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(54) Kit for transport of a biological sample by mail

(57) The invention relates to a kit for transport of a biological sample. The kit comprises a sample holder, an assembly for holding the sample holder, and a postal envelope. The assembly comprises a protective structure, a fluid tight sealable bag comprising a bag interior, and a fluid absorbing lining. The protective structure comprises a semi rigid front and back panel, which are connected such that they form a semi rigid structure defining an interior space between the panels and an opening communicating with said interior space. The protective structure is provided inside the bag interior and the fluid absorbing lining is provided inside the bag interior between the front panel and the bag and between the back panel and the bag. The protective structure is positioned and configured such that it holds open the opening of the sealable bag to facilitate inserting the sample holder into the interior space.

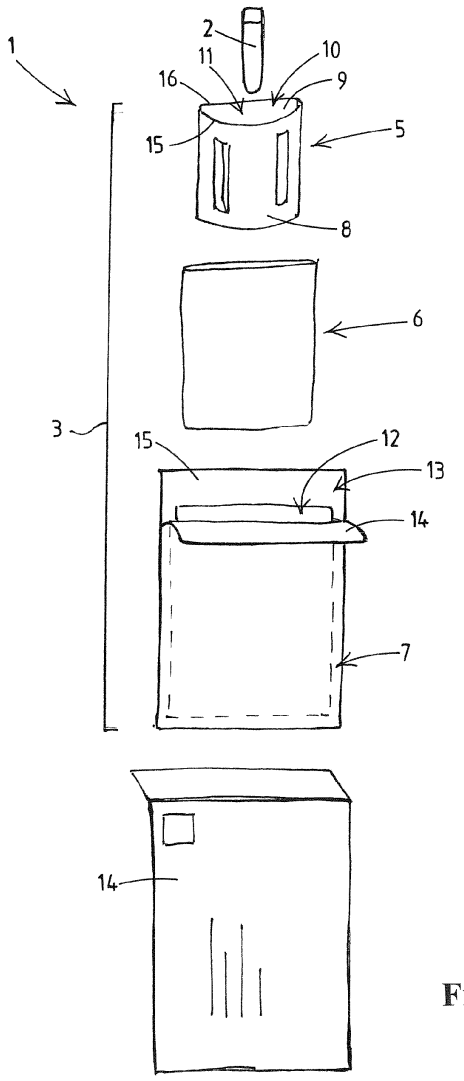

Fig.1

EP 2 737 951 A1

Description

[0001] The invention relates to a kit for transport of a biological sample to an intended recipient by mail. The invention furthermore relates to a multi pocket instruction bag for use with such a kit.

[0002] It is known to transport sample holders by mail. For example samples taken by a general practitioner are often sent by mail from the doctor's surgery to the laboratory for examination.

Dedicated, reusable plastic envelopes are used for transporting the sample holders. These plastic envelopes are provided with fluid tight closures, air cushions or foam rubber protective means for protecting the sample holders and pouches for holding documents. The sample holders are sometimes wrapped in liquid absorbing material to reduce leakage in case of breakage of the sample holder. These dedicated envelopes are expensive to produce and often comprise multiple components which makes them complicated to use.

[0003] Due to demographic changes, screenings for medical examination of parts of the older population, in particular of persons above 65, have become more common. These target populations have increased as well. Therefore, the work load of general Practitioners is increased. Thus, it would be beneficial to enable persons to be tested to return a test sample by mail, and not to send the sample holders via the general practitioner to the test lab.

Drawback is that the test subjects often are elderly people with no experience in sending biological samples, while the kits for returning a test sample are complicated.

Also, the kits known are intended for multiple usages, and therefore expensive. This may pose a problem when the test subjects are invited to provide a biological sample on a voluntary basis. With these kind of screenings, a significant percentage of the kits may not be returned, which makes it rather expensive to use the known reusable kits

[0004] Thus, it can be concluded, that a drawback of the prior art kits is that they are expensive, and are designed for use by professional users.

[0005] The aim of the invention is to provide an alternative kit for transport of a biological sample to an intended recipient, which transport kit preferably can be provided at low costs and is suitable for single use by a nonprofessional user.

[0006] The invention therefore provides a kit according to claim 1.

[0007] A kit according to claim 1 comprises a sample holder, a, preferably pre-addressed, postal envelope and an assembly for holding the sample holder.

[0008] The kit according to the invention comprises the sample holder for containing a biological sample. The sample holder is provided in the form of a vial with a closure.

[0009] The assembly for holding the sample holder, more in particular the vial, according to the invention comprises a protective structure, a fluid tight sealable bag, and a fluid absorbing lining.

[0010] The protective structure of the assembly comprises a semi rigid front panel and a semi rigid back panel, which front panel and back panel are connected such that they form a semi rigid structure that defines an interior space between the front panel and the back panel, and an opening at one end of the protective structure that communicates with said interior space for inserting the sample holder in said interior space.

The protective structure is provided to protect the sample holder against impact during transport, and to thus reduce the risk of damage to the sample holder during transport.

[0011] The fluid tight sealable bag of the assembly has a bag interior, an opening for communicating with the sealing bag interior, and a fluid tight closure flap movable between an open position, in which the sample holder may be inserted into and removed from the bag interior via said opening, and a closed position, in which it seals the opening fluid tight to retain the sample holder in the bag interior.

The fluid tight sealable bag is provided to contain the biological sample in case of breakage of the sample holder or the closure of the sample holder during transport.

[0012] The fluid absorbing lining of the assembly is provided to absorb fluids of the biological sample in case of leakage from the sample holder or the closure of the sample holder. This to further reduce the chance of leakage of the biological sample in case of breakage of the sample holder or the closure of the sample holder during transport.

[0013] The assembly according to the invention furthermore comprises the postal envelop, for holding the assembly and the sample holder, and for thus sending the biological sample by mail to the intended recipient. Due to providing the assembly for holding the sample holder, a fully dedicated envelope is not required and a standard envelope can be sufficient.

[0014] According to the invention, the protective structure is provided inside the sealable bag interior and the fluid absorbing lining is provided inside the sealable bag interior between the front panel and the sealable bag and between the back panel and the sealable bag. Furthermore, according to the invention, the protective structure is positioned with its opening in line with the opening of the bag, and is configured such that it holds open the opening of the sealing bag to facilitate inserting a sample holder into the interior space of the protective structure via the bag opening.

[0015] By providing the protective structure according to the invention, the opening of the sealable bag is held open and the fluid absorbing lining is pushed against the inside surface of the interior space of the bag. Thus a nonprofessional user can insert the test sample in a simple motion and without the risk of misplacing the sample holder, i.e. inserting it between the protective structure and the fluid absorbing lining or between the fluid absorb-

ing lining and the sealable bag.

[0016] It is noted that known fluid tight sealable envelopes typically are provided with complicated closures, for example comprising multiple overlapping flaps, which may confuse the nonprofessional user with respect to finding the correct opening and correctly sealing the bag. By providing a protective structure according to the invention, the opening of the bag is clearly indicated to the nonprofessional user.

[0017] Furthermore, it is not necessary to provide the sealable bag with a fluid absorbing lining fixed to its inside surface and provided with integrated protective means to prevent user form incorrectly inserting the sample holder. Thus, the production costs of an assembly according to the invention can be kept low.

The invention thus provides an alternative kit for transport of a biological sample to an intended recipient, which transport kit can be provided at low costs and is suitable for single use by a nonprofessional user.

[0018] In an embodiment according to the invention, the protective structure comprise a rectangular front panel and a rectangular back panel, each panel having two side edges, a top edge and a bottom edge, which panels are connected to each other along their two sides and wherein at least one of the panels is bend or folded such that the panels form an opening between their top edges, for example a wing shaped opening, an almond shaped opening, a diamond shaped opening, or an triangular shaped opening.

Such a protective structure allows for a simple and light weight construction of a semi rigid nature to provide protection to the sample holder against impact.

[0019] It is noted that the opening and the interior space defined by the front and back panel of the protective structure are preferably dimensioned for moveably receiving the sample holder, i.e. such that the vial is not clamped between the front panel and the back panel of the protective structure. By thus dimensioning the protective structure, the protective structure may under an external load deform to a certain extent without transferring that force to the sample holder.

[0020] In a further embodiment according to the invention, the width of the opening of the protective structure is substantially larger than the height of that opening, such that the opening has an elongated shape. The width is preferably at least 3,5 times the height of the opening, more preferably at least 3,7 times the diameter of the height of the opening, most preferably is about 3,8 times the diameter of the sample holder.

When a structure with such an elongated opening is loaded such that its front panel and back panel are pushed towards each other and the structure collapses, the one or more curved or folded panels are flattened and their sided edges pushed outward. However, due to the height of the opening being small compared to the width of the opening, the width of the protective structure does not substantially change. Thus, such a protective construction can be fittingly contained in a sealable bag, with a reduced risk of the sides of the protective construction slicing the bag when the protective construction collapses.

[0021] In an embodiment according to the invention, the front panel has a width that is larger than the width of the back panel, such that, when the panels are connected along their two side edges, the front panel is curved or folded and the back panel is flat, and the protective structure has respectively a wing or triangular shaped opening and cross section.

The difference in width between the front panel and the back panel in combination with connecting those panels along their edges provides a protective construction with a flat back panel and a curved front panel. By providing the protective construction with a flat back panel, the resistance of the protective construction against flattening under external pressure, i.e. pressing the panels towards each other, is increased.

Furthermore, the curved or folded panels help to guide external loads towards the sides or flanks of the protective structure. For example, when during transport another package is placed on top of the kit, the curved or folded panels may guide that package away from the central part of the protective structure and towards its flanks, thus reducing the risk that the load exerted by that package damages the sample holder.

In a further embodiment according to the invention, the width of the front panel is larger than the width of the back panel but is smaller than 1,25 times the width of the back panel, preferably smaller than 1,2 times the width of the back panel, for example 1,15 times the width of the back panel.

Thus, the width of the protective construction does not substantially increase when flattened. Therefore, such a protective construction can be fittingly contained in a sealable bag, with a reduced risk of the sides of the protective construction slicing the bag when the protective construction collapses.

[0022] In an alternative embodiment, the front panel and the back panel have similar dimensions, and the front panel is not connected with its edges to the edges of the back panel, but is connected with its edges to the back panel inward from the edges of the back panel, to provide the protective construction with a bent or folded front panel.

[0023] In an embodiment according to the invention, the sealable bag is provide with a front panel and a back panel sealed together along at least the two side edges and the bottom edge of the panels, and the width of the inner space of the bag has a width similar to or larger than the width of the front panel, such that bag can hold the protective structure with its front panel in a curved state and in a flattened state. Thus, the construction of the bag is configured for holding the construction after collapse, more in particular a flattened construction. This reduces the risk of the collapsed construction damaging the bag such that part of the biological sample may leak out.

In a further embodiment according to the invention, the width of the inner space is about 1,25 times the width of the back panel, preferably about 1,2 times the width of the back panel, for example 1,15 times the width of the back panel.

[0024] In an embodiment according to the invention, the protective structure is provided with one or more rib elements extending in the interior space between the front panel and the back panel. Thus the constructional strength of the protective construction is increased, in particular against flattening of the construction.

In a further embodiment according to the invention, the rib elements are folded partial cut outs from the front and/or back panel. This provides a simple construction that can be produced against low costs, more in particular can be made from sheet material.

In a further embodiment, the ribs can be provided such that the sample holder is clamped between them. It is noted that when the protective structure is for example provided with a wing shaped opening, an almond shaped opening, a diamond shaped opening, or a triangular shaped opening, the sample holder is to be inserted at the center of the protective structure, and the rib elements can be provided in the flanks of the protective structure.

[0025] In an embodiment according to the invention, the protective structure is folded from a single strip of semi rigid material, such that the front panel and the back panel are connected via a fold along at least one of their sides. This provides a simple construction that can be produced against low costs, more in particular can be made from sheet material.

[0026] In an embodiment according to the invention, the protective structure is folded form a single strip of semi rigid material, such that the front panel is connected to the back panel via at least one intermediate panel. Such a construction is more box shaped, and for example has rectangular, trapezoid, or a U-shaped cross section. This provides a simple construction that can be produced against low costs, more in particular can be made from sheet material.

[0027] In an embodiment according to the invention, the front panel and/or the back panel of the protective structure are/is provided with a recess, which recess(es) form(s) part of the interior space for receiving the sample holder, such that the sample holder can be held between the panels in the recess. The panels can for example be made of semi rigid preshaped plastic sheet elements. By providing the panels with a recess, the rigidity of the panel and thus the rigidity of the overall protective construction is increased

[0028] In an embodiment according to the invention, the fluid absorbing lining is a sleeve, preferably a sleeve bag, that has a sleeve interior configured to hold the protective structure with the sample holder, and has at least one opening communicating with said sleeve interior, which opening is dimensioned for passing through the protective structure such that it can be positioned in the sleeve interior with its opening in line with the opening of the fluid absorbing sleeve.

Providing the fluid absorbing lining in the form of a sleeve or sleeve bag facilitates production of the assembly since it allows for easy applying the lining to the protective structure by simply positioning the protective construction inside the sleeve or sleeve bag.

In a further construction, the protective construction comprise a rectangular front panel and a rectangular back panel, which panels are connected to each other along their two sides and wherein the front panel has a larger width than the back panel and is bend or folded, in combination with a tightly fitting sleeve. Thus, the sleeve may contribute to the resistance of the protective construction against flattening.

In an alternative embodiment, the fluid absorbing lining is for example provided as two separate panels, each provided adjacent a panel of the protective construction.

In an embodiment according to the invention, the dimensions of the opening of the protective structure, the sealable bag, and, if present, the fluid absorbing sleeve or sleeve bag, generally correspond in shape and dimensions, such that they form what is essentially a single opening for passing through the sample holder. Such overlapping openings further reduce the chance of a user misplacing the sample holder that is inserting it outside the interior space of the protective construction.

[0029] In a further embodiment, the panels of the protective structure are provided with one or more openings or perforations, to, in case of leakage of the sample holder, facilitate fluid absorption by the lining provided outside the interior space.

[0030] In an embodiment according to the invention, the protective structure is made of a semi rigid and light weight material, for example plastic or cardboard, preferably is folded form a blank of such material. The construction of the protective structure according to the invention, with a front panel and back panel, allows for making it from a sheet material even for folding it form a single blank. This allows for low production costs and easy assembly.

[0031] The invention furthermore provides a multi pocket instruction bag the pockets of which comprise one or more components of a kit according to the invention and/or instructions on how to use one or more of these components. The multi pocket instruction bag is configured, and the instructions and components are distributed over said pockets, for presenting the components and instructions to a nonprofessional user in an ordered, predetermined sequence, thus guiding said user through the process of taking the sample and returning it by mail.

[0032] By providing the nonprofessional user of a kit according to the invention with clearly structured instructions and components of the kit, the chances that the recipient successfully returns a sample are increased. Providing clear instructions and guiding the user through the process of taking and returning a sample are especially important when nonprofessional users are concerned. Particularly when the users concerned are eld-

erly people, the chance of information overload is significant when the user is presented with a lot of information in a non-structured manner.

[0033] Furthermore, when using the multi pocket instruction bag to present the kit, or components thereof, to the user of the kit, the time needed for taking and returning the sample is reduced. This is especially beneficial when voluntary participation of the test subject is required, for example when performing a sample survey in a particular population by sending test kits to a random selection of males between 50 and 60 years of age. When the time needed for taking a test is reduced, more people are willing to participate. Thus, when a multi pocket instruction bad according to the invention is used with a test kit, the chances that test subjects return a sample is increased.

[0034] The multi pocket instruction bag according to the invention is configured of sheets of plastic material, sealed together such that multiple pockets are created. In an embodiment according to the invention, a strip of pockets is provided. In another embodiment, for example an A4 sized sheet is provided with a grid, i.e. one or more rows and one or more columns, of multiple pockets.

[0035] Instructions and components of the kit are distributed over the pockets of the multi pocket instruction bag such that a user, consulting the pockets in a logical and predetermined sequence, is guided through the process of taking a sample using the kit.

[0036] The multi pocket instruction bag can be provided with open pockets, or with pockets provided with closing means, for example a foldable flap, a flap with an adhesive strip, or a zip lock, etc. In a further embodiment, on or more of the pockets may be sealed close, for example by way of heat sealing plastic sheets forming the pocket. Thus the contents of the pockets can be protected against for example moist or air, and thus for example the storage life of the test kit can be increased. In such an embodiment the user has to tear open the one or more sealed pockets to get access to its contents.

[0037] In addition to the pockets, sub pockets, i.e. pockets in or on the main pockets, can be provided. The multi pocket instruction bag can furthermore be provided with attachment means, such as loops or an adhesive area, for holding and/or attaching components of the kit related to the instructions provided in a pocket adjacent the attachment means.

[0038] To obtain a multi pocket instruction bag according to the invention, instructions, for example in the form of a leaflet, and one or more of the components of a kit according to the invention are inserted in the pockets. The instructions and components are distributed over the pockets such that each pocket comprises the instructions and/or components of the kit related to a specific step in the process of taking and returning a sample with a kit according to the invention. The pockets thus define steps in the process, and by

[0039] The pockets can furthermore be provided with signs, symbols, letters, numbers, and/or pictures which indicate the user in which sequence the pockets, more in particular the content of the pockets, have to be consulted and used. When the pockets are made of a transparent material, the signs, symbols, numbers, and/or pictures can be provided on sheets or leaflets inserted in the pockets. In an alternative embodiment, instructions, written and/or in pictures, are printed on the pockets.

[0040] Preferably, the pockets are separated by a hingeable section wide enough to allow for folding the pockets, including their belongings, upon each other. Thus, a strip of pockets can be folded into a stack of pockets, thus providing a compact shape which can be inserted into an envelope for transport by mail.

[0041] In an embodiment, the multi pocket instruction bag is made of sheets of plastic material sealed together such that multiple pockets are created, preferably a strip of multiple pockets is created. The multi pocket instruction bag is preferably made of one or more sheets of transparent plastic, such that at least part of the contents held in the pocket is visible. Such an embodiment also allows for scanning barcodes printed on leaflets or kit components held in the pockets. In an alternative embodiment, the multi pocket instruction bag is made of sheets of fabric material or paper, paper in combination with cardboard, etc.

[0042] By providing the kit according to the invention in a multi pocket instruction kit according to the invention, the kit is configured such that its components and instructions are presented to the user in subsequent steps, thus reducing the chance errors are made in handling the kit and preventing information overload of the user.

[0043] Advantageous embodiments of the kit and of a multi pocket instruction bag according to the invention are disclosed in the subclaims and in the description, in which the invention is further illustrated and elucidated on the basis of a number of exemplary embodiments, of which some are shown in the schematic drawing.

[0044] In the drawings:

Fig. 1 shows an exploded view of a kit according to the invention

Fig. 2a shows a side view of a sealable bag in cross section according to the invention;

Fig. 2b shows a frontal view of a sealable bag in cross section according to the invention;

Fig. 2c shows a top view of a sealable bag in cross section according to the invention;

Fig. 3a shows a blank for folding a first protective construction according to the invention

Fig. 3b shows a top view of a protective construction folded from the blank of Fig. 3a;

Fig. 4a shows a blank for folding a second protective construction according to the invention

Fig. 4b shows a top view of a protective construction folded from the blank of Fig. 4a;

Fig. 5a shows a blank for folding a third protective construction according to the invention

Fig. 5b shows a top view of a protective construction

folded from the blank of Fig. 5a;
Fig. 6a shows a blank for folding a fourth protective construction according to the invention;
Fig. 6b shows a top view of a protective construction folded from the blank of Fig. 6a, *and;*
Fig. 7 shows a multi pocket instruction bag according to the invention, the multi pocket instruction bag holding instructions and components of a kit according to the invention.

[0045] A kit according to the invention comprises a sample holder, a pre-addressed postal envelope and an assembly for holding the sample holder. The assembly comprises a protective structure, a fluid absorbing lining and a fluid tight sealable bag.

[0046] Fig. 1 shows an exploded view of a kit 1 according to the invention, the kit comprising a sample holder 2, an assembly 3 for holding the sample holder 2, and a pre-addressed postal envelope 4. The assembly 3 for holding the sample holder comprises a protective structure 5, a fluid absorbing lining 6 and a fluid tight sealable bag 7.

[0047] Fig. 2a-c show a side, front and top view in cross section of the kit of Fig. 1 in an assembled state, excluding the postal envelope 4.

[0048] A kit according to the invention is configured for shipping a biological sample, for example a urine sample or an faeces sample to an intended recipient, for example a laboratory, by mail. The kit is therefore provided with a sample holder in the form of a vial with a closure, for example a stop. The vial is to be used for holding the biological sample. The biological sample can be a liquid sample, a solid state sample, or a mixture of both. Furthermore, additional materials can be held in the vial, for example a liquid preservation material.

In the embodiment shown in Fig. 1, the vial 2 is a simple vial with stop. Alternative embodiments are also possible, for example a vial with closures at both ends, and/or closures which are configured for obtaining a sample, for example are provided with an integrated scoop for obtaining a sample.

The protective structure 5, comprises a semi rigid front panel 8 and a semi rigid back panel 9. The front panel 8 and back panel are 9 connected along their side edges such that they form a semi rigid structure that defines an interior space 10 between the front panel and the back panel, and an opening 11 at one end of the protective structure that communicates with the interior space 10 for inserting the sample holder 2 in that interior space. The opening is defined by the top edge 15 of the front panel 8 and the top edge 16 of the back panel 9.

[0049] The fluid tight sealable bag 7, has a bag interior 12, an opening 13 for communicating with the sealing bag interior 12, and a fluid tight closure flap 14 movable between an open position, shown in the figures, in which the sample holder may be inserted into and removed from the bag interior via said opening, and a closed position, in which it seals the opening fluid tight to retain the sample holder in the bag interior.

It is observed the in the side view shown in Fig. 2A the flaps are held open by the protective construction, and the top flap is supported in a curved position, such that a comparatively large part is visible in the side view.

In the particular embodiment shown, the sealable bag 7 is provided with a closure having two opposed flaps, flap 14 and flap 15, which are combined to seal of the interior space of the bag 7. To seal the interior space 12 of the bag fluid tight from its surroundings, one or both the flaps 14, 15 are provided with an adhesive material, such that the flaps can be bonded to each other.

It is observed that other types of closures known in the prior art for sealing a plastic bag fluid tight can also be used with a sealable bag according to the invention.

[0050] In the embodiment shown in fig. 1, the fluid absorbing liner is provided in the form of a sleeve, more in particular a sleeve bag, i.e. a sleeve with one end sealed. It is observed that other configurations are also possible, for example sheets of fluid absorbing material that are provide on opposite side of the protective structure.

As is clear from the Figs 2a-c, showing the assembly in cross section, the protective structure 5 is provided inside the sealable bag interior 12 and the fluid absorbing lining is 6 provided inside the sealable bag interior between the front panel 8 and the sealable bag 7 and between the back panel 9 and the sealable bag 7.

Fig. 2 also shows that in the embodiment shown, the elements of the assembly are dimensioned such that the fluid absorbing liner closely fits the protective structure, and the sealable bag in turn fits the lining. Because the protective structure stretches the sealable bag to present it with an opened opening, it also holds the fluid absorbing lining in position between the protective structure and the sealable bag.

Fig. 2 shows that the protective structure 5 is positioned with its opening 11 in line with the opening 13 of the bag 7, and is configured such that it holds open the opening of the sealable bag to facilitate inserting the sample holder 2 into the interior space of the protective structure via the bag opening.

The kit according to the invention is thus self explanatory in its use. The opening of the bag is held open which makes it clear to a non professional user where the sample holder should be inserted. This is especially helpful considering that sealable bags are typically provided when complicated closures with large and/or multiple flaps, to enable a liquid tight closure. At the same time, the protective construction keeps the fluid absorbing lining positioned such that the sample holder can only be inserted between the layers of lining, and not between the lining and the sealable bag. Thus, combining such a sealable bag with a protective structure according to the invention facilitates usage of these bags by non-professional users.

[0051] An end user is provided with the sample holder, the assembly for holding the sample holder and the postal envelope. The end user takes a biological sample and

places it in the sample holder. The sample holder is in turn placed in the assembly, which in turn is placed in the postal envelope for sending the biological sample to an intended recipient, for example a laboratory, for examination.

[0052] It is observed that a kit according to the invention is preferably presented to the person with the sample holder, the assembly and the return envelope separated. The three elements can for example be sent to the person in an envelope, preferably in combination with a manual or the like that explains how the kit is to be used. However, such a manual can also be provided separately, for example via the internet.

In an alternative embodiment, the kit is presented to the user fully assembled, thus with the sample holder inserted in the assembly, inserted in the postal envelope.

[0053] In the embodiment shown in Figs. 1-2, the sealable bag is provide with a front panel and a back panel that are sealed together along two side edges and the bottom edge of the panels. The width of the inner space of the sealable bag has a width larger than the width of the front panel of the protective construction, such that bag can hold the protective structure with its front panel in a curved state and in a flattened state, i.e. after collapse of the structure.

[0054] With a kit according to the invention, the fluid absorbing lining is provided between the protecting structure and the sealable bag, instead of directly adjacent the sample holder or inside the protective structure to directly absorb the fluid in case of leakage from the sample holder. Thus, the structure can be used to hold open the bag and the liner, and a nonprofessional user can simply insert the sample holder inside the structure without the risk of misplacing the sample holder between the fluid absorbing liner and the bag

[0055] In the embodiment shown in Figs. 1-2, the absorbing lining is provided in the form of a sleeve, more in particular a sleeve bag. The sleeve has a sleeve interior configured to hold the protective structure with the sample holder, and, in the embodiment shown, has one opening communicating with said sleeve interior. The opening is dimensioned for passing through the protective structure such that it can be positioned in the sleeve interior with its opening in line with the opening of the fluid absorbing sleeve.

[0056] Furthermore, in the embodiment shown in Figs. 1-2 the dimensions of the opening of the protective structure, the sealable bag, and the fluid absorbing sleeve bag, generally correspond in shape and dimensions, such that they form what is essentially a single opening for passing through the sample holder. Providing the assembly with such a single opening furthermore enhances the self-explanatory character of the kit and thus facilitates its use by nonprofessional users.

[0057] Preferably, the elements of the assembly have a rectangular lay out wherein the sleeve and the panels of the protective structure have two longer sides and two shorter sides. Thus, the protective structure can only be inserted in a single direction into the bag and sleeve, which facilitates combining of the separate parts to assemble the final assembly. Thus, mistakes during production of the assembly can be reduced.

[0058] Figs. 3-6 show different configurations of the protective structure according to the invention. The figures show the blank from which the protective structure is folded, and a top view of the assembled protective structure. Similar parts of the different protective structures are provided with similar reference signs. The protective structures shown are folded from a single strip of semi rigid material, such that the front panel and the back panel are connected via a fold along one of their sides and by way of a "tab in slot" or adhesive connection, or a combination of both, at the opposite side.

The invention thus allows for providing a protective structure that is made of a semi rigid and light weight material, for example plastic or cardboard, which preferably is folded from a blank of such material. This in turn allows for low production costs.

Furthermore, the protective structures shown in Figs. 3-5 are each provided a front panel that has a width that is larger than the width of the back panel, such that, when the panels are connected along their two side edges, the front panel is curved or folded and the back panel is flat. The panels of the protective structures form an opening between their top edges, for example a wing shaped opening, as shown in Figs 3b and 4b, or triangular shaped opening, as shown in fig. 5b.

In an embodiment of a protective structure according to the invention, the width of the front panel is preferably larger than the width of the back panel but is smaller than 1,25 times the width of the back panel, preferably smaller than 1,2 times the width of the back panel, for example 1,15 times the width of the back panel.

The openings of the protective structures shown in the Figs. thus have a width that is substantially larger than the height of that opening, such that the opening has an elongated shape. Such a configuration reduces the risk of the protective structures shown piercing the sealable bag when flattened under an external pressure, because the comparatively large width in combination with a folded or bent front panel provides a protective structure of which the width will only slightly increase upon collapse.

The width of the opening of a protective structure according to the invention is preferably at least 3,5 times the height of the opening, more preferably at least 3,7 times the diameter of the height of the opening, most preferably is about 3,8 times the diameter of the sample holder.

[0059] The protective structure shown in Fig. 4 is similar to the one shown in Figs 1-2. In this embodiment, the protective structure 205 comprise a rectangular front panel 208 and a rectangular back panel 209, each panel having two side edges, a top edge and a bottom edge.

The panels are connected to each other along their two sides. In the particular embodiment shown, the panels 208, 209 are along one side connected by a fold 220. The front panel 208 is provided with two tabs 221 that

can be inserted into slots provided in the back panel 209 to provide a second connection between the front and back panel. Thus the wing shape protective construction, shown in Figs. 1 and 4b is achieved. In the particular embodiment shown, the tabs are bent after insertion in the slots to secure them. In addition, the tabs can be attached to the back panel using an adhesive.

The protective structure shown is furthermore provided with two rib elements 223 extending in the interior space 210 between the front panel 208 and the back panel 209. The rib elements are partial cut outs of the front panel, which are to be bend from the panel and with their ends inserted in a slot 224 provided in the back panel, as shown in Fig. 4b.

[0060] Figs. 3a-b shows a protective construction 105 according to the invention, having a rectangular front pane 108, and back panel 109. The front panel has a width larger than the width of the back panel, and the panels are connected along their sides, such that the assembled protective structure has a wing-shaped cross section and opening, as is shown in Fig. 3b.

The back panel 109 is provided with a tab to be attached, with for example an adhesive or heat sealing, to the front panel 108 to assemble the protective construction 105.

The front and / or back panel of a protective construction according to the invention are preferably provided with openings or perforations, to, in case of leakage of the sample holder, facilitate fluid absorption by the lining provided outside the interior space. The protective construction shown in fig. 3 is therefore provided with three circular openings 122 in the front panel and in the back panel.

[0061] Figs. 5a-5b show a protective construction 305 according to the invention, provided with a folded front panel, and thus with a triangular shaped opening and cross section. The front panel 308 and the back panel 309 are connected via a fold 320. The back panel 309 is provided with a tab 321 for attachment to the front panel 308 by adhesion or heat sealing. The front panel is provided with a fold line, essentially dividing the front panel in two similar halves, along which fold line the front panel is to be folded to form the protective structure, more in particular define the interior space of the protective structure. The folded front panel 308 in combination with the back panel 309 having a smaller width than the front panel provides the triangular shape and a structural rigid construction.

In an alternative embodiment, the front and back panel are both provided with a central fold line to provide a protective construction with a diamond shaped cross section and opening. Such an embodiment is preferably provided with rib elements to provide a rigid construction. In a further embodiment, the front and / or back panel are both provided with multiple fold lines to provide a staggered front and / or back panel.

[0062] Figs. 6a-6b show a protective construction 405 according to the invention, provided with a bent front panel and a bent back panel, and thus with an almond shaped opening and cross section. The front panel 408 and back panel 409 are connected via a fold line 420.

The back panel 409 is provided with a tab 421 for attachment to the front panel 408 by adhesion or heat sealing. Both the front panel 408 and back panel 409 are provided with a partial cut out 423, 424 which form a rib element in assembled protective construction. In the particular embodiment shown, the two rib elements are located opposite each other when the protective construction is assembled. The rib elements 423, 424 are to be connected, for example using an adhesive or a tab in slot connection, to provide the rib element, as shown in Fig. 6b. The combined rib element thus obtained provides the almond shaped protective construction with structural rigidity.

[0063] It is noted that in the embodiments shown, the protective structure is provided with an insert opening at the top and at the bottom end of the protective construction. Thus, the assembly of the assembly is facilitated since the protective structure can be inserted with its bottom end first or with its top end first in the sealable bag and/or fluid absorbing ling sleeve.

[0064] It is noted that the protective structure preferably is dimensioned such that it extends along almost the entire bag interior. Thus its top is always positioned close enough to the opening of the bag to hold it open, but it still allows for closing the bag.

[0065] In an embodiment according to the invention, the sealable bag and/or the sample holder are provided with printed instructions in word and/or pictures, indicting how the elements should be used and/or fit together. These instructions can be printed directly on the sample holder or bag, or be provided in the form of a sticker, etc.

[0066] It is observed that in the embodiments shown the front panel and the back panel of the respective protective construction are connected via a fold. In an alternative embodiment, the protective structure is folded form a single strip of semi rigid material, such that the front panel is connected to the back panel via at least one intermediate panel. Such a protective construction is more box like, or may have a U-shaped cross section. Alternatively, the protective construction can be constructed such that the front panel or back panel comprises two halves, which are each connected via a fold to the other panel, and are to be connected to each other to form the protective structure.

It is furthermore observed that the protective constructions shown can alternatively be composed from separate panels or elements that are to be connected using glue and/or heat sealing and/or tab / slot connections, etc.

[0067] In a further embodiment according to the invention, the front panel and/or the back panel of the protective structure are/is provided with a recess, which recess(es) form part of the interior space for receiving the sample holder, such that the sample holder can be held between the panels in the recess. Such panels can for example be provided by vacuum forming plastic sheet material, or be folded from cardboard.

[0068] In an embodiment according to the invention, the protective construction is provided with a front panel

and a back panel that meet each other along opposite sides, such that they form a sharp angle, i.e. an angle smaller than 90 degrees, preferably smaller than 45 degrees. Such a protective construction thus has a wing shaped, triangular shaped, diamond shaped or almond shaped opening and cross section. Such a protective construction is substantial narrow shaped along its flanks or sides, and thus optimally fits a bag which is provided with front and back panel that are sealed along its sides.

[0069] The protective construction can be provided from a sheet of semi rigid light weight material, such as a sheet of plastic material, a sheet of paper or card board material, or a combination thereof, for example a sandwich material. Also, the front and back panel can be made of different materials. In a further embodiment, the protective construction is made of a fluid absorbing material, such as a card board material.

[0070] Fig. 7 shows an embodiment of a multi pocket instruction bag 550 according to the invention. The multi pocket instruction bag comprises three pockets 551, 552, 553 for holding instructions and/or components of a kit according to the invention. In the particular embodiment shown, the multi pocket instruction bag is furthermore provided with securing means in the form of a loop 554 for holding a component of the kit according to the invention. It is observed that a multi pocket instruction bag can be provided with more or less than three pockets when this is required for clearly presenting a specific process.

[0071] In the particular embodiment shown the pockets are provided in the form of a strip, the strip comprising the three pockets positioned one next to the other. The three pockets are marked from left to right with the numbers 1, 2 and 3. In addition, the subsequent pockets can be marked "information", "taking the sample" and "return shipment". Furthermore, the pockets themselves may be provided with instruction in the form of text or pictures.

[0072] In the embodiment shown, the first pocket 551 comprises a letter 555 with general information, for example about the purpose of a medical examination, the parties involved, what is expected of the test subjects, etc.

[0073] The second pocket 552 comprises leaflet 556 with instructions on how a sample is to be taken. In addition to the instructions relevant devices can be provided in or on the compartment. In the particular embodiment shown the instructions 556 are accompanied by a sample holder 502 to be used for taking the sample as described in the instructions provided in the second pocket. The sample holder, in the form of a vial 502, is attached to the strip of pockets with a loop 554, located adjacent to the bottom end of the second pocket 552. Thus it is clear that the sample holder 502 is related to the instructions provided in that second pocket. By attaching the vial with a loop shaped attachment device, the top end of the sample holder is free, and can be directly engaged for removing the vial form the strip.

[0074] In an alternative embodiment, the strip of pockets is provided with a sub pocket, located adjacent the bottom end of the second pocket, for holding the vial. In another embodiment, the sample holder is provided inside the second pocket together with the instructions on how to take the sample.

[0075] The third pocket is provided with an assembly 503 according to the invention. The assembly 503 comprises a protective structure, a fluid absorbing lining and a fluid tight sealable bag for holding the sample holder 502 as described in this document. In an embodiment, instructions on how to seal the sample holder inside the assembly are provided on the side of the fluid tight sealable bag. It is observed that the sample holder and the assembly preferably are configured as disclosed in this document. The multi pocket instruction bag 550 is thus used for presenting components of a kit according to the invention to a user, to facilitate use of the kit, more in particular to facilitate taking a sample with the sample holder 502 and inserting the sample holder in the assembly 503 for protection during transport.

[0076] In the particular embodiment shown, the postal envelope for receiving the assembly holding the sample holder, is provided separate from the multi pocket instruction bag. In a further embodiment, the multi pocket instruction bag is provided with a fourth pocket for holding the postal envelop.

[0077] In the embodiment shown, the multi pocket instruction bag is provided by sealing two flexible sheets of plastic material onto each other. The pockets are sealed along three sides and provided with one non-sealed top side, the latter providing an opening for inserting and removing objects from the compartment, for example a leaflet with instructions, an assembly, etc. The loop is cut from one of the flexible sheets. Alternatively, the loop can be obtained by sealing a sheet of plastic material onto one of the sheets used for making the pockets. In addition, sub pockets and further loops can be provided, for holding and or attaching further devices and/or instructions.

[0078] In the embodiment shown, the first and second pocket are separated by a first fold 557 and the second and third pocket are separated by a third fold 558. Thus, the first and third pocket can be folded onto the second pocket. Thus, the multi pocket instruction bag can be folded into a compact configuration, in which the pockets are located above each other. This facilitates transport by mail.

[0079] In the embodiment shown, the pockets are provided with an open insert opening, such that inserts, for example a leaflet with instruction, can be engaged directly for instant removal. In an alternative body, one or more of the pockets can be provided with an opening that can be closed or sealed after the instructions have been inserted. Thus a person has to tear open the pocket prior to removing its contents. Alternatively, the pockets can be provided with an opening that is provided with a flap to be inserted in the compartment for closing the opening, with an adhesive strip or a zip lock, etc. Suitable devices for closing a flat plastic bag or envelope known in the

prior art can be used.

[0080] The multi pocket instruction bag show in Fig. 7 is presented to a user in combination with a return envelope for returning the assembly holding the sample holder. For example, the multi pocket instruction bag and return envelope can be sent to a user by mail.

[0081] In such an embodiment the user will receive an envelope holding the multi pocket instruction bag and the return envelope. In an alternative embodiment the multi pocket instruction bag is provided with an additional pocket holding the return envelope or the return envelope is provided in the same pocket as the assembly.

[0082] The user confronted with the multi pocket instruction bag, will, if necessary, unfold the multi pocket instruction bag and position the bag such that the pockets are presented next to each other, as shown in Fig. 7. The pockets are clearly marked one, two and three, such that the sequence in which the pockets should be checked is clear. The user will remove the letter 551 form the first pocket indicated with the number one. Subsequently, the leaflet from the second pocket will be consulted, providing instructions on how to take a sample. The sample holder 502 will be removed from below the second pocket to take the sample. Finally, the assembly will be removed from the third pocket, such that the sample holder holding the sample can be inserted therein. The sealable envelop of the assembly is provided with instructions (not shown in the Fig.) on how the sample holder should be inserted in the assembly, and how the sealable envelope should subsequently be sealed and inserted in the return envelope. Thus, the user is guided by the multi pocket instruction bag through the process of taking a sample and returning the sample holder with sample to an predetermined address.

[0083] It is observed that in an alternative embodiment, the sealable envelope of the assembly according to the invention can also be the return envelope, i.e. is provided with the return address and postage to allow for transport by mail.

[0084] In a further embodiment of a kit according to the invention, the assembly holding the sample holder is not returned by mail individually. In such an embodiment, the user has to deliver the assembly holding the sample holder with sample at a collection point, for example at a practice of a general practitioner. From there, postal envelops or containers holding multiple assemblies are dens by mail to the return address, for example a laboratory for examining the samples.

Claims

1. Kit for transport of a biological sample to an intended recipient, comprising:

- a sample holder in the form of a vial with a closure for containing the biological sample;
- an assembly for holding the sample holder, the assembly comprising:

  = a protective structure, which protective structure comprises a semi rigid front panel and a semi rigid back panel, which front panel and back panel are connected such that they form a semi rigid structure that defines an interior space between the front panel and the back panel, and an opening at one end of the protective structure that communicates with said interior space for inserting the sample holder in said interior space,
  = a fluid tight sealable bag, which sealable bag has a bag interior, an opening for communicating with the sealing bag interior, and a fluid tight closure flap movable between an open position, in which the sample holder may be inserted into and removed from the bag interior via said opening, and a closed position, in which it seals the opening fluid tight to retain the sample holder in the bag interior;
  = a fluid absorbing lining,

- a, preferably pre-addressed, postal envelop, for holding the assembly with sample holder;

wherein the protective structure is provided inside the sealable bag interior and the fluid absorbing lining is provided inside the sealable bag interior between the front panel and the sealable bag and between the back panel and the sealable bag, and

wherein the protective structure is positioned with its opening in line with the opening of the bag, and is configured such that it holds open the opening of the sealing bag to facilitate inserting a sample holder into the interior space of the protective structure via the bag opening.

2. Kit according to claim 1, wherein the protective structure comprise a rectangular front panel and a rectangular back panel, each panel having two side edges, a top edge and a bottom edge, which panels are connected to each other along their two sides and wherein at least one of the panels is bend or folded such that the panels form an opening between their top edges, for example a wing shaped opening, an almond shaped opening, a diamond shaped opening, or an triangular shaped opening.

3. Kit according to claim 2, wherein the width of the opening of the protective structure is substantially larger than the height of that opening, such that the opening has an elongated shape, and wherein the width is preferably at least 3,5 times the height of the opening, more preferably at least 3,7 times the diameter of the height of the opening, most preferably is about 3,8 times the diameter of the sample holder.

4. Kit according to one or more of the preceding claims wherein the front panel has a width that is larger than the width of the back panel, such that, when the panels are connected along their two side edges, the front panel is curved or folded and the back panel is flat, and the protective structure has respectively a wing or triangular shaped opening, and wherein preferably the width of the front panel is larger than the width of the back panel but is smaller than 1,25 times the width of the back panel, preferably smaller than 1,2 times the width of the back panel, for example 1,15 times the width of the back panel.

5. Kit according to one or more of the preceding claims wherein the sealable bag is provide with a front panel and a back panel sealed together along the two side edges and the bottom edge of these panels, and wherein the width of the inner space of the bag has a width similar to or larger than the width of the front panel of the protective construction, such that bag can hold the protective structure with its front panel in a curved state and in a flattened state.

6. Kit according to one or more of the preceding claims wherein the protective structure is provided with one or more rib elements extending in the interior space between the front panel and the back panel, which rib elements preferably are folded partial cut outs from the front and/or back panel.

7. Kit according to one or more of the preceding claims wherein the protective structure is folded form a single strip of semi rigid material, such that the front panel and the back panel are connected via a fold along at least one of their sides.

8. Kit according to one or more of the claims 1-6, wherein the protective structure is folded form a single strip of semi rigid material, such that the front panel is connected to the back panel via at least one intermediate panel.

9. Kit according to one or more of the preceding claims wherein the fluid absorbing lining is a sleeve, preferably a sleeve bag, that has a sleeve interior configured to hold the protective structure with the sample holder, and has at least one opening communicating with said sleeve interior, which opening is dimensioned for passing through the protective structure such that it can be positioned in the sleeve interior with its opening in line with the opening of the fluid absorbing sleeve.

10. Kit according to one or more of the preceding claims wherein the dimensions of the opening of the protective structure, the sealable bag, and, if present, the fluid absorbing sleeve or sleeve bag, generally correspond in shape and dimensions, such that they form what is essentially a single opening for passing through the sample holder.

11. Kit according to one or more of the preceding claims wherein the protective structure is made of a semi rigid and light weight material, for example plastic or cardboard, preferably is folded form a blank of such material.

12. Multi pocket instruction bag, the pockets of which comprise one or more components of a kit according to one or more of the claims 1-11 and/or instructions on how to use one of more of these components of said kit, wherein the multi pocket instruction bag is configured for presenting the components and instructions to a nonprofessional user in an ordered, predetermined sequence, thus guiding said user through the process of taking the sample and returning it by mail.

13. Multi pocket instruction bag according to claim 12, wherein the multi pocket instruction bag, preferably the pockets of the multi pocket instruction bag are provided with signs, symbols, letters, numbers, and/or pictures which indicate the user in which sequence the pockets, more in particular the content of the pockets, have to be consulted and/and or are to be used.

14. Multi pocket instruction bag according to claim 12 or 13, wherein the pockets of the multi pocket instruction bag are provided such that one or more of the pockets, the pockets holding instructions and/or components of the kit, can be folded upon one another to provide the multi pocket instruction bag with a compact configuration and facilitate transport by post.

15. Method for providing a biological sample, using a kit according to one or more of the claims 1-11, preferably in combination with a multi pocket instruction bag according to one or more of the claims 12-14.

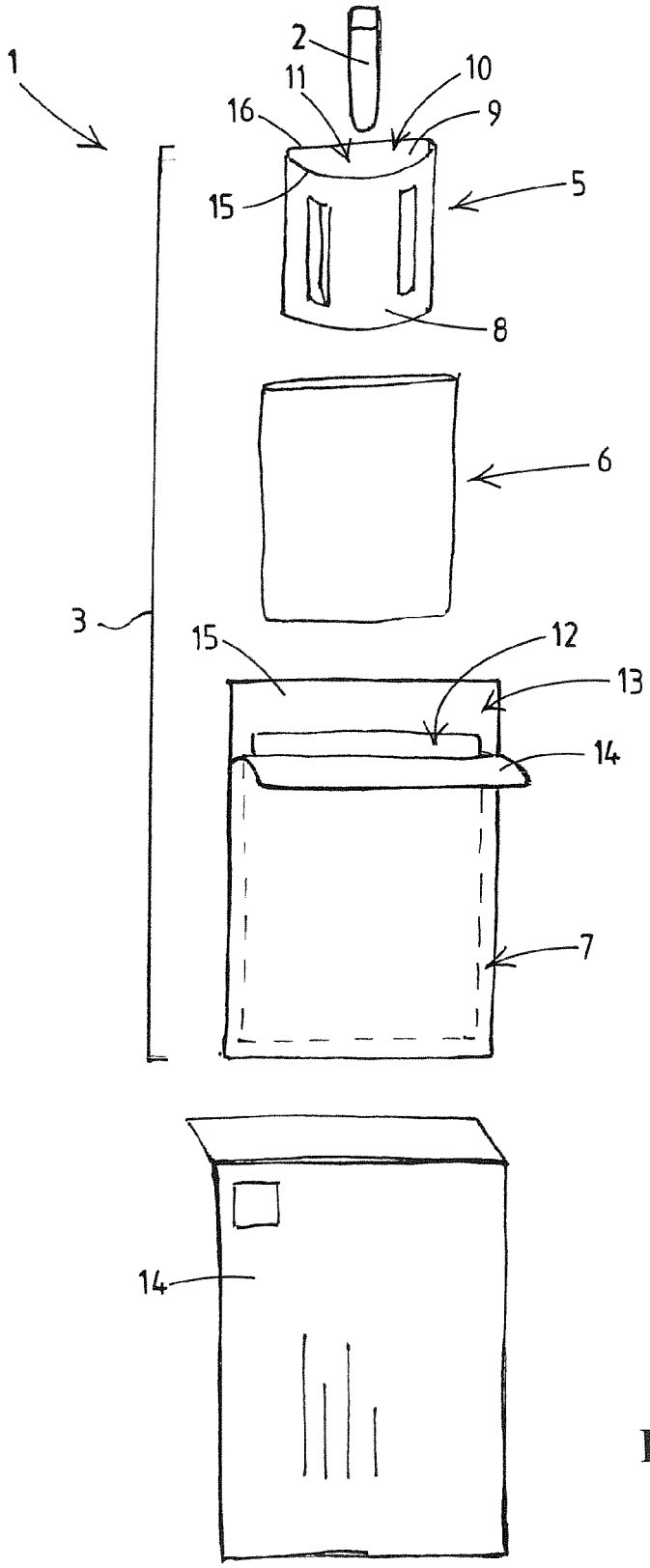

Fig.1

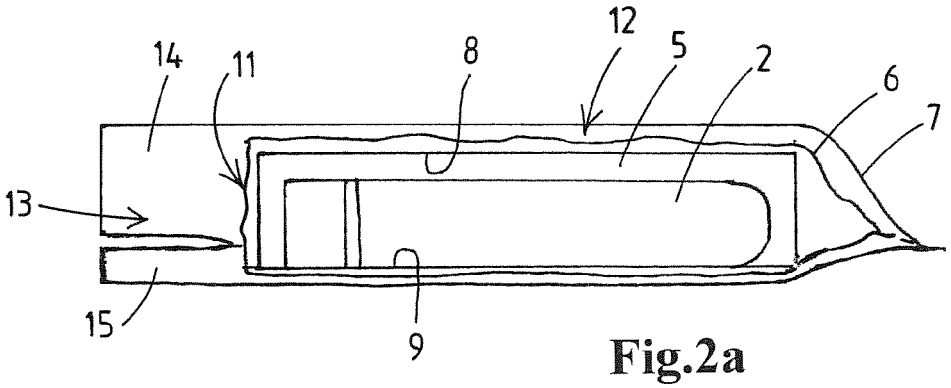

Fig.2a

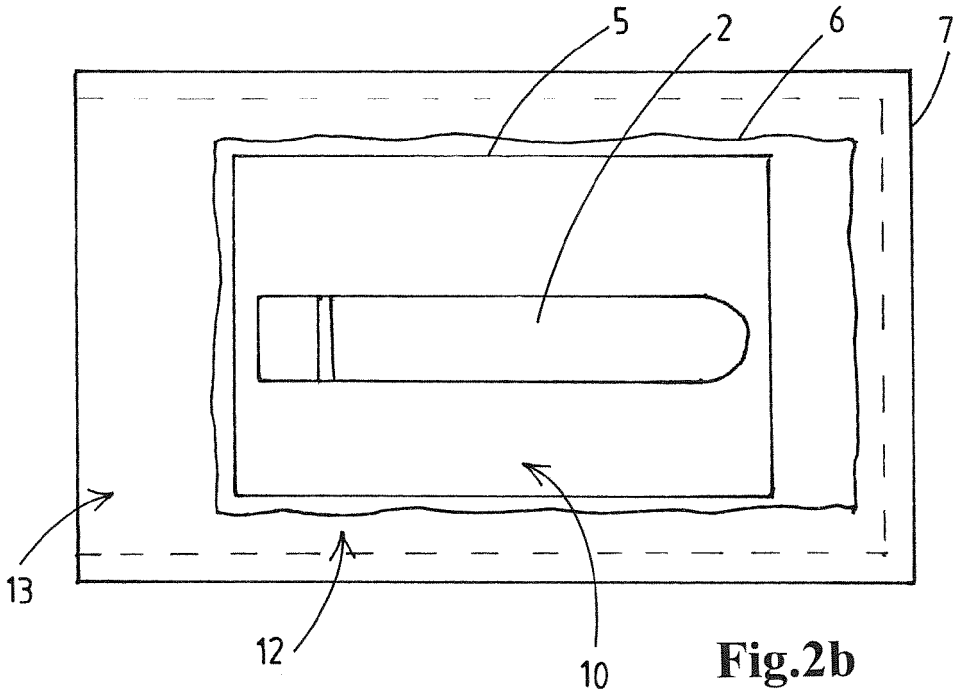

Fig.2b

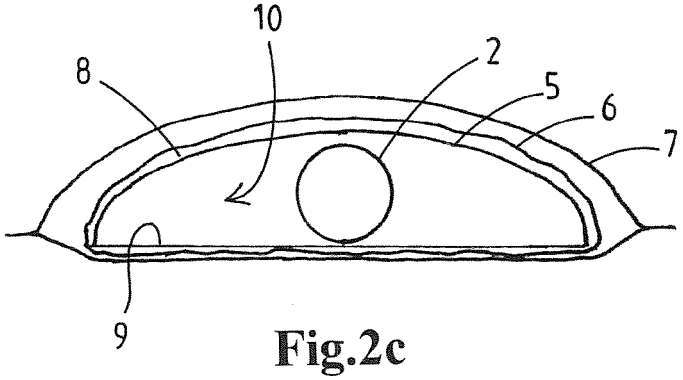

Fig.2c

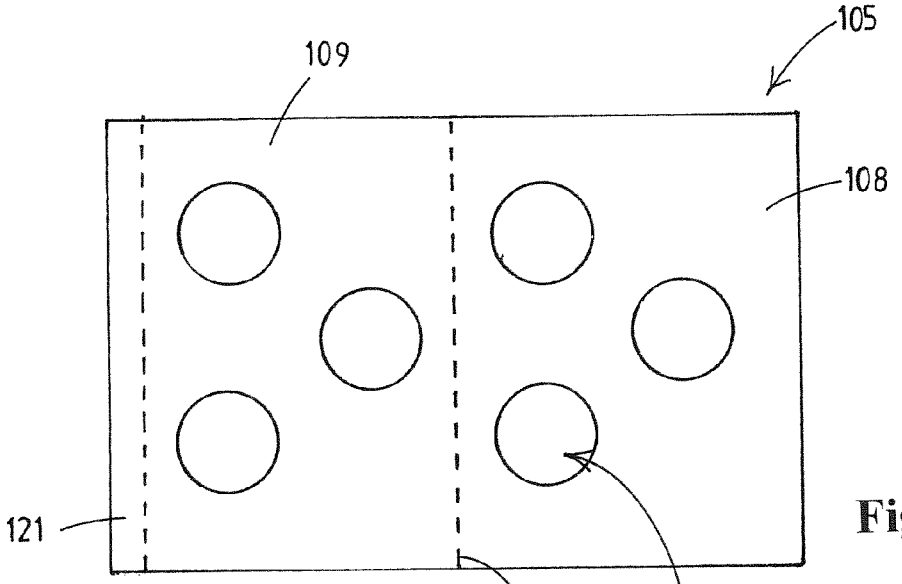

Fig.3a

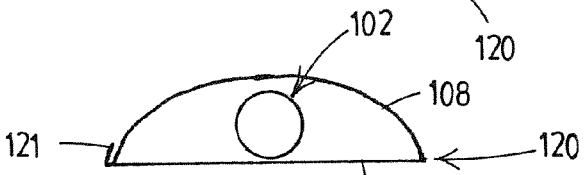

Fig.3b

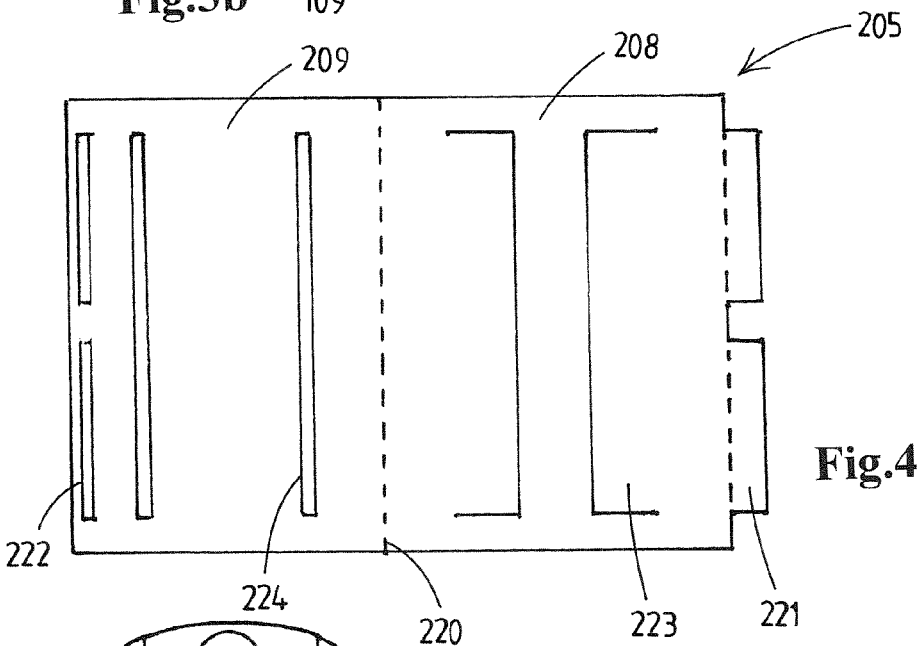

Fig.4a

Fig.4b

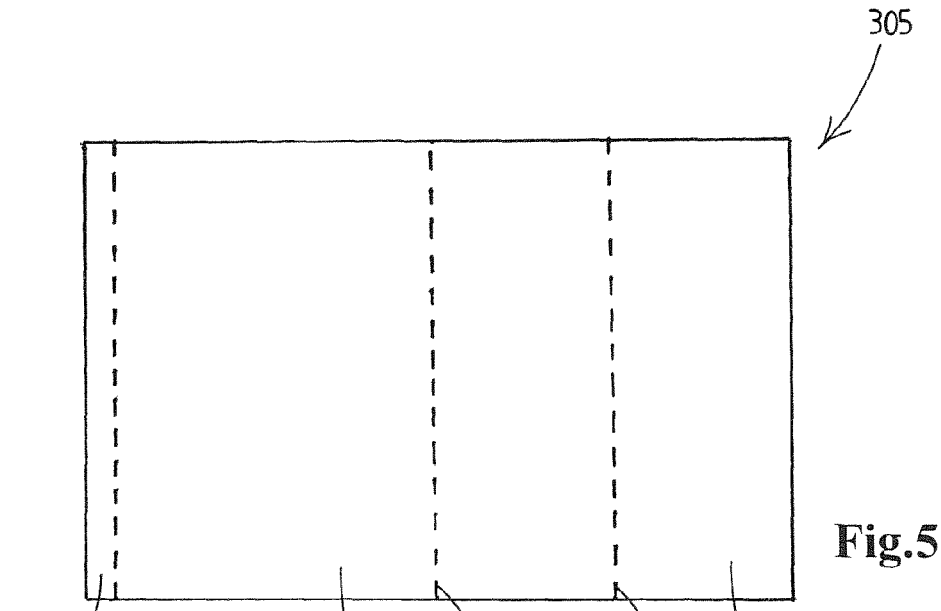

Fig.5a

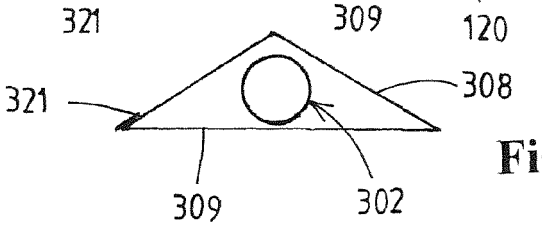

Fig.5b

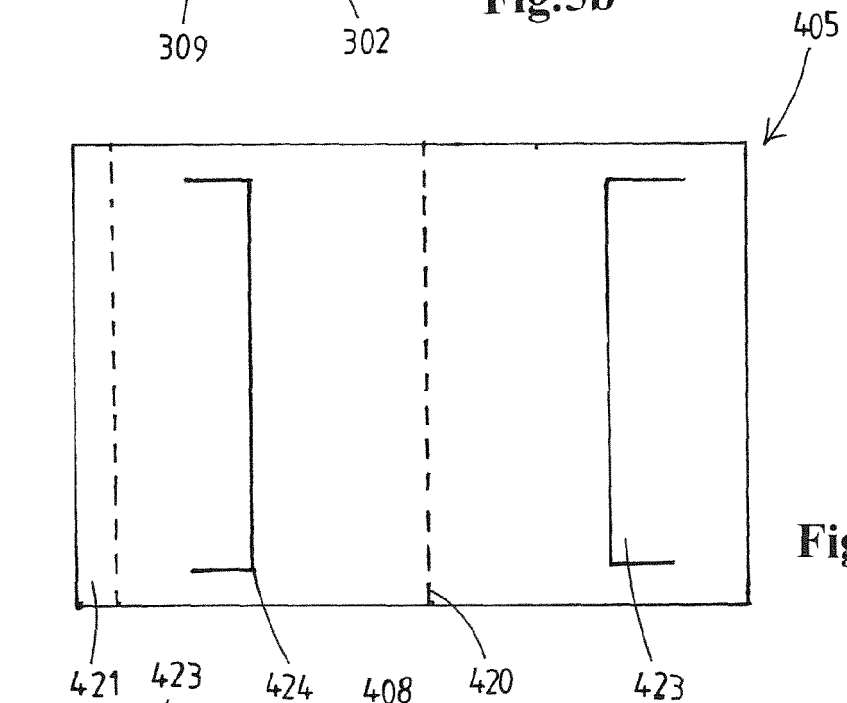

Fig.6a

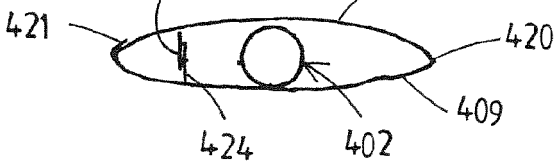

Fig.6b

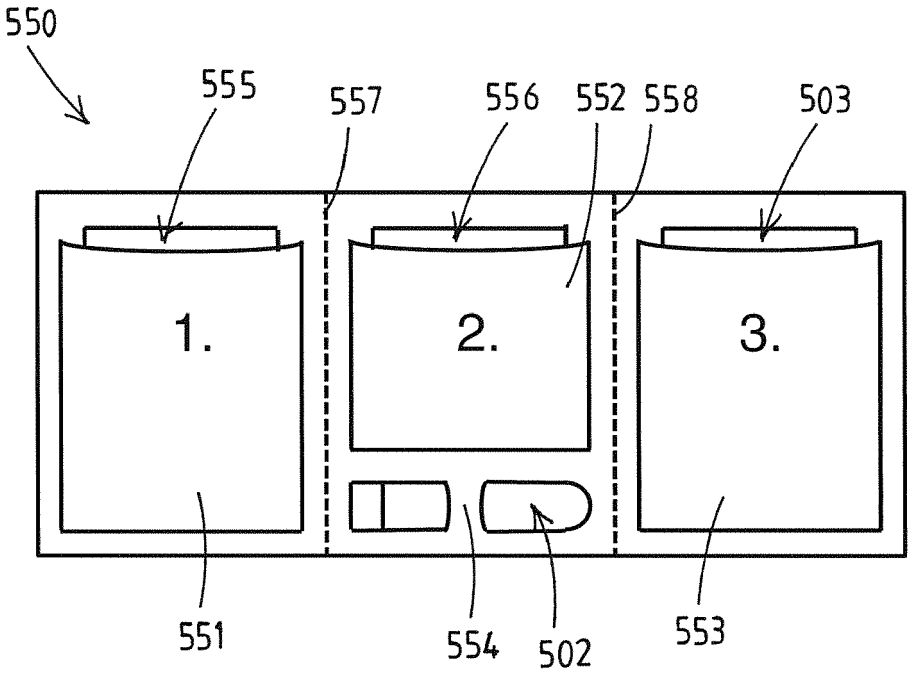

Fig.7

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EUROPEAN SEARCH REPORT

Application Number
EP 13 19 5498

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 December 2013	Sinn, Cornelia

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EUROPEAN SEARCH REPORT

Application Number
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