims 1 to 7, wherein the one or more fasteners are chosen among

- one or more slide fasteners (52); and/or

- one or more buttons; and/or

- hook and loop tape; and/or

- a permanent magnet interacting with other magnetic material.

9. A foldable package (10) according to any of claims 1 to 8, wherein the foldable package (10) includes one or more flaps (60) extending between the closable opening (32) and

- the lid (30), and/or

- the base (20), and/or

- the one or more walls (40),

wherein the one or more flaps (60) include at least one of the fasteners (50).

10. A foldable package (10) according to any of claims 9, wherein the one or more fasteners (50) of the closable opening (32) include a slide fastener (32) and the one or more flaps (60) include at least one flap (60) configured to extend across the slide fastener (32).

11. A foldable package (10) according to claim 9 or 10, wherein the at least one flap comprises hooks or loops for engaging loops or hooks positioned on the lid (30) or one of the walls.

12. A foldable package (10) according to any of claims 9

or 11, wherein the at least one flap (60) comprises hooks or loops for engaging loops or hooks positioned on the base (20), wherein the foldable package (10) comprises

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- a compressed state (300), where the closeable opening (32) is closed by the one or more fasteners (50) and the internal space (12) is inaccessible and the at least one flap (60) is connected to the base (20).

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- 13.** A foldable package (10) according to any of claims 9 to 12, wherein the at least one flap (60) comprises a width of 3.5 cm to 11 cm, or 5 to 9 cm, or 7-8 cm.

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- 14.** A foldable package (10) according to any of the preceding claims 1 to 13, wherein the foldable package (10) includes a smart tag (17) positioned inside the tag pocket (14).

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- 15.** Use of a foldable package (10) according to any of the preceding claims 1 to 14 for distribution of an item in a parcel distribution system, wherein the item stored in the internal space (12) supports the lid (30) during transportation.

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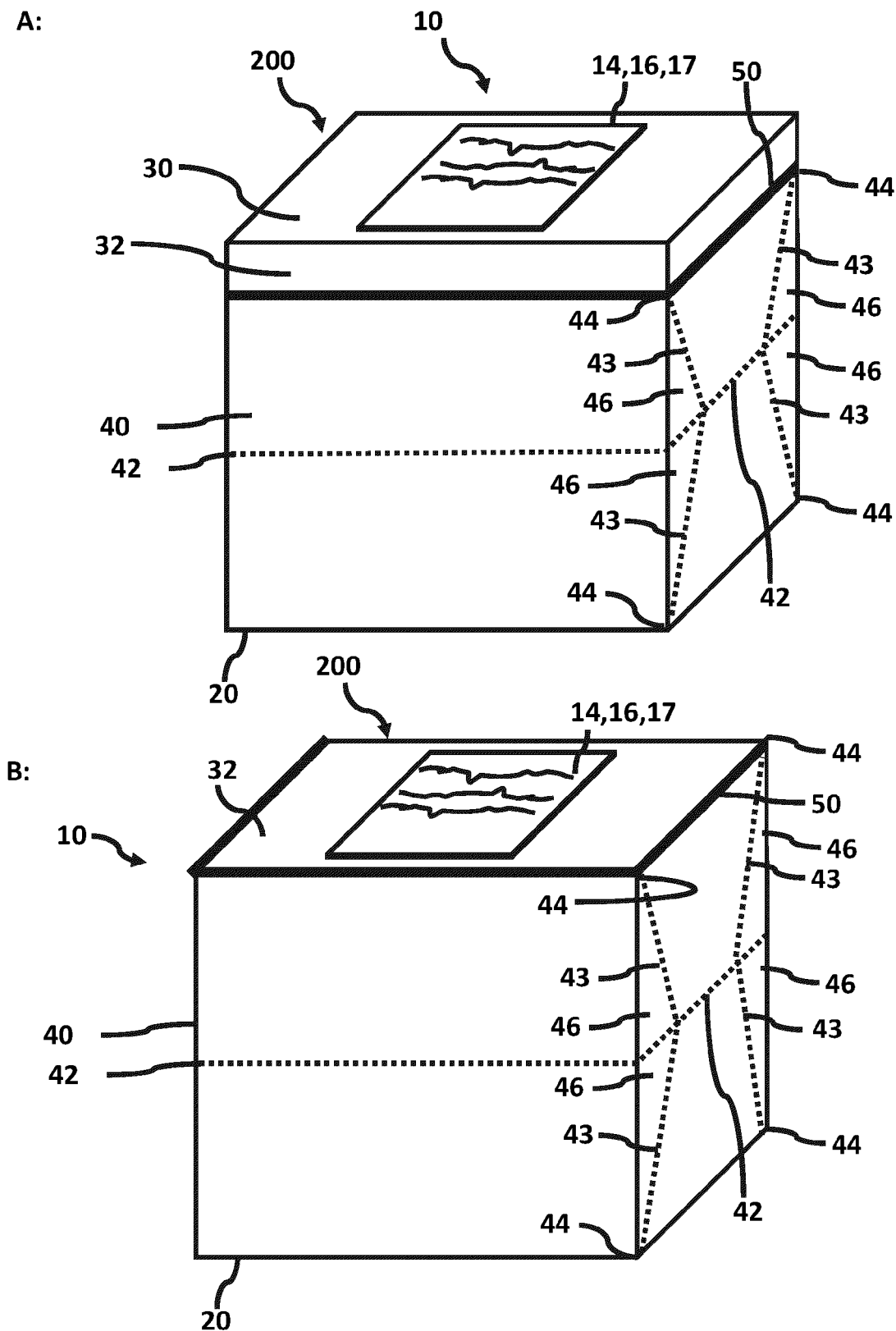


Fig. 1

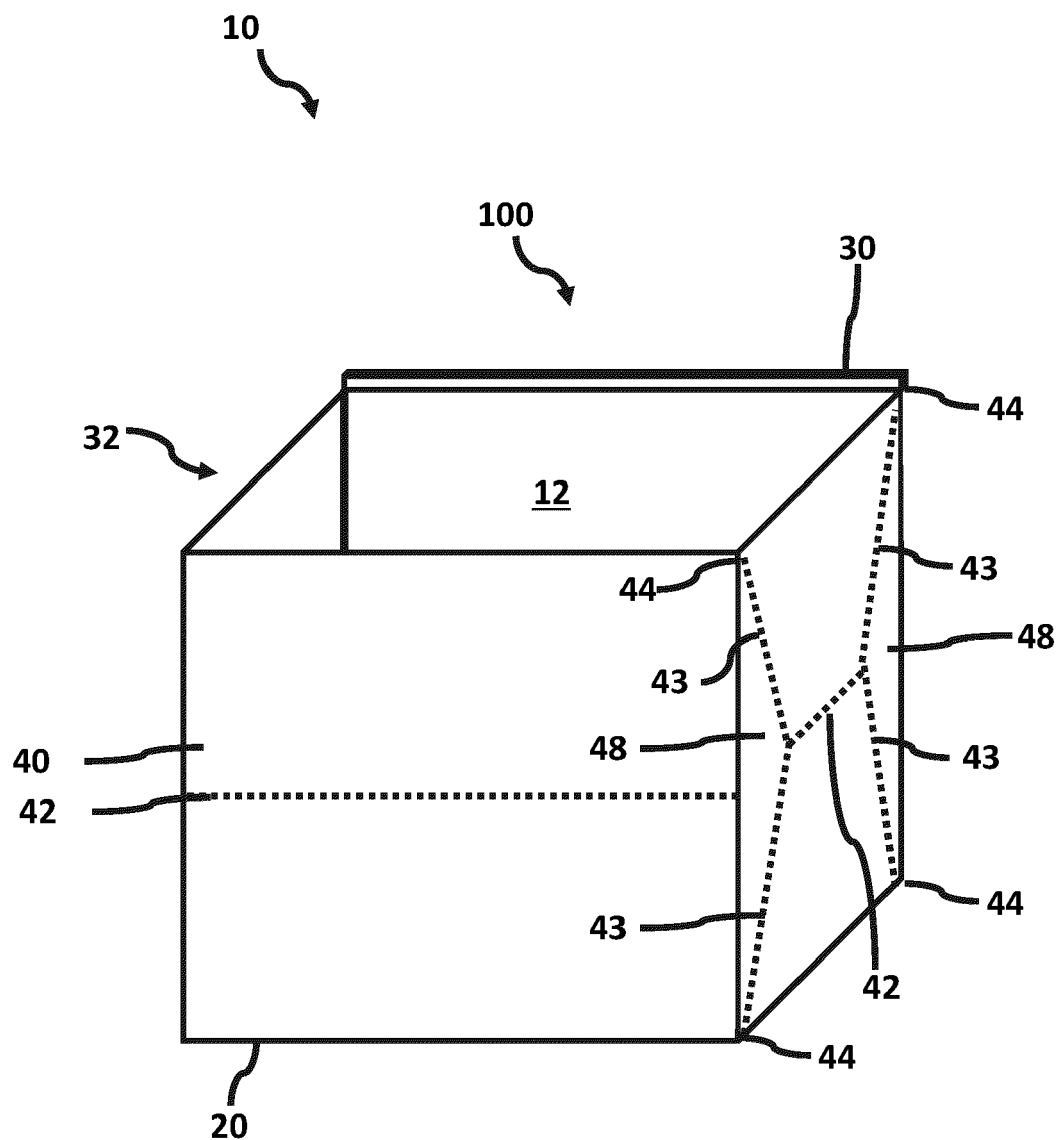


Fig. 2

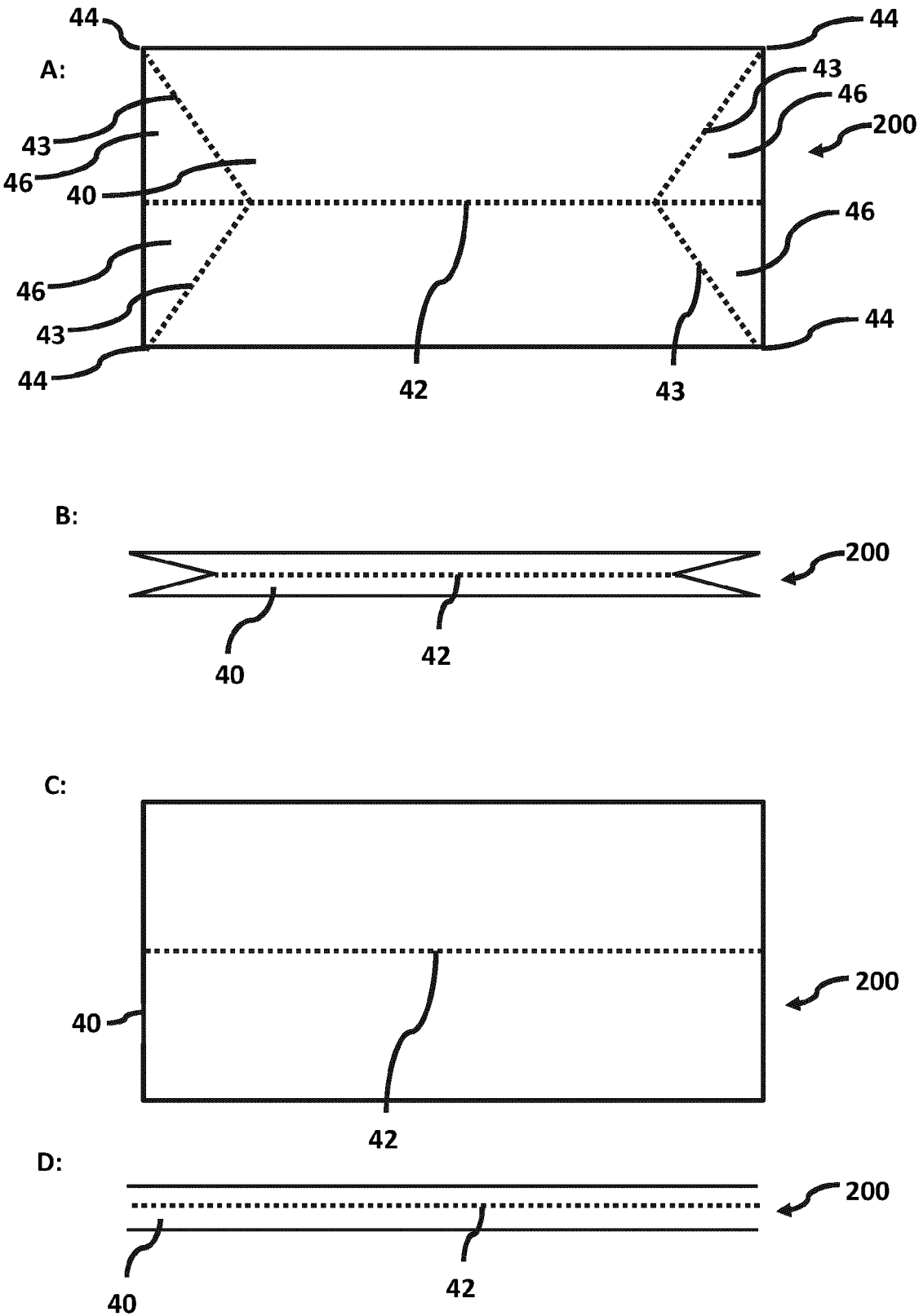


Fig. 3

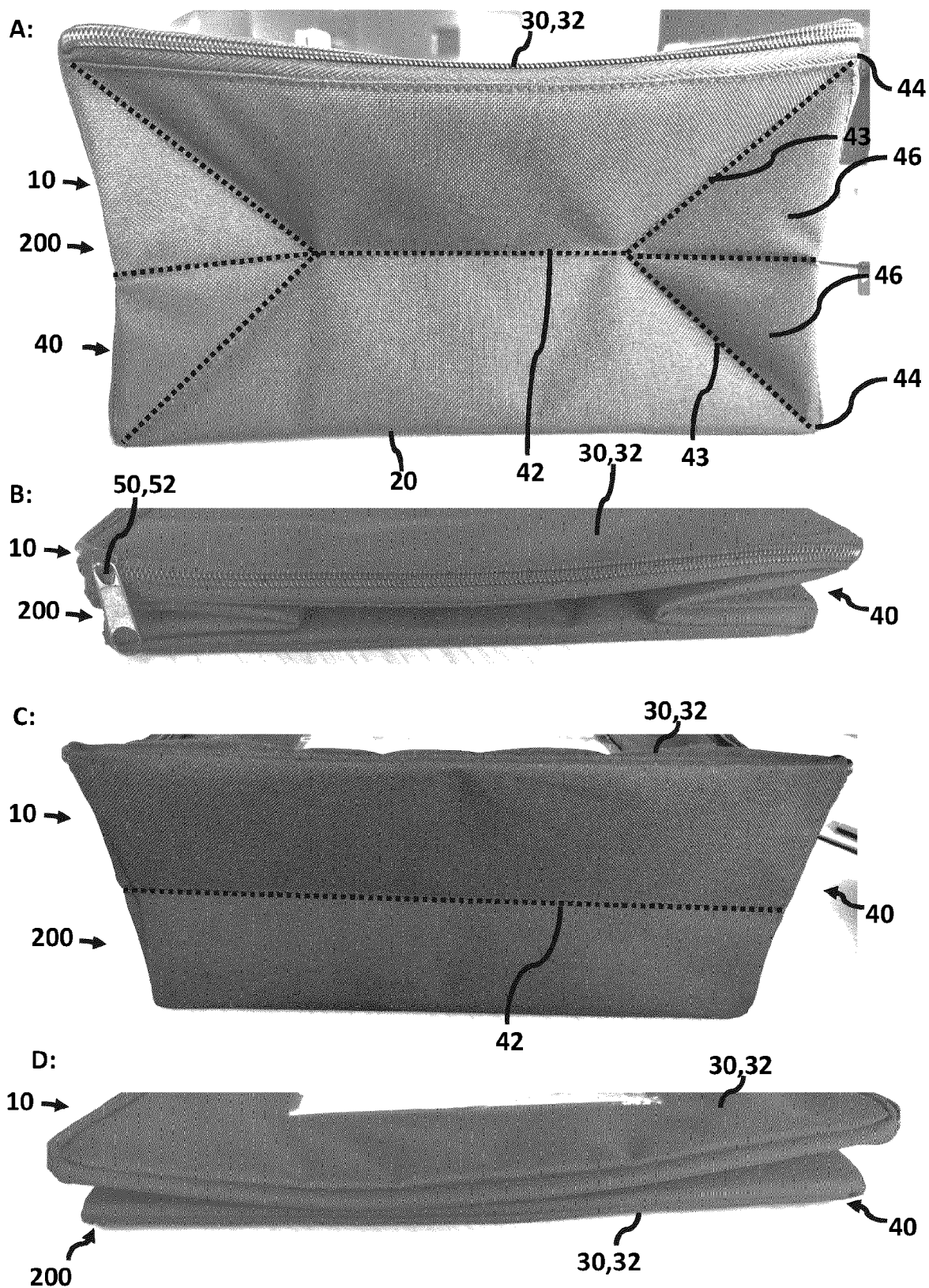


Fig. 4

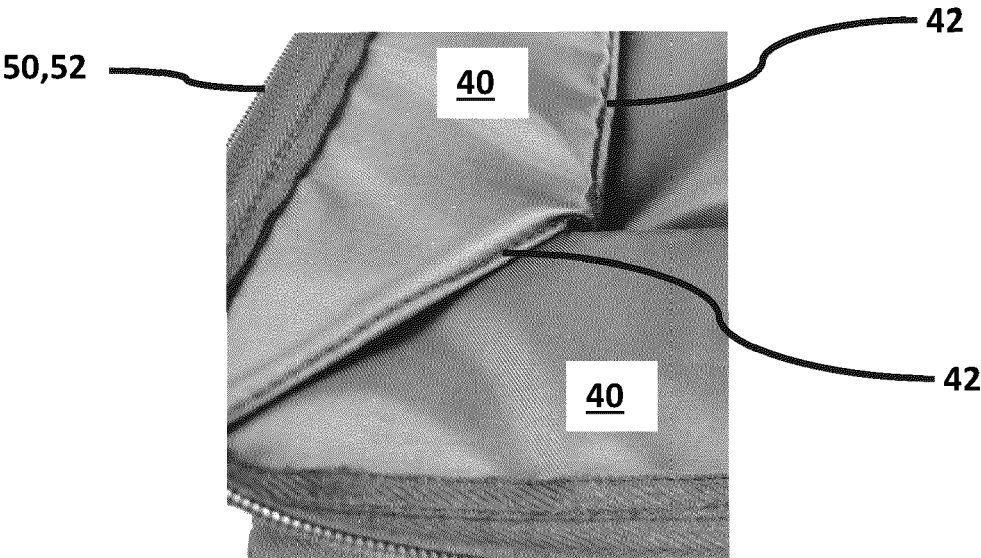
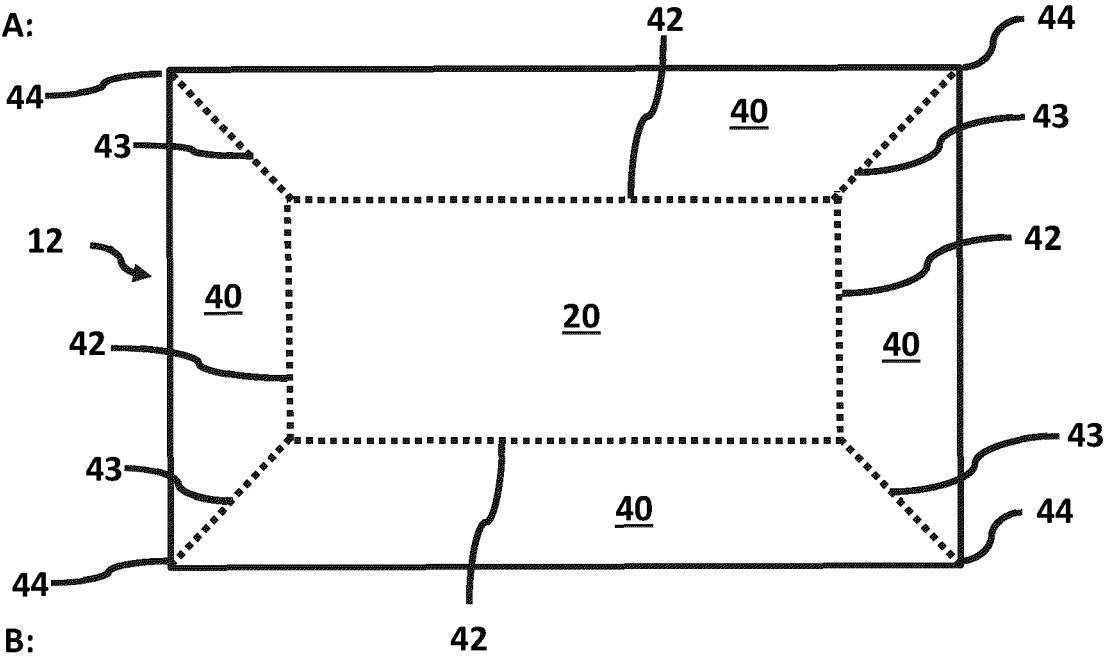


Fig. 5

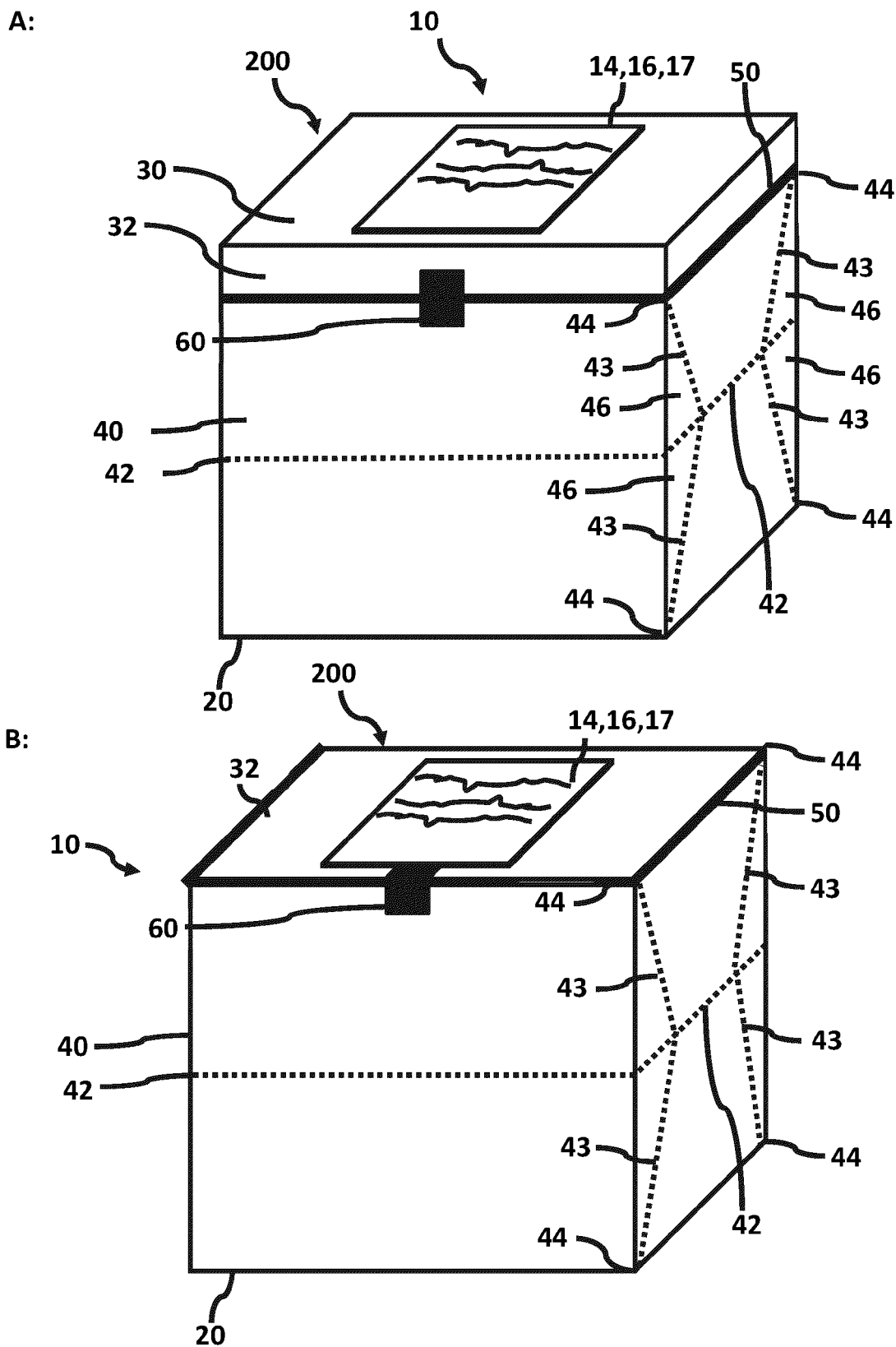
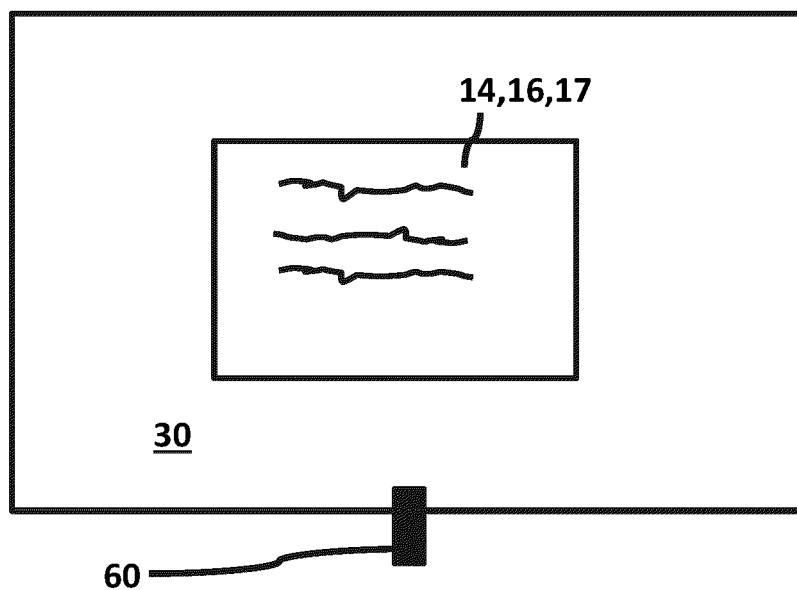


Fig. 6

A:



B:

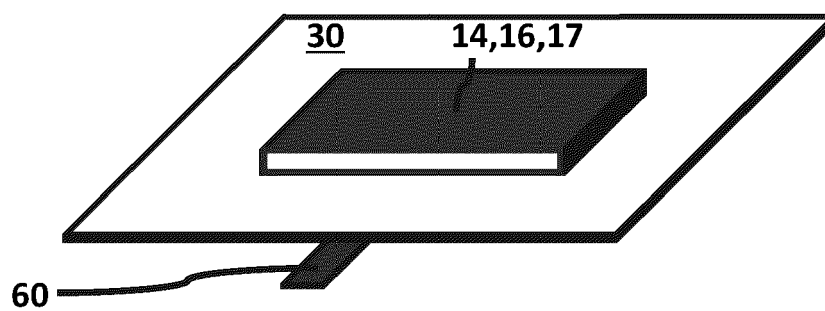


Fig. 7

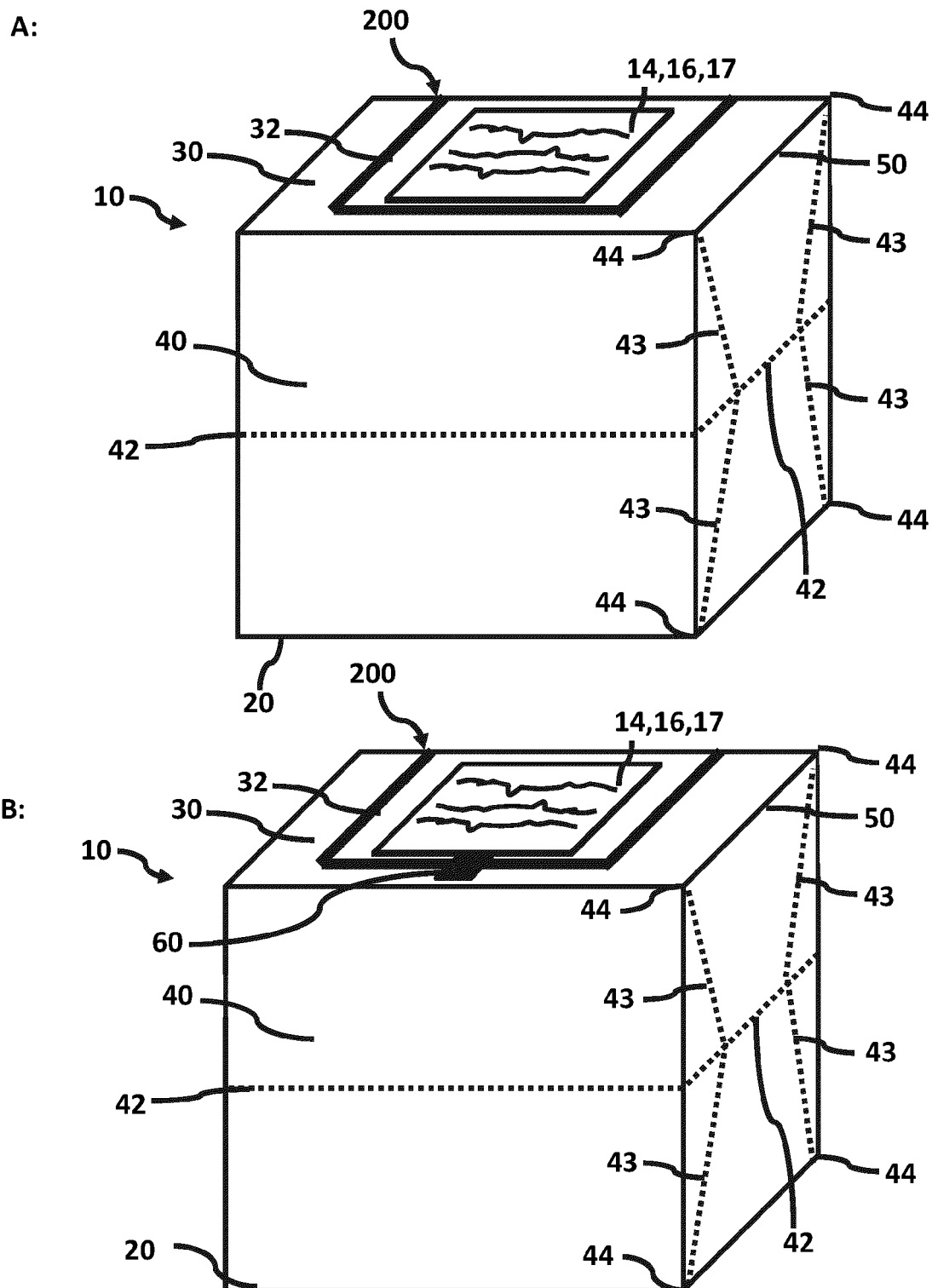


Fig. 8

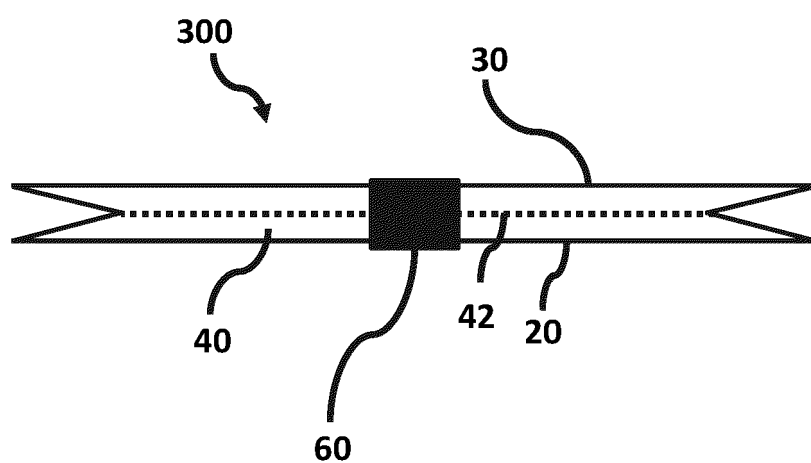


Fig. 9



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Application Number

EP 23 18 2608

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Place of search Munich		Date of completion of the search 14 December 2023	Examiner Rodriguez Gombau, F
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