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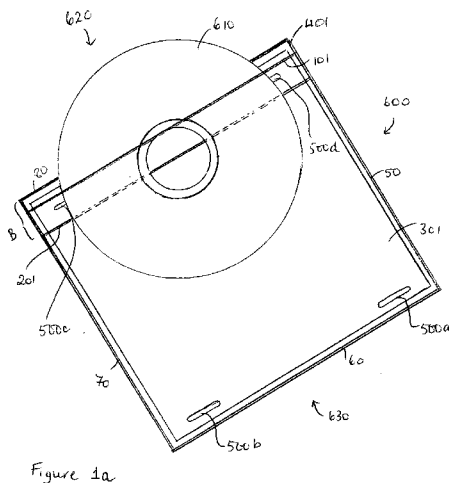
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(57) Abstract: The present invention relates to a pouch for storing and transporting machine- readable discs which may be used numerous times and which protects the contents of the sleeve from breakage and abrasion, which comprises a first and second layer of flexible material and a third layer which comprises a non-abrasive material; wherein the third layer of non-abrasive material is interposed between the first and second layers of material; and wherein the first and second layers and the non- abrasive layer are connected to form a pouch, also claimed is a method of preparing a sleeve or pouch for use in storing and transporting machine-readable discs.



WO 2010/001130 A2

POUCH AND METHOD

The present invention relates to improvements in the packaging and transportation of machine-readable discs. More specifically the present invention relates to a method of and improvements in packaging for containing, protecting and transporting DVDs and CDs, primarily for but not limited to transportation by the postal or mailing industry.

The choice of games, films and music available to consumers today for recreational purposes is constantly increasing. With such a wide choice of titles and subject matter available, the public increasingly choose to rent a specific film, game or CD on disc rather than purchasing titles.

One way of obtaining films, games or CDs is to obtain a rental copy of one or more of the discs containing said film, game or music by way of ordering the selected DVD, game or CD over the Internet. The selected disc is then sent to the end user by a rental outlet using the postal service. When the end user has finished with the DVD, game or CD, the disc is returned to the rental outlet for use by another party.

The DVDs, games or CDs are generally issued with a means for returning the article to the rental company. This return means usually also involves using the postal service, which allows a rapid return of the DVD, game or CD for re-hire.

A key feature of this form of rental operation is that the machine readable data, such as for example the software, stored on the game, DVD or CD must be protected from damage during the transportation process, thereby enabling use of the particular articles a number of times. If the DVDs, games or CDs are damaged either at the point of receipt of the end user or upon return to the rental company then the whole rental system fails leading to disgruntled customers and loss of revenue for the rental company.

In addition, it should be noted that postal services apply strict rules to the transportation of articles with the cost of transportation increasing greatly if the size, weight and form of packaging does not comply with the terms and conditions laid down by the postal delivery system.

There is therefore a requirement for a means of transporting DVDs, games and CDs via postal services that ensures the transported discs are not damaged or scratched upon receipt by either the end user or the rental company and which complies with the strict postal rules for transporting large quantities of such articles via the postal system.

There are currently a number of articles available which attempt to provide a means of transporting machine-readable discs for example DVDs, games and CDs.

One example, of this type of transportation means exists in the form of rigid plastic cases, also known as caddies. These cases or caddies are of a suitable strength that discs stored within may be readily transported. Unfortunately, the means of manufacturing the cases is such that the cases are required to be made of a certain size, weight and thickness in order to afford suitable protection for the discs contained therein.

The rules imposed by postal services have the effect that the size and thickness of the cases renders them unsuitable economically to be mailed by the postal service on a large scale. In addition, the rigid plastic materials that the cases are made of means that the cases are prone to cracking and breakage during transportation with the risk of damage to the contents within.

A further example of a means of protecting machine-readable discs exists in the form of a lightweight sleeve. The sleeves are commonly manufactured as a simple open-ended wallet either with or without a window aperture. Typical sleeves are comprised of a non-woven synthetic paper like material. One example of this

type of sleeve have been developed by DuPont™ Industries and marketed under the trade name Tyvek™ for protecting DVDs and CDs.

Whilst sleeves comprised of Tyvek™ have been proven to be significantly more effective than any other material in protecting the data stored on DVDs and CDs from contamination, particularly by scratching, due to its non-abrasive smoothness and anti-static qualities, a major disadvantage of this form of product is that it is flimsy, is not impervious to marking and staining, and the appearance deteriorates rapidly with multiple use. In addition, such a sleeve produced solely from Tyvek™ alone is unable to withstand the rigours of multiple mailings making a Tyvek™ only sleeve unsuitable for the purposes of mailing and protecting games, DVDs and CDs.

Paper and cardboard sleeves have also been employed as a means of transporting and protecting machine-readable discs. Such paper and cardboard sleeves, like the Tyvek™ sleeves, are typically manufactured, as a simple open-ended wallet (with or without window aperture), from a variety of cellulose substrates, comprising for example various gram weights and thickness of paper, through to board weights, with various finishes to the surface.

The main disadvantage of these cellulose-based substrates is that over time they generate fibres that abrade the data stored on the discs and hence lead to surface damaged discs with impaired readability.

Whilst flexible plastic wallets comprised for example of polyvinylchloride (PVC) have been mooted as an alternative to card and paper wallets these too have drawbacks. PVC wallets exist which are manufactured as simple, open-ended, sleeves from two or more pieces or leaves, of flexible PVC. The PVC material may be of various microns in thickness, with each leaf being welded or glued along three of its four edges.

Whilst PVC wallets have the advantage that due to the transparency of the material the disc may be viewed directly through the wallet, and PVC affords greater protection from breakage for discs contained therein, than, for example, either Tyvek™ or paper product wallets, the PVC material is itself abrasive to the discs such that over time discs stored within the PVC sleeves can become unreadable due to scratching.

It is therefore an object of the present invention to provide a sleeve or pouch for storing and transporting machine-readable discs which overcomes at least some of the above disadvantages of the prior art.

It is a further object of the present invention to produce a sleeve or pouch for storing and transporting machine-readable discs which delivers not just longevity through multiple use, but also importantly protects the contents of the sleeve from breakage and abrasion, and which is particularly suited for use via the mailing/postage process.

It is yet a further object of the present invention to provide a method of preparing a sleeve or pouch for use in storing and transporting machine-readable discs which can be used numerous times via the mailing/postage process and which protects the contents of the sleeve from breakage and abrasion.

Therefore according to a first aspect of the present invention there is provided a pouch, suitable for use in the transportation and protection of one or more machine-readable discs comprising:

- a first layer of material;
- a second layer of material; and
- a third layer of non-abrasive material;

wherein the third layer of non-abrasive material is interposed between the first and second layers of material; and

wherein the first and second layers and the non-abrasive layer are connected to form a pouch.

The machine-readable discs preferably comprise one or more DVDs, games or CDs.

In accordance with the present invention the first, second and third layers of the pouch are synthetic. The first and second layers are also preferably flexible and are preferably transparent.

The third layer of synthetic, non-abrasive material preferably comprises a plastic material. More preferably the third layer of non-abrasive material comprise high-density polyethylene fibres.

The first and second layers of material preferably comprise a synthetic plastics material, more preferably polyvinylchloride (PVC). Even more preferably the second layer of flexible material comprises polyvinyl chloride with a textured surface.

In a preferred pouch according to the first aspect of the present invention the first and second layers of flexible material are connected along three sides. The first and second flexible layers are preferably connected by gluing or welding, most preferably by welding.

In addition, the layer of synthetic, non-abrasive material is preferably connected to the second layer of material, preferably by welding.

More preferably the layer of synthetic, non-abrasive material is preferably connected to the second layer and to the first layer or material by welding.

In one embodiment of the present invention the second layer of material is preferably extended in length with respect to the first layer of material to form a flap that may be inserted into the pouch.

In an alternative embodiment of the first aspect of the present invention the pouch further comprises a fourth layer of material which preferably comprises flexible plastic material, is preferably transparent and is preferably comprised of polyvinylchloride (PVC) and in addition a portion of which is cut away.

In addition, the fourth layer of material is preferably shorter in length than the first and second layers of flexible plastic material and is interposed between the first layer of flexible material and the layer of non-abrasive material. In this embodiment the fourth layer is attached to the first layer of plastic material along three sides to form a first feeding guide.

In a further embodiment of the present invention the pouch comprises a fifth layer. The fifth layer is also preferably comprised of a layer of flexible plastic material as described in relation to the fourth layer above. The fifth layer is preferably interposed between the second layer of flexible material and the layer of non-abrasive material and is attached to the second layer of plastic material along three sides to form a second feeding guide.

In accordance with a second aspect of the present invention there is provided a method for producing a pouch for use in storing and transporting machine-readable discs as described above in relation to the first aspect of the present invention comprising the steps of:

- i) introducing the required number of layers of material into an assembly machine prior to construction,
- ii) introducing the required number of layers of material into an assembly machine in the correct order;
- iii) securing the layers together in the required order;
- iv) removing any waste material from the finished pouches.

In the method according to the second aspect of the present invention prior to assembly of the pouch one or more of the materials for the component layers are 'panelled'.

The assembly machine comprises a multiple station rotary (turnable) welding machine using automated sheet feeders to lay down the leaves in the correct order

and position. Alternatively the assembly machine comprises a machine with manual sheet feeding arrangements.

Once the layers have been laid down in the required order, the required layers are plain rule line welded together. The plain rule line welding is performed using a high frequency welding machine and is preferably performed in a single operation.

In this single operation the layers are welded together on selected sides.

In addition, in the method of the present invention one or more of the layers are further held in position by one or more spot welds, which may for example be positioned at the corners of the layers.

Also, prior to assembly of the pouch one of the layers of flexible material is folded, or creased to accept a fold to form a flap prior to assembly of the layers.

For a better understanding of the present invention and to show more clearly how it may be carried into effect, reference will now be made, by way of example only, to the accompanying drawings, in which:

Figure 1a is an illustration of a disc pouch according to the first aspect of the present invention with a disc partially exposed.

Figure 1b is an alternative embodiment of a disc pouch according to the first aspect of the present invention with a disc partially exposed.

Figure 1c is yet a further embodiment of a disc pouch according to the first aspect of the present invention.

Figure 2a is an illustration of a disc pouch according to the first aspect of the present invention with a disc completely contained within the pouch.

Figure 2b is an alternative embodiment of a disc pouch according to the first aspect of the present invention with a disc completely contained within the pouch.

Figure 2c is yet a further alternative embodiment of a disc pouch according to the first aspect of the present invention with a disc completely contained within the pouch.

Figure 3a is an illustration of a disc pouch according to a first aspect of the present invention with no disc present.

Figure 3b is an alternative embodiment of a disc pouch according to a first aspect of the present invention with no disc present.

Figure 3c is yet a further alternative embodiment of a disc pouch according to a first aspect of the present invention with no disc present.

Figure 4 is an exploded view of a first example of a disc pouch according to the first aspect of the present invention.

Figure 5 is an exploded view of a second example of a disc pouch according to the first aspect of the present invention.

Figure 6 is an exploded view of a third example of a disc pouch according to the first aspect of the present invention.

Figure 7 is an exploded view of a fourth example of a disc pouch according to the first aspect of the present invention.

Figure 8 is yet a further alternative embodiment of a disc pouch according to the first aspect of the present invention with no disc present.

Considering the drawings in more detail.

In Figures 1a, 1b and 1c there is illustrated a disc pouch 600, according to the first aspect of the present invention with a disc 610 partially exposed.

In Figures 2a, 2b and 2c there is again illustrated a disc pouch 600 according to the first aspect of the present invention with a disc 610 completely contained within the pouch.

In Figures 3a, 3b and 3c there is illustrated a disc pouch 600 according to a first aspect of the present invention without any disc present.

In each of Figures 1a, 1b, 1c, 2a, 2b, 2c, 3a, 3b and 3c the pouch 600 is comprised of a number of layers. More specifically, the pouch comprises a layer of non-abrasive material 301, that is a layer of material which will not impair the readability of a DVD, game or CD by scratching or abrading when the data side of such a disc is placed next to said material. This layer of non-abrasive material 301, is preferably synthetic and is preferably interposed between two layers of flexible material 101, 401. The flexible material is preferably not only flexible but also transparent.

A preferred non-abrasive material 301, comprises high-density polyethylene fibres and derivatives thereof, and is available, for example, under the trade name Tyvek™.

A preferred flexible and transparent material suitable for use in the present invention comprises a flexible plastic material such as for example, but not limited to, polyvinylchloride, (PVC). Other suitable flexible plastics materials that may be incorporated comprise polyethylene, or polypropylene. More specifically, lesser gauge polyethylene or light gauge polypropylene. However, polyvinylchloride is the preferred flexible plastics material.

It is also preferred that the flexible plastics materials comprising the pouch of the present invention have a durometer or shore hardness value in the range of 45 to 65. More specifically the flexible plastic materials utilised have a shore hardness value in the range of 50 to 65. Most preferably, the shore hardness values of the flexible plastics materials are in the range of 55 to 65.

In addition, it is also preferred that the pouch of the present invention is comprised of flexible plastics material which are of a suitable transparency to allow the title of any disc present within the body of the pouch to be viewed directly through

the flexible plastic material thereby obviating the need to remove the disc from the pouch in order to ascertain the disc contents.

The first and second layers of flexible plastic material 101, 401 are securely attached along three sides, 50, 60 and 70 in Figures 1a, 1b, 1c, 2a, 2b, 2c, 3a, 3b and 3c to form an open ended pouch with the open end denoted by 620.

In addition, in Figures 1a, 1b, 1c, 2a, 2b, 2c and 3a, 3b and 3c the pouch 600 can be seen to comprise a further layer 201 indicated by region B in Figures 1a, through to 3c inclusively.

The layer 201, is preferably also comprised of a flexible plastic material, for example polyvinylchloride. The layer 201 is also preferably transparent. More specially, the layer 201 is shorter in length than the first and second layers of flexible plastic material. The layer 201 of shorter length flexible plastic material is attached to the layer of plastic material 401 along three sides (50, 70 and 80) in order to form a 'feeding guide' such that correct insertion of a machine readable disc between the first layer of flexible plastic material 101 and the non-abrasive layer 301 is ensured.

Three sides of the first and second layers of flexible plastic material (101, 401) are also preferably secured together along three sides, (denoted by 50, 60 and 70 in Figures 1a to 3c inclusively). The preferred form of securing the three sides of the first and second layers of flexible plastic material is by welding. More specifically, the edges of the first and second layers (101, 401) of flexible plastic material are secured together by means of a high frequency welding machine. In use, the high frequency welding machine passes a current of electricity through a brass electrode tool head which heats said head to a suitable temperature. Once the required temperature is reached the brass head is pressed along and against the three edges 50, 60 and 70 of the first and second layers of flexible plastic material with the effect that the layers of flexible material (101, 401) are bonded or welded together.

The welding of the first and second layers of flexible plastic material (101, 401) preferably takes place continuously along the length of the sides of the layers in order to achieve a weld line to securely hold the first and second layers (101, 401) together.

It will however be appreciated by one skilled in the art that whilst the present invention employs the formation of a 'weld-line' to securely hold the first (101) and second (401) layers of flexible plastic material together, other weld formations may be used leading to variations in the weld patterns generated when securing the open sides of the first and second layers together.

In Figure 5 there is illustrated an exploded view of a first embodiment of the disc pouch according to a first aspect of the present invention. In this first embodiment the pouch comprises four layers or leaves of material in order to produce the finished product pouch. The first layer or leaf 101, is preferably comprised of a flexible, transparent polymeric material such as for example, but not limited to, polyvinylchloride (PVC).

The second layer or leaf, 201 is also preferably comprised of a polymeric material which is again transparent and flexible, for example, but not limited to, polyvinylchloride (PVC). In this preferred embodiment, the second layer 201, of transparent and flexible PVC is shorter in height than the first layer of flexible, transparent PVC, 101. The provision of a shorter length layer of flexible, transparent, PVC leads to the production of a pouch or sleeve that is more readily opened and enables correct insertion of a machine-readable disc into the pouch. Insertion of a machine-readable disc into a pouch with a shorter height second sheet is much easier than insertion of a machine-readable disc into a pouch in which both layers of flexible plastic material are of the same length. The shorter height second sheet or layer provides what will be referred to herein as a 'feeding guide'.

The third layer or leaf 301, is comprised of a layer of non-abrasive material, that is a layer of material which will not impair the readability of a DVD, game or CD by scratching or abrading when the data side of such a disc is placed next to said material. This layer of non-abrasive material is preferably synthetic. An example of such a non-abrasive material is comprised of, for example but not limited to, high-density polyethylene fibres. An example of such a material is commercially available under the tradename Tyvek™. This most preferred material is very strong and difficult to tear but is easy to cut with scissors or other sharp cutting objects such that the correct shape of material may be employed.

In addition, the layer of non-abrasive material, 301, such as for example Tyvek™, may be plain or alternatively may be printed as required.

Finally, the pouch or sleeve comprises a fourth leaf or layer of material 401. The fourth layer of material is preferably also comprised of a layer of flexible, transparent polymeric material, for example, polyvinyl chloride (PVC). More preferably the fourth layer of flexible PVC material comprises a layer of flexible polyvinyl chloride (PVC) which comprises a textured surface and is commonly referred to as having an 'orange peel finish' PVC.

The purpose of using 'orange peel finish' PVC as the fourth leaf of the pouch is that this form of PVC material prevents stacked finished sleeves or pouches from adhering to one another when stored in a stacked arrangement or row.

In this preferred embodiment of the present invention the fourth layer of flexible PVC material has a shore hardness value in the range of 50 to 60. More specifically, the layer has a shore hardness of 55 and is comprised for example of clear Atlas polyvinylchloride (PVC). In contrast, the first layer of flexible plastics material 101, has a shore hardness value in the range of 55 to 65. More specifically, the first layer 101 of flexible material has a shore hardness value of 62 and is comprised of Dulis polyvinylchloride (PVC).

In the preferred embodiment illustrated by Figure 5, three edges 110, 112, 114, of the first layer of flexible material 101 are secured to three edges of the fourth layer of flexible material 410, 412, 414 by for example welding or gluing, more preferably welding.

With regard to the second layer of flexible material 201, two sides of this layer 210 and 214 are secured to edges 110 and 410, and 114 and 414 of the first 101 and fourth 401 layers of flexible material respectively, again preferably by welding. In addition, a third edge 216 of the second layer of flexible material is secured to a corresponding edge of the fourth layer or leaf of flexible material, 416. Again, edges 216 and 416 on the respective layers are preferably secured by welding. The attachment of the relevant edges of the first and fourth layers together as described above in combination with edges 216 and 416 of the second 201 and fourth 401 layers together respectively has the effect of forming a pouch or sleeve with an opening at one end.

The construction of the open-ended pouch or sleeve described above enables a disc to be inserted into the pouch. More specifically, because of the specific welding of the sides of the layers, insertion of a disc, or CD into the pouch is preferentially controlled such that the printed side of the disc faces towards the outside of the sleeve and can thus be read through layer 101 of transparent flexible polymeric material. Furthermore, when a disc is inserted as described above, the construction of the pouch ensures that the data side of the disc rests against a first surface of the non-abrasive (Tyvek™) layer, 301.

Most preferably the non-abrasive (Tyvek™) layer is sized to extend completely over the data readable portion of the disc. However, the non-abrasive layer is also sized such that the layer does not extend fully to the edges of the first and fourth layers of flexible material, 101 and 401 respectively, and is not secured to the first and fourth layers by for example weld lines along sides 110, 410, 112, 412 and 114, 414 respectively. Instead the non-abrasive layer is sized to fit within the

boundaries of the secured or welded portions of the first and fourth layers 101 and 401 respectively.

In order to ensure that the non-abrasive (Tyvek™) layer, 301 is maintained in position as a smooth sheet within the pouch, the non-abrasive layer 301 is welded at specific locations to the flexible layers of material. In Figure 5, these weld points are indicated by weld points, 225, 226, 325, 326, 425, 426 at the uppermost or open end region of the pouch, and weld points 127, 128, 428 and 429 in the lower region of the pouch. Whilst in Figure 5 the weld points are indicated as substantially rectangular, it will be appreciated that the shape and position of the weld spots may be altered so long as the non-abrasive layer 301 is held in position by the weld spots.

For example, as illustrated in Figure 5, in addition, to the side edges of the layers of flexible material (101, 401) being secured together preferably by weld lines along the side edges of the layers, the layers are also secured towards, for example, the corners of the pouch. That is, three of the layers are secured together in, for example, two adjacent corners at the open end of the pouch, 201, 301 and 401 and three of the layers 101, 301 and 401 are secured at the opposing bottom two corners of the pouch.

The securing of the layers at, for example, the corners of the pouch is also preferably by welding. The act of welding the layers together at substantially the corners of the pouch results in 'cut-out' portions or regions of the pouch. That is, the heat generated during the welding process effectively melts the flexible synthetic layers of polymeric material 101, 201 and 401 and the layer of non-abrasive layer 301 resulting in 'cut-out' portions. It will be appreciated by one skilled in the art that the shape of the cut-out portions may vary depending upon the pattern of the welding which may produce for example, circular, rectangular or slot arrangements. It will also be appreciated that whilst in this embodiment welds are indicated at, for example, the corner regions of the pouch alternative 'spot' welding of the layers may occur so long as the 'spot welds' hold the non-abrasive layer in place.

For example, in the illustrations of the pouch according to the first aspect of the present invention in Figures 1a, 2a and 3a, pattern welds 500a, 500b, 500c and 500d, located substantially at the corners of the pouch can be seen and which form a slot arrangement. The purpose of these slot-welds as described above being to hold in place the non-abrasive layer 301.

In alternative Figures 1b, 2b and 3b the pattern welds are substantially in the form of rectangular welds at the top edge of the pouch indicated by 510c and 510d and at the bottom edge of the pouch indicated by 510a and 510b.

As described above, the introduction of a disc between the correct layers or leaves of the pouch is assisted by means of securing the second leaf, 201 and fourth leaf 401 together along the length of their respective fourth sides, 216 and 416 respectively by welding or gluing. This extended securing of the second and fourth layers ensures that a disc is inserted into the pouch in the correct way, that is, between the first layer of flexible material 101 and the layer of non-abrasive material (Tyvek™) 301.

In a further preferred embodiment according to a first aspect of the present invention as illustrated in Figures 1c, 2c and 3c, the pouch is prepared as described in relation to Figure 5 above with the following changes. Firstly, at least two holes 701, 702 are created in the non-abrasive Tyvek™ layer 301. The two layers of flexible plastics material 101 and 401 are then spot-welded together through these holes, indicated by 800 in Figures 1c, 2c and 3c.

The holes (701, 702) and welds (800) so formed are positioned towards the lower third of the pouch and act to form a 'stop' or "bumper" which a disc inserted into the pouch rests against. The positioning of the holes and weld serves to prevent a disc inserted into the pouch from touching the bottom most weld line 60.

The presence of the holes and welds not only has the advantage that damage to the edge of the disc is prevented as a result of the disc rubbing against the bottom weld line 60, but also has the added advantage that the welds lock the Tyvek™ sheet 301 into position, thereby negating the need to weld Tyvek™ layer in place anywhere else.

Consequently, the welding needed to construct the pouch is simplified such that the shorter length PVC strip (feed guide 201) is only welded on three sides, that is 50, 70 and 80 (top and sides). The top of the feed guide layer 201 is still welded to the fourth layer of PVC 401 of the pouch as previously described above however, the sides are also welded to a greater extent to strengthen the side welds, to a range between 20mm and 50mm, more preferably 25mm, measured from the top edge of the pouch.

In this alternative preferred embodiment the non-abrasive Tyvek™ layer 301 is pre-drilled or punched with a preferably circular punch hole, of a size not more than 9mm in diameter, or less than 6mm. The holes are also positioned in the region of between 14 and 18mm from the left and right hand edge of the Tyvek™ layer respectively, more preferably 16mm from the left and right hand edge of the Tyvek™ layer and preferably between 20 and 25mm from the base of the Tyvek™ layer, more preferably 20mm from the base of the Tyvek™ layer.

Whilst in this preferred embodiment two 'bumper' holes are described in relation to forming a block or stop against which a disc may rest, it will be appreciated that alternatively, a number of 'bumper' holes could be formed in the Tyvek™ layer and the first and fourth PVC layers welded together about the holes accordingly in a arcuate manner, across the Tyvek™ layer to form a cup or dish into which the disc may rest.

In an alternative embodiment, as described in relation to Figure 6, if it is required that the pouch is to hold for example two discs, then an additional layer of flexible material 501, which is again shorter in length than the first 101 and fourth 401 layers of flexible material is employed. This fifth layer 501 which is substantially the same as the second sheet of flexible material 201, is positioned and secured in the same way as layer 201, but is instead located between the second side of the non-abrasive (Tyvek™) layer 301, and the fourth layer of flexible material 401. In this second embodiment of the first aspect of the present invention, the two substantially identical shorter layers of flexible material 201 and 501, with the non-abrasive (Tyvek™) layer 301 located between them, are secured to each other, preferably by welding along the edges 216 and 516 of the pouch and each side edge 210, 214 and 510, 514 respectively. This arrangement allows two machine-readable discs to be correctly inserted, that is, with the printed side of the discs facing outwardly, such that one of the discs may be read through the first layer of flexible (PVC) material 101, and the second disc through the fourth layer of flexible (PVC) material 401 respectively, (assuming both layers are suitably transparent) while the data side of each disc rests against either side of the non-abrasive (Tyvek™) layer 301.

Again, in this embodiment, holes and welds as described in relation to Figures 1c, 2c and 3c above may again be employed in order to provide 'bumpers' for both discs inserted into the pouch.

In a further alternative embodiment as illustrated with respect to Figure 4 of the present invention, the pouch comprises only three leaves. That is, two leaves 101 and 401 of flexible, transparent polymeric material (as detailed with respect to Figure 5) and a layer of non-abrasive material, 301, that is preferably comprised of Tyvek™ and which is interposed between the two layers of flexible (PVC) material. In this alternative embodiment, in which the non-abrasive (Tyvek™) layer is interposed between the two layers of flexible PVC material 101 and 401 either one or both of the

flexible layers of (PVC) material may be comprised of textured or 'orange peel' PVC material.

In this embodiment, the shorter are length layer(s) of flexible material, previously denoted by 201 (and 501), omitted. That is, in this embodiment, there is no feeding guide present.

In this embodiment which comprises only three layers of material, the two layers of flexible material 101, 401 are substantially of the same size and are secured together along three of their four side edges, namely 110, 410, 112, 412 and 114, 414 respectively. The side edges of the layers are preferably secured by gluing or welding, more specifically welding to produce a pouch which is open along one edge. In order to ensure that the non-abrasive (Tyvek™) layer, 301 is maintained in position as a smooth sheet within the layers of flexible (PVC) material, the non-abrasive layer is secured for example by welding at specific locations 325, 326, to the flexible layer of material 401. This creates again for example the weld slots as described above in relation to the previous embodiments.

That is, in addition, to the side edges of the layers of flexible material being secured together preferably by weld lines along the side edges of the layers, the layers 301 and 401 are also secured at for example the two corners at the closed end 630 of the pouch. That is, the two layers 301, 401 are secured together in two adjacent corners at the closed end 630 of the pouch to hold the non-abrasive layer in place.

The securing of the two layers 301, 401 at for example the closed end corners of the pouch is also preferably by welding. The act of welding the two layers together at the corners of the pouch results in 'cut-out' portions or regions of the pouch. More specifically, heat generated during the welding process effectively melts the flexible synthetic layer of polymeric material 401 and the layer of non-abrasive layer 301, together resulting in the 'cut-out' portions. It will again be

appreciated by one skilled in the art that the shape of the cut-out portions may vary depending upon the pattern of the welding.

Likewise, in this embodiment, holes and welds as described in relation to Figures 1c, 2c and 3c above may again be employed in order to provide 'bumpers' for a single disc inserted into the pouch.

In yet a further embodiment of the present invention as described in relation to Figure 7, which may be applied to either a pouch with three or four layers, the third or fourth layer of material (401), which preferably comprises a layer of transparent, flexible polymeric (PVC) material, more preferably a layer of textured, 'orange peel' PVC, may be extended such that it is longer in length than the other layers of material forming the pouch. This extended layer of flexible material 402 may then be folded over the top of the other layers of material to form a flap. The flap may then for example be folded inside the first layer of flexible (PVC) material thereby forming a closed pouch covering the opening 620 of the pouch.

In a still further embodiment of the present invention as described in relation to Figure 8 the pouch comprises a further modification which relates to layer 201. In Figure 8 it can be seen that a portion of layer 201 has been cut away, for example, by means of a die cut process. It will be appreciated that this shaping of layer 201 is preferably made prior to assembly of the pouch by welding and involves removing a section of the layer 201. The removed section of layer 201 is preferably semi-circular in shape. The removal of a portion of layer 201 has the effect that there is no part of PVC layer 201 which is in direct contact with a disc when the disc is placed inside the pouch.

It has been found that the removal of a portion of layer 201 ensures that during transportation of the discs there is no longer the possibility of the

condensation being generated on the PVC which can transfer to the play side of the discs creating a 'mottling' pattern which could impair the play function of the discs.

All other features of the embodiment illustrated in Figure 8 including for example the welding process and the layering of layer 201 are the same as previously described in relation to the first aspect of the present invention.

It will also be appreciated that the removal of a portion of the layer 201 can be performed for all of the embodiments described in relation to pouch of the present invention where layer 201 is present and also in respect of the layer of flexible material 501 which is described in Figure 6 for a pouch designed to hold multiple discs.

In the embodiments described above the materials from which each of the layers or leaves of the pouch are comprised will now be considered further.

The first leaf of the pouch 101, is preferably comprised of a sheet of flexible and most preferably transparent material, such as for example but not limited to polymeric materials. Suitable polymeric materials include for example polymers such as polyvinylchloride (PVC), polypropylene, polyethylene and derivatives thereof. However, the most preferred material for the flexible transparent layer comprises polyvinylchloride.

The first (101) and fourth (401) layers of flexible transparent material are preferably between 180 and 350 microns in thickness. More preferably between 250 and 350 microns in thickness, and most preferably between 300 and 350 microns in thickness.

The width of the first 101 and fourth 401 layers and hence the pouch is preferably between 122 mm and 135 mm wide, most preferably, between 124mm and 130mm and most preferably between 127 and 129mm wide.

The length of the first layer (101) and the fourth layer (401) and hence the length of the pouch, is preferably between 122 mm and 135 mm in length, most preferably the first layer (101) is 123 mm in length, and the fourth layer (401) is 135mm in length.

However, it will be apparent to one skilled in the art that the width and height of the pouch may vary in either one or both directions if the weld or glue widths of the closed sides of the pouch exceed 2.5 mm, or alternatively the one or more discs to be inserted into the pouch exceed the current industry standard of 120mm diameter.

In addition the height of the fourth layer (401) may be increased by between 5 and 10 mm over the height of the first layer to allow easier opening of the pouch in use.

The pouch is also preferably sized such that there is a minimum of 2mm in difference between the size of the machine-readable disc and the pouch opening, and a minimum clearance of 2mm between the edge of the disc and the edges of the pouch when a disc is inserted into the pouch.

The layer of non-abrasive material (301), which most preferably comprises high-density polyethylene fibres, such as, for example, Tyvek™ material may be either plain or alternatively printed on one or both sides. Furthermore, the material may be either colourless or coloured. The layer on non-abrasive material (Tyvek™) 301 is preferably between 118 mm and 133 mm wide, more preferably between 119mm and 125mm wide, and most preferably between 119 and 121mm wide. Even more preferably 120mm wide. The non-abrasive material layer (Tyvek™) is also preferably between 118 mm and 130 mm in length, more preferably between 120mm and 128mm in length and most preferably 127mm in length.

However, it will be again appreciated by one skilled in the art that the dimensions of the non-abrasive material layer (Tyvek™) may change in either one or

both directions if the weld or glue widths of the closed sides of the pouch exceed 2.5 mm, or alternatively the one or more discs to be inserted into the pouch exceed the current industry standard of 120mm diameter.

The second layer of preferably flexible, transparent material 201 and the fifth layer 501 in the embodiment described above and illustrated in Figure 6 above, that forms for example the second or fifth leaf of the pouch and which forms the feeding guide, is again preferably comprised of flexible and most preferably transparent material, such as for example but not limited to polymeric materials. Suitable polymeric materials include for example polymers such as polyvinylchloride (PVC), polypropylene, polyethylene and derivatives thereof. However, the most preferred material for the flexible transparent layer comprises polyvinylchloride. The polymeric material may also tinted.

The thickness of this second and fifth layer is preferably between 130 and 350 microns, more preferably, between 170 and 200 microns in thickness. The height of the second or fifth layer is typically between 9 and 50 mm, more preferably between 10 mm and 20mm high. The width of the second and fifth layer is between 122 mm and 135 mm, most preferably 128mm wide.

Again, the width of the second and fifth layer will vary within the limits indicated above if the weld or glue width of the closed sides exceeds 2.5mm, or alternatively if the standard disc size varies from the industry value of 120mm diameter.

According to a second aspect of the present invention there is provided a method of preparing a sleeve or pouch for use in storing and transporting machine-readable discs which can be used numerous times via the mailing/postage process and which protects the contents of the sleeve from breakage and abrasion.

The method suitable for producing the pouch according to the first aspect of the present invention comprises the following stages.

Prior to assembly of the pouch the materials for the component layers are carefully selected. For example, the layers comprised of flexible, transparent material such as polyvinyl chloride (PVC), are 'panelled' prior to assembly. This is, the layer is cut or guillotined to the required size from a mother reel, to a sheet size determined by the number of finished pouches which may be obtained from the reel for optimum production output, including necessary sheet edge waste.

The layer of 'non-abrasive' material, comprised of for example TyvekTM which may be either plain, or pre-printed, or a combination thereof, and which is supplied in either sheet or reel format, is also guillotined to the correct size for use in the correctly finished size of single pouch product or multiples thereof.

The required number of layers of material are then introduced into a machine for assembly. For example, one such suitable machine comprises a multiple station rotary (turnable) welding machine using automated sheet feeders to lay down the leaves in the correct order and position.

Other suitable machines which may be employed include machines with manual sheet feeding arrangements.

With regard to the order in which the multiple station rotary welding machine lays down the layers or leaves of material, for the preferred embodiment illustrated in Figure 5, which comprises four layers, namely, three layers of flexible, transparent polyvinylchloride, one of which is preferably textured or orange peel PVC, and a layer of non-abrasive material in the form of (TyvekTM), the four layers are laid down as follows:

Layer 4, leaf (401) (that is the textured 'orange peel' PVC layer), layer 3, (301), non-abrasive (Tyvek™) layer 2, leaf 201 (PVC feeding guide layer 2,) and layer 1, leaf 101 (PVC transparent, preferably front panel).

Once the layers have been laid down in the required order, the layers, (in the case of the embodiment relating to Figure 5, four layers) are plain rule line welded, that is a high frequency welding machine passes a current through a brass electrode tool which by this process is heated to a suitable temperature. The brass head is then pressed into the layers of PVC material (not the non-abrasive layer) which are heated sufficiently to bond or weld each of the flexible PVC layers together. This is preferably performed in a single operation. The preferred form of welding is plain line ruled welding.

More specifically, in this preferably single operation, layer 1, 101, is welded on three sides, namely, 110, 112 and 114, to layer 201 on three sides, 210, 214, 216, and also through to layer 4, 401 along four sides, 410, 412 and 414 and 416.

Alternatively, when the embodiment described in relation to Figures 1c, 2c and 3c is constructed with holes in the Tyvek™ layer 301 and spot welding of the first and fourth layers through the hole, the preferably single operation comprises welding layer 101 along two sides 110 and 114 to layer 201, along sides 210 and 214, and also through to layer 401, along sides 410 and 414. Layer 1, 101, is also welded on 3 sides 110, 112, and 114, to layer 4, 401, along 410, 412 and 414. Layer 2, 201 is also welded across top edge 216 to layer 4, 401, along 416.

The holes in layer of non-abrasive material 103 are preferably made prior to assembly and welding of the pouch.

Also, preferably in the same operation, two layers of flexible polymeric (PVC) material, 201 and 401, are spot or pattern welded together in a predetermined position at the same time striking through the layer or non-abrasive material

(Tyvek™) 301, at adjacent corner positions 225, 325, 425 and 226,326,426 respectively in order to permanently attach layer 301, into position.

Similarly, layer 101, is spot welded at pre-determined points 127 and 128 to layer 401 at points 427 and 428 respectively in order to further affix layer 301, comprised of the non-abrasive material (Tyvek™) into position.

Alternatively, holes are punched in the Tyvek™ layer prior to assembly and the first and fourth layers 101 and 401 welded through the holes accordingly.

In the final stage of the operation the waste material from the outer edges of the leaves are removed. The completed pouches are then separated into single sheets or leaves.

In one method of manufacture there is ideally no waste material to be removed between each of the pouch products, only slight trimming required around the outside edges of the pouches.

In an alternative method of manufacture there exists narrow strips or gutters of material between each product pouch. Once the manufacturing process is complete the waste material in the form of the strips or gutters is removed or 'stripped out' in a form that is commonly referred to in the industry as a 'ladder'. That is, all of the strips or gutters are connected and hence removed as continuous piece of material with the appearance of a ladder.

When it is required to produce an embodiment that comprises a flap 402, extending from layer 401, the stages of construction of the pouch described above are again followed. The difference with the 'flap embodiment' as illustrated in Figure 7 however is that prior to assembly the sheet of textured material preferably comprised of the flexible, 'orange peel' PVC 401, is folded, or creased to accept a

fold 402 as the final operation, before each of the layers are joined together to form the finished pouches.

For the manufacture of pouches comprised of only three layers 101, 301, 401 as described above in relation to Figure 4, which comprises either:

a layer of non-abrasive material 301, preferably comprised of Tyvek™ disposed between two layers 101, 401 of preferably flexible material, such as for example PVC; or

a layer of non-abrasive material 301, preferably comprised of Tyvek™ disposed between a layer of preferably flexible material 101, such as for example PVC and a layer of preferably flexible, textured material, such as for example 'orange peel' PVC 401,

a first layer of PVC material, layer 101 is welded on three sides, 110, 112 and 114, to either the second layer of PVC, 401 on three sides, 410, 412, 414 or the textured orange peel PVC layer 401, on three sides 410, 412, 414 respectively.

When the feeding guide layer 2, 201 is omitted, layer 1, 101 is spot welded at pre-determined positions 127 and 128 to leaf 4 at positions 427 and 428 respectively in the lower left and right corners of the pouch in order to fix layer 3, 301 into position. There are no top corner spot welds required.

In the case of producing a pouch in which there are two flexible, polymeric layers to form feeding guides 201, 501, as illustrated in Figure 6, comprised preferably for example of flexible PVC material positioned either side of the non-abrasive layer 301 of Tyvek™, such that the complete pouch is comprised of five layers in total, manufacture proceeds as follows, with the layers positioned as follows:

layer 4, leaf 401 (rear, textured 'orange peel' PVC layer), layer 5, 501 (PVC layer) layer 3, 301 Tyvek™, layer 2, 201, and layer 1, leaf 101 (PVC transparent front panel) wherein leaf 201 comprised of PVC is duplicated. In this embodiment, layer

101 is line welded to 401 along sides 112, 412. Layers 101, 201, 501, and 401 are all line welded together along sides 110, 210, 510, 410, and 114, 214, 514, 414 respectively. Leaves 201 and 501 are line welded together across the top edge 216 and 516.

However, in this embodiment, there are no spot-welds at the upper and lower corners between layers 501 and 401 as leaves 201 and 501 hold layer 301 in position alone by spot welds.

It will be appreciated by one skilled in the art that whilst welding is the preferred method of closure for the sides of the layers that other closure mechanisms could also be employed, for example but not limited for example, drilling through all of the leaves in predetermined positions and inserting metal or plastic eyelets.

In addition, it will also be appreciated that multiple pouches could be connected to hold for example 3 or more machine readable discs and this could be achieved by inserting an eyelet in one corner of the pouch corner, thereby allowing the pouches to be displayed in a fan like arrangement.

CLAIMS

1. A pouch, suitable for use in the transportation and protection of one or more machine-readable discs comprising:

a first layer of material;

a second layer of material; and

a third layer of non-abrasive material;

wherein the third layer of non-abrasive material is interposed between the first and second layers of material; and

wherein the first and second layers and the non-abrasive layer are connected to form a pouch.

2. A pouch according to claim 1 wherein the machine-readable disc comprises a DVD, game or CD.

3. A pouch according to claim 1 or 2 wherein the first, second and third layers are synthetic.

4. A pouch according to any one of the preceding claims wherein the first and second layers are flexible.

5. A pouch according to any one of the preceding claims wherein the first and second layers are transparent.

6. A pouch according to any one of the preceding claims wherein the third layer of synthetic, non-abrasive material comprises a synthetic plastics material.

7. A pouch according to claim 6 wherein the third layer of non-abrasive material comprise high density polyethylene fibres.
8. A pouch according to any one of the preceding claims wherein the first and second layers of material comprises a synthetic plastics material.
9. A pouch according to claim 8 wherein the first and second layers of material comprise polyvinylchloride (PVC).
10. A pouch according to claim 9 wherein the second layer of flexible material comprises polyvinyl chloride with a textured surface.
11. A pouch according to any of the preceding claims wherein the first and second layers of flexible material are connected along three sides.
12. A pouch according to claim 11 wherein the first and second flexible layers are connected by gluing or welding, most preferably by welding.
13. A pouch according to any of the preceding claims wherein the layer of synthetic, non-abrasive material is connected to the second layer of material.
14. A pouch according to claim 13 wherein the layer of synthetic, non-abrasive material is connected to the second layer of material by welding.
15. A pouch according to any of claims 1 to 13 wherein the layer of synthetic, non-abrasive material is connected to the second layer and to the first layer or material.

16. A pouch according to claim 15 wherein the layer of synthetic, non-abrasive material is connected to the first and second layer of material by welding.
17. A pouch according to any one of the preceding claims wherein the second layer of material is extended in length with respect to the first layer of material to form a flap which may be inserted into the pouch.
18. A pouch according to any one of the preceding claims further comprising a fourth layer of material.
19. A pouch according to claim 18 wherein the fourth layer comprises flexible plastic material.
20. A pouch according to claims 18 or 19 wherein the fourth layer is transparent.
21. A pouch according to any of claims 18 to 20 wherein the fourth layer of material is comprises polyvinylchloride (PVC).
22. A pouch according to any of claims 18 to 21 wherein the fourth layer of material is shorter in length than the first and second layers of flexible plastic material and wherein a portion of the fourth layer is cut away.
23. A pouch according to any of claims 18 to 22 wherein the fourth layer is interposed between the first layer of flexible material and the layer of non-abrasive material.

24. A pouch according to any of claims 18 to 23 wherein the fourth layer is attached to the first layer of plastic material along three sides to form a first feeding guide.
25. A pouch according any of the preceding claims comprising a fifth layer, wherein the fifth layer comprises a layer of flexible plastic material as described in relation to the fourth layer and as claimed in claims 19 to 22.
26. A pouch according to claim 25 wherein the fifth layer is interposed between the second layer of flexible material and the layer of non-abrasive material.
27. A pouch according to claim 25 or 26 wherein the fifth layer is attached to the second layer of plastic material along three sides to form a second feeding guide.
28. A pouch as substantially hereinbefore described with reference to and as illustrated in the accompanying drawings.
29. A method for producing a pouch for use in storing and transporting machine-readable discs as claimed in any one of claims 1 to 27 comprising the steps of:
- i) introducing the required number of layers of material into an assembly machine prior to construction,
 - ii) introducing the required number of layers of material into an assembly machine in the correct order;
 - iii) securing the layers together in the required order;
 - iv) removing any waste material from the finished pouches.
30. A method according to claim 29 wherein prior to assembly of the pouch one or more of the materials for the component layers are 'panelled' prior to assembly.

31. A method according to claim 29 or 30 wherein the assembly machine comprises a multiple station rotary (turnable) welding machine using automated sheet feeders to lay down the leaves in the correct order and position.

32. A method according to claim 29 or 30 wherein the assembly machine comprises a machine with manual sheet feeding arrangements.

33. A method according to any of claims 29 to 33 wherein once the layers have been laid down in the required order, the required layers are plain rule line welded together.

34. A method according to claim 33 wherein the plain rule line welding is performed using a high frequency welding machine.

35. A method according to claim 33 wherein the welding is formed in a single operation.

36. A method according to claim 35 wherein in the single operation selected layers or welded along selected sides.

37. A method according to any of claims 29 to 36 wherein one or more of the layers are further held in position by one or more spot welds.

38. A method according to claim 37 wherein the one or more spot-welds is/are positioned at the corners of the layers.

39. A method according to any of claims 29 to 38 wherein prior to assembly of the pouch one of the layers of flexible material is folded, or creased to accept a fold to form a flap prior to assembly of the layers.

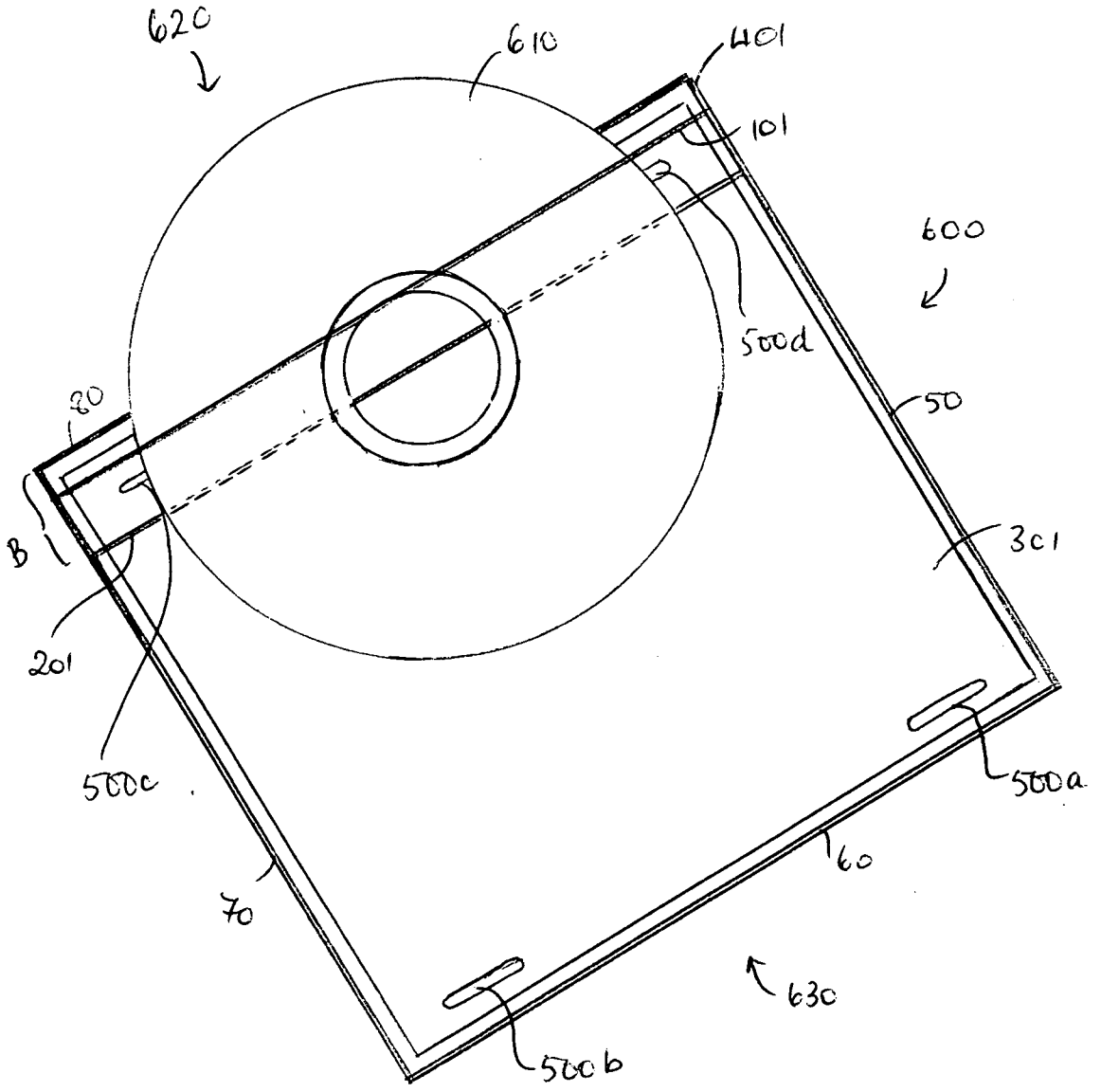


Figure 1a

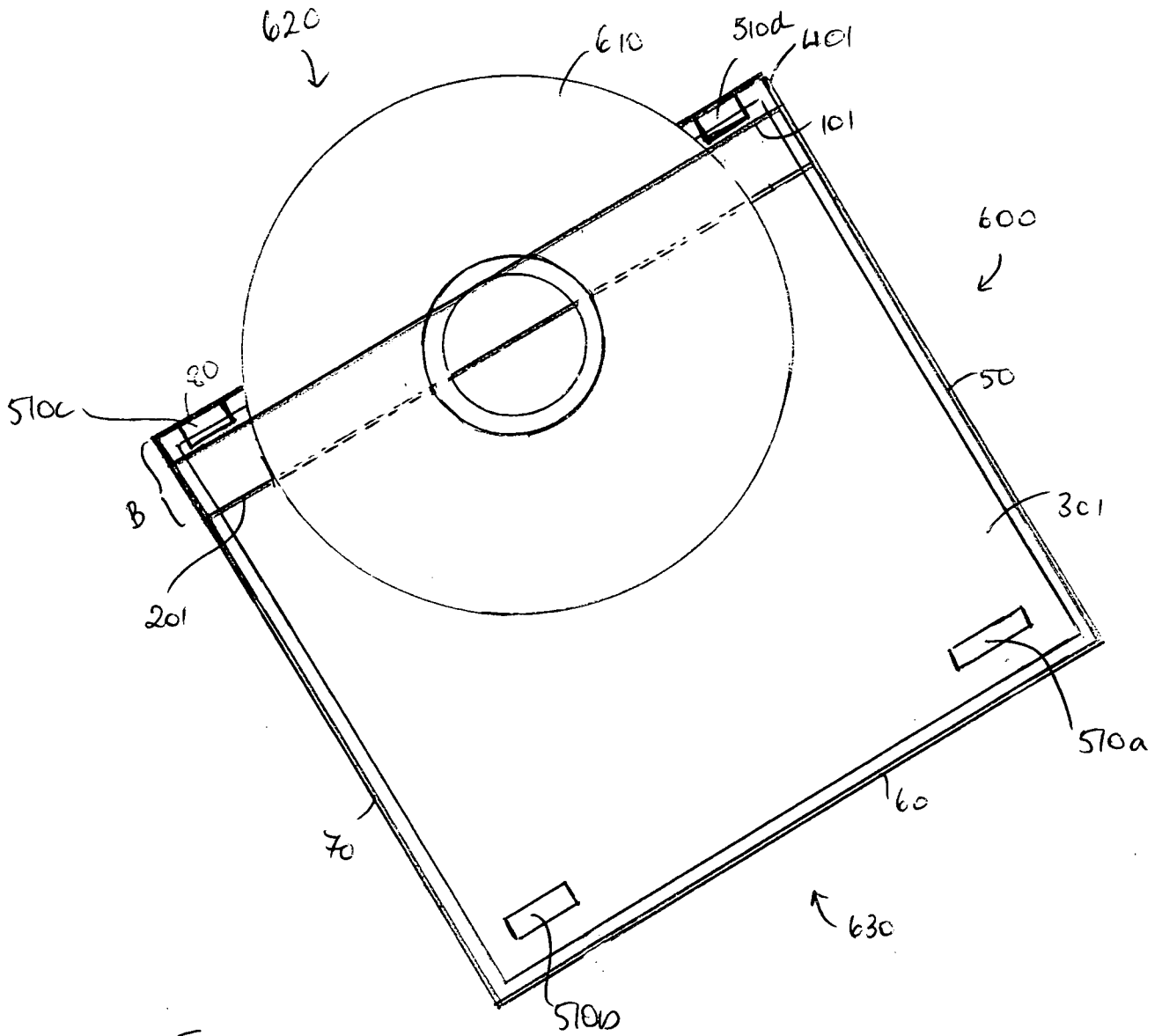
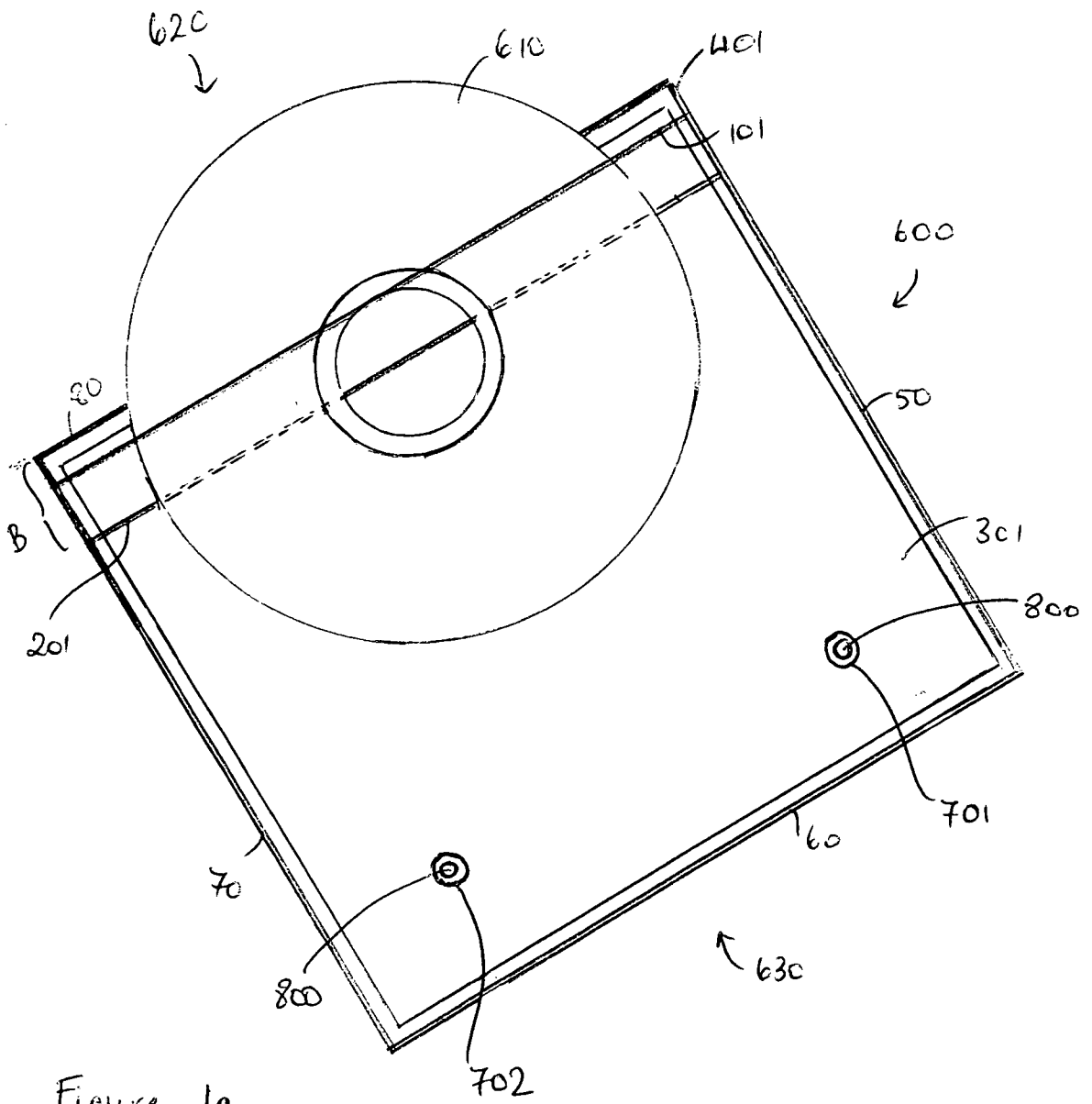


Figure 1b



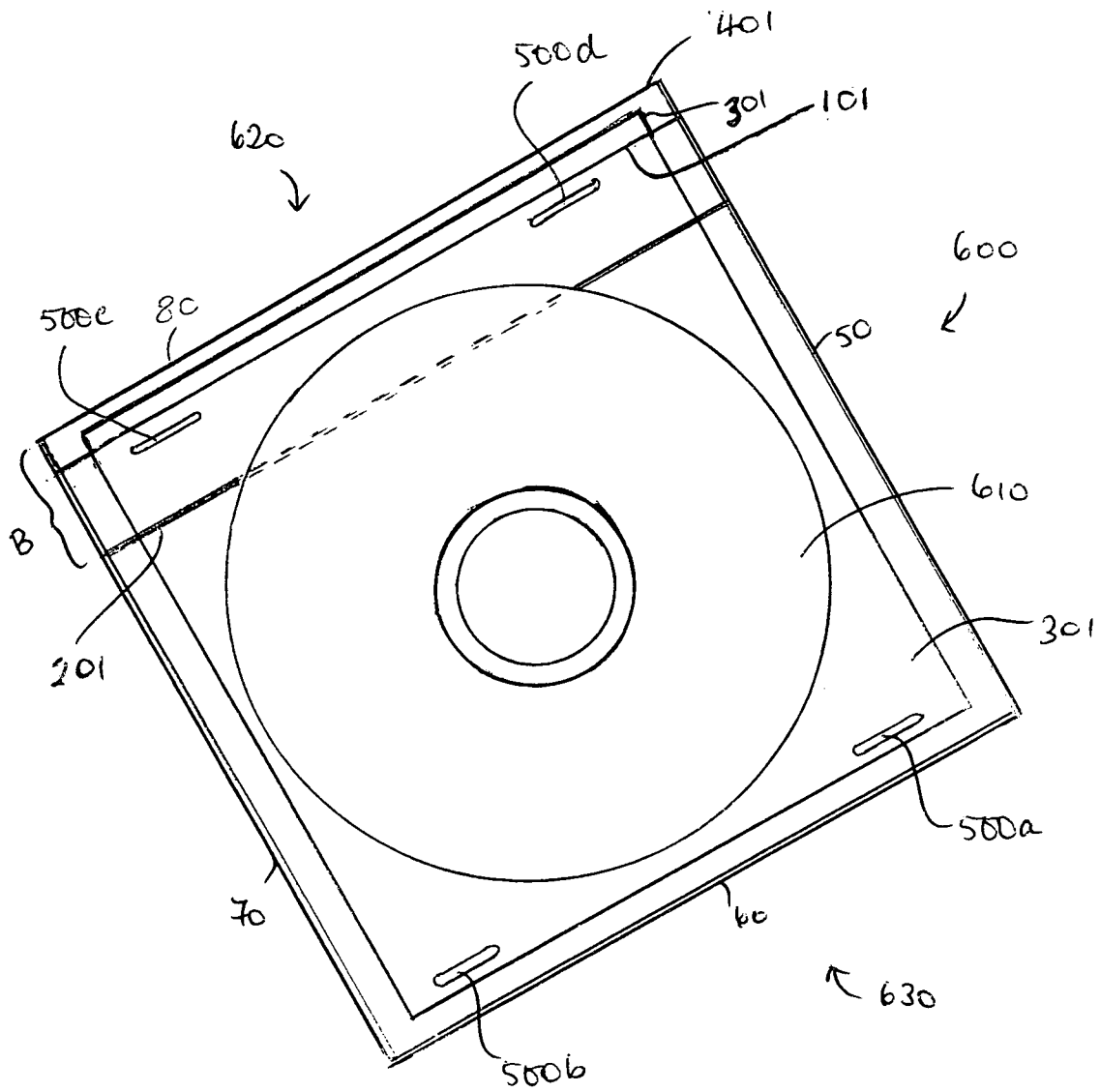


Figure 2a

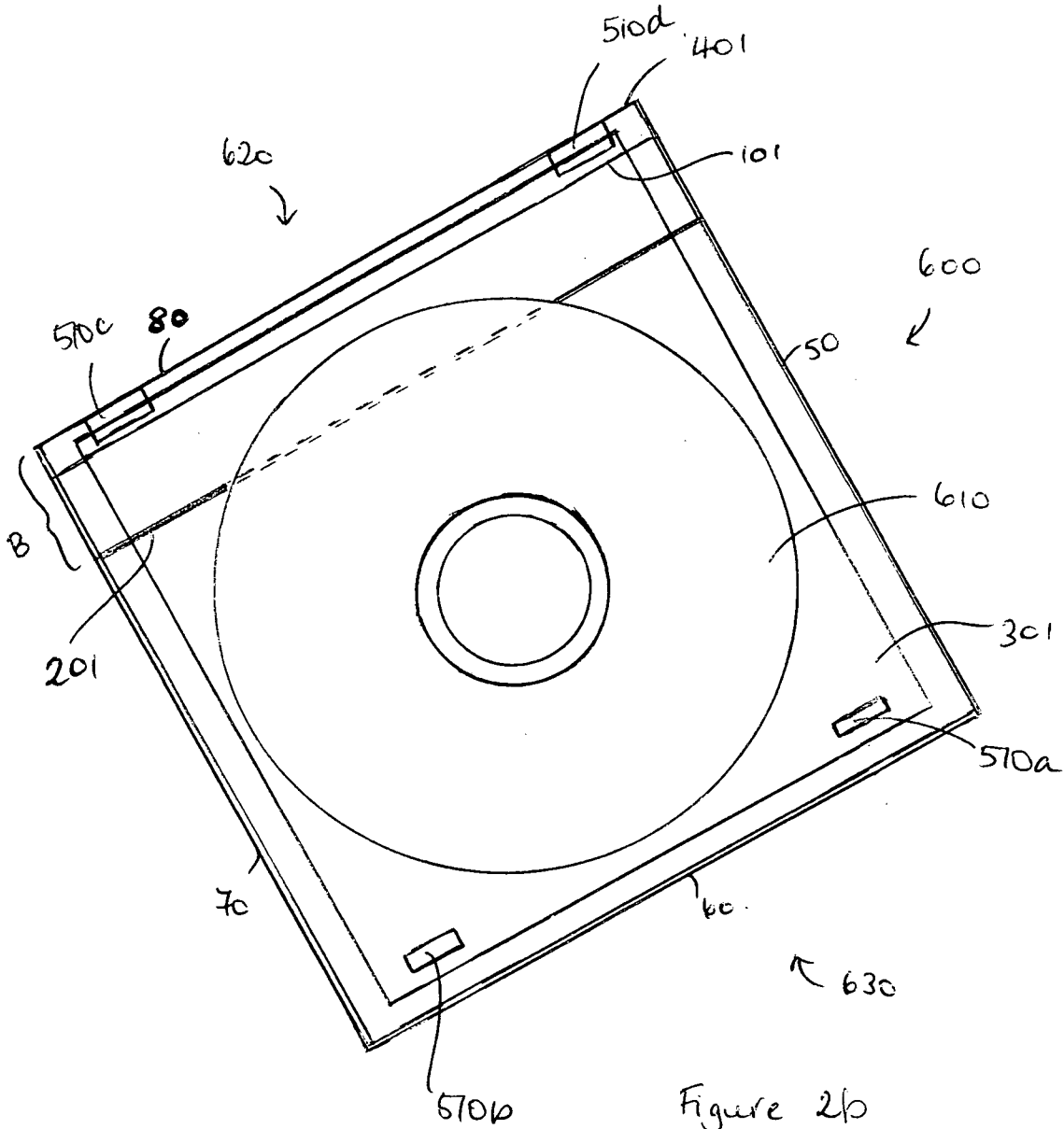


Figure 2b

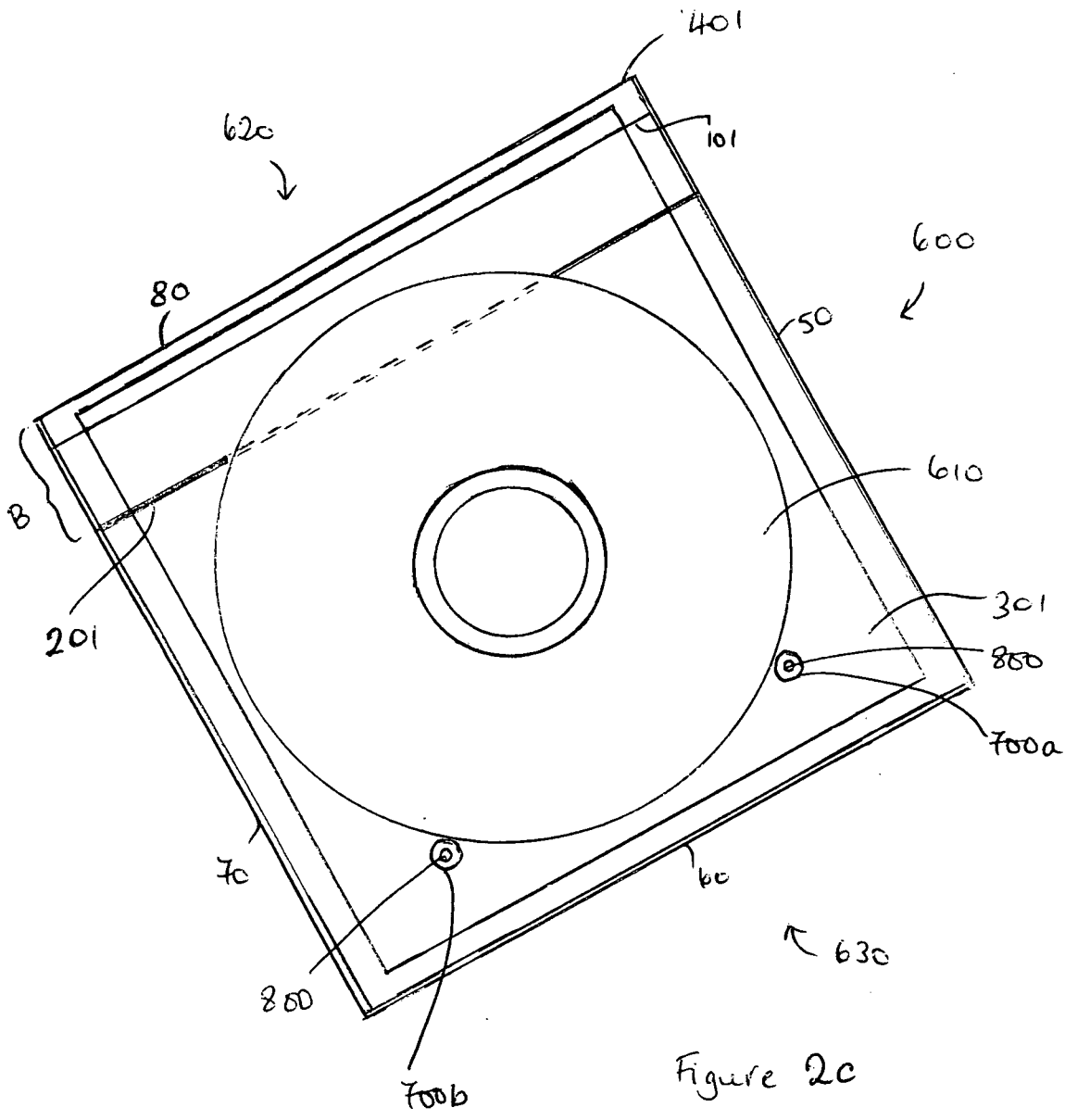


Figure 2c

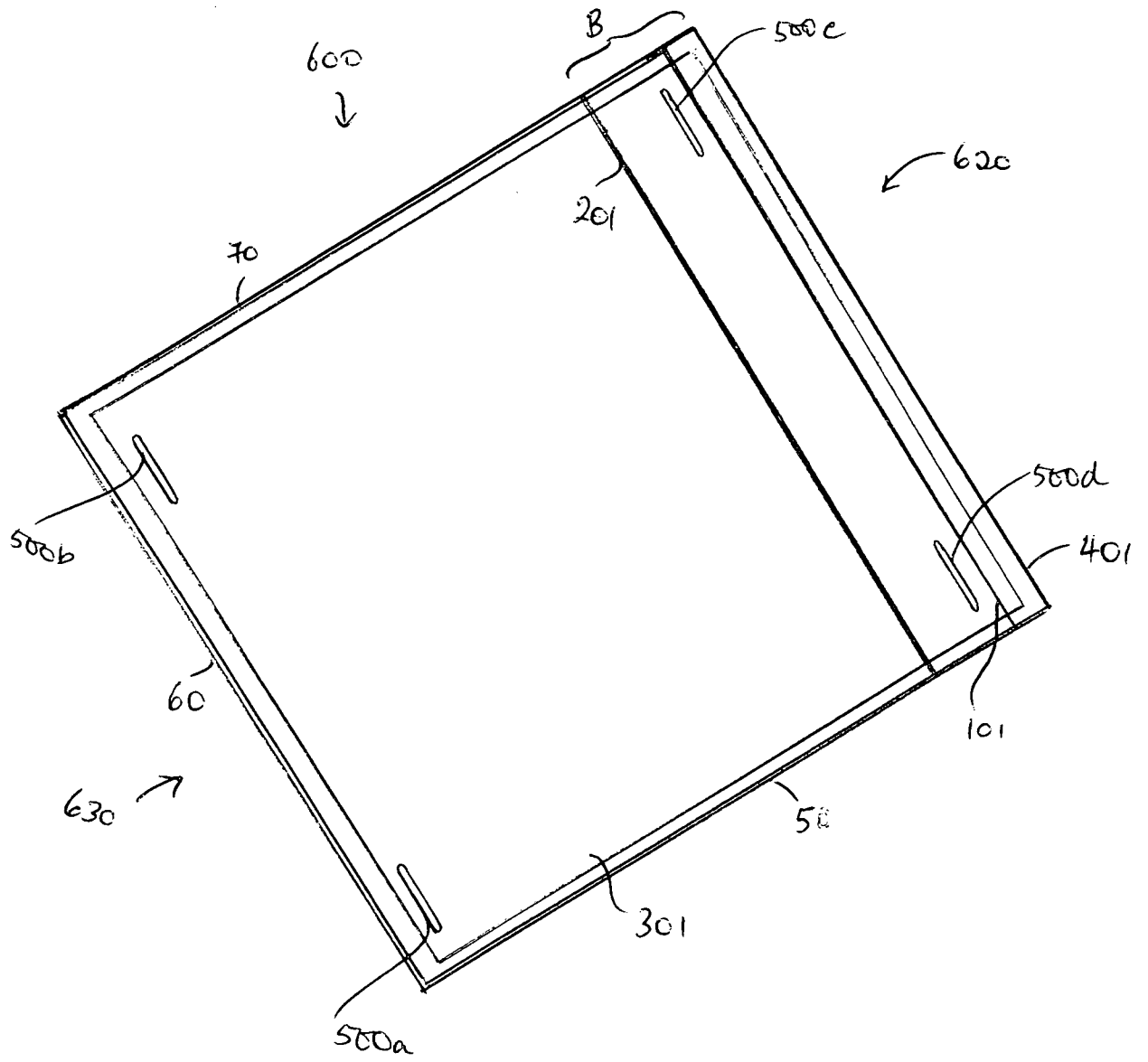


Figure 3a

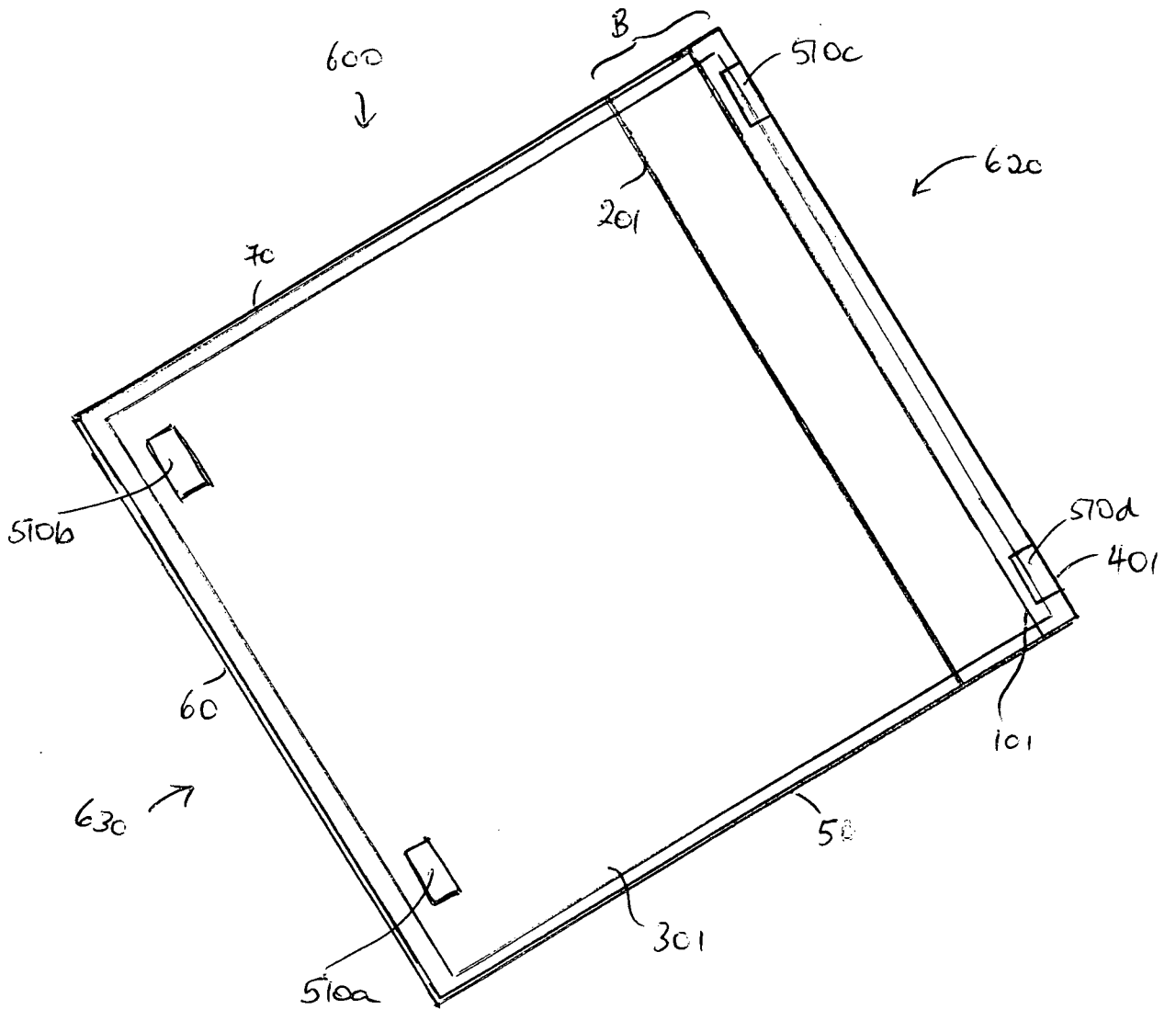


Figure 3b

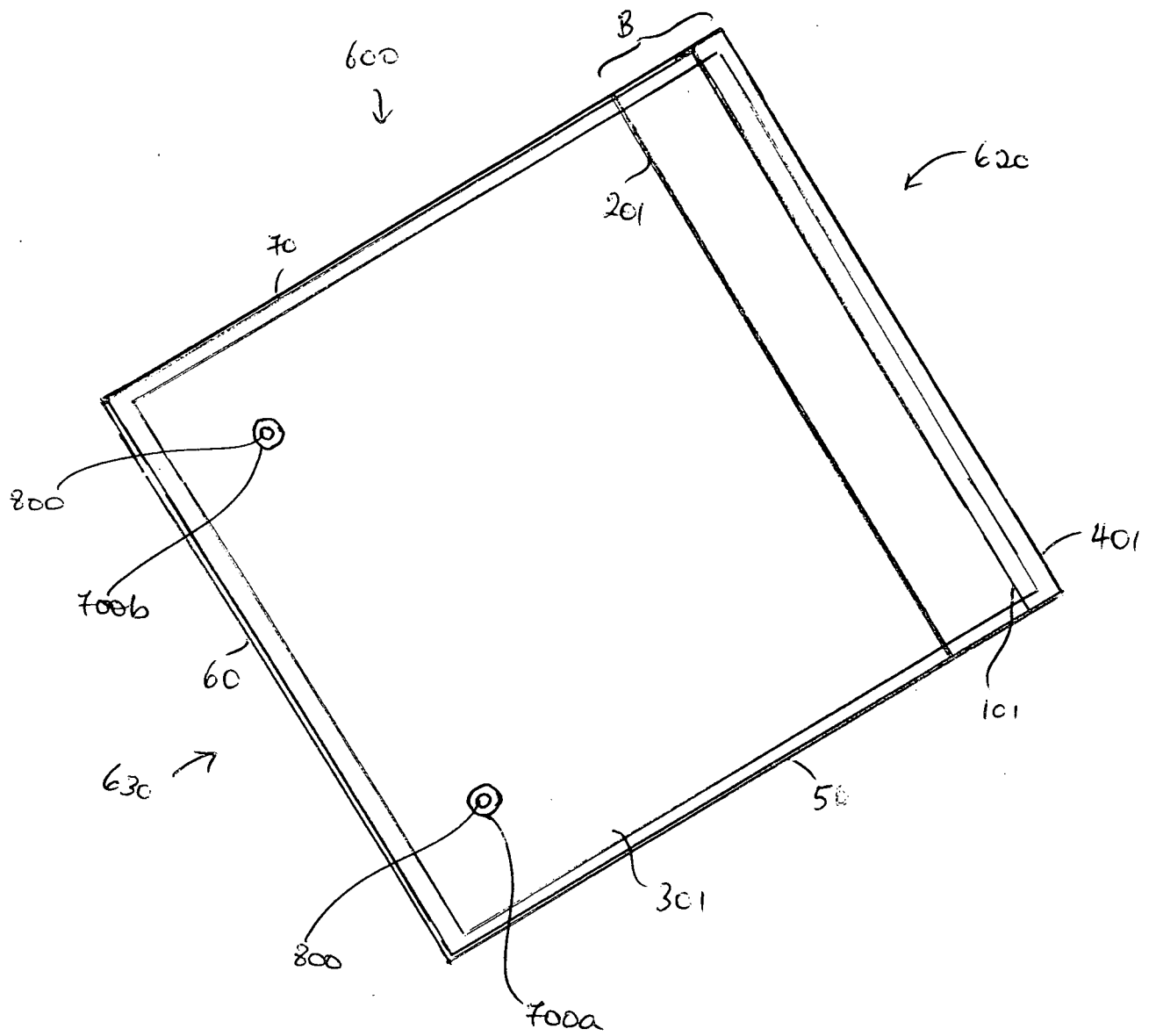


Figure 3c

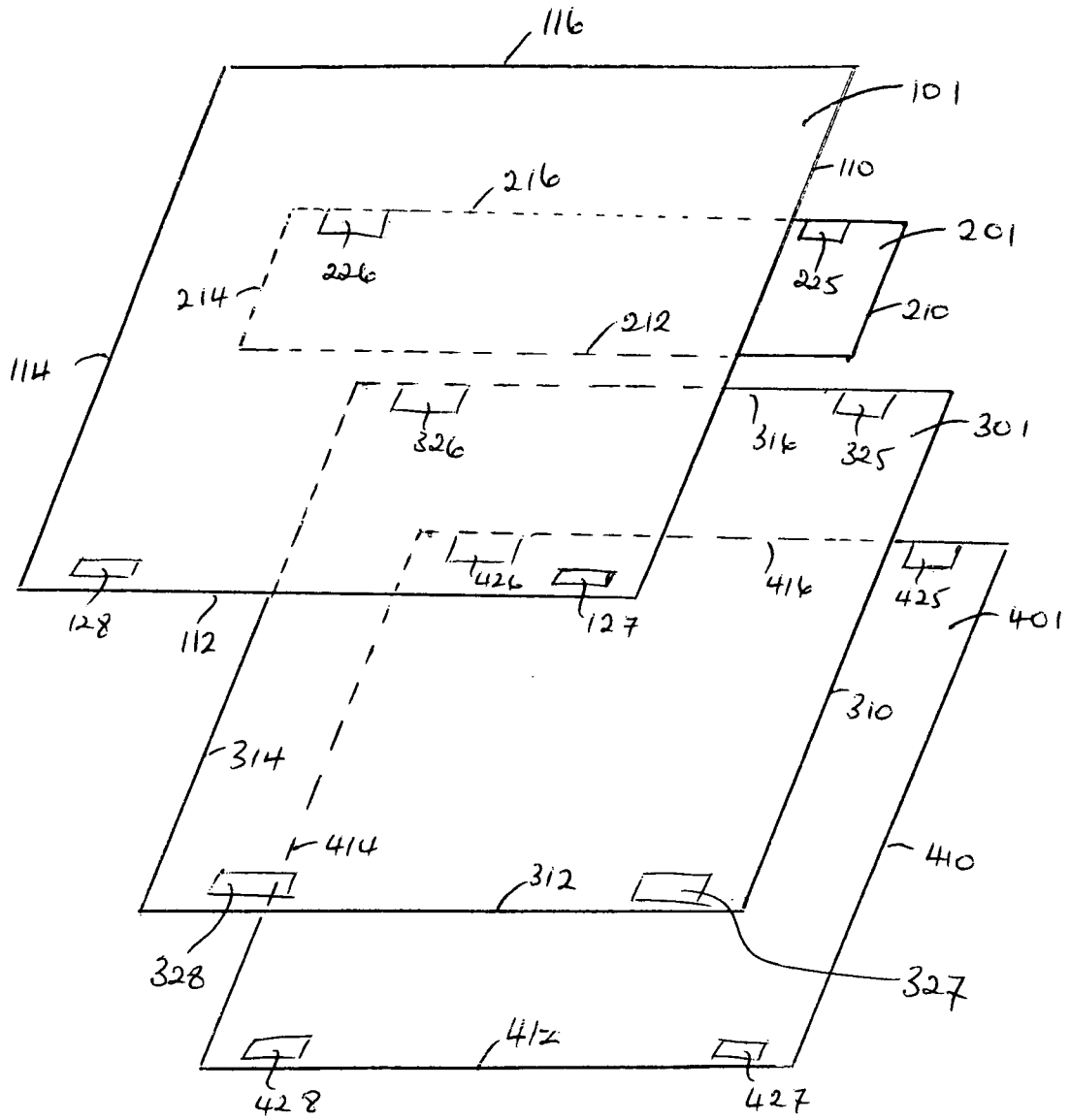


Figure 5

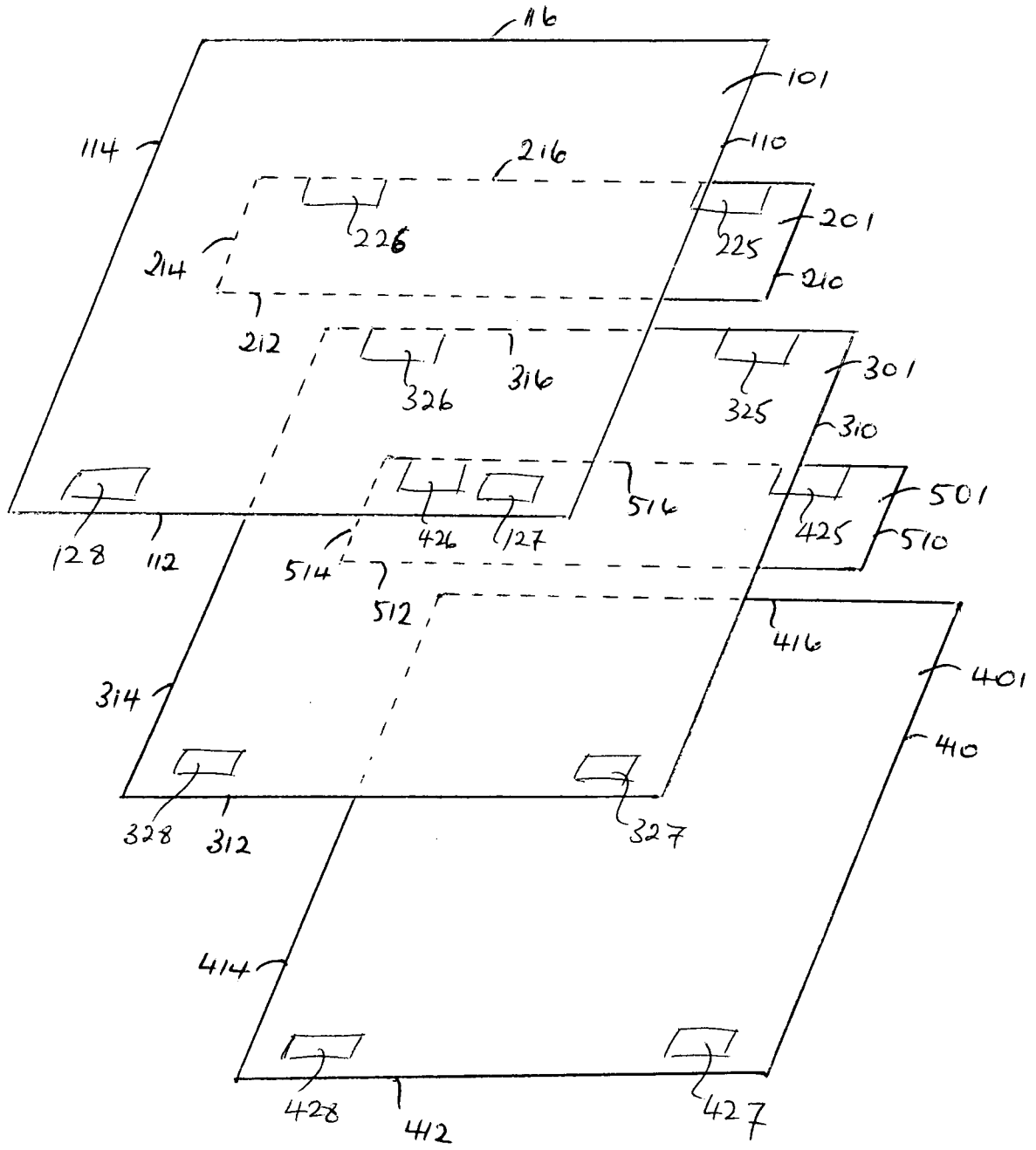


Figure 6

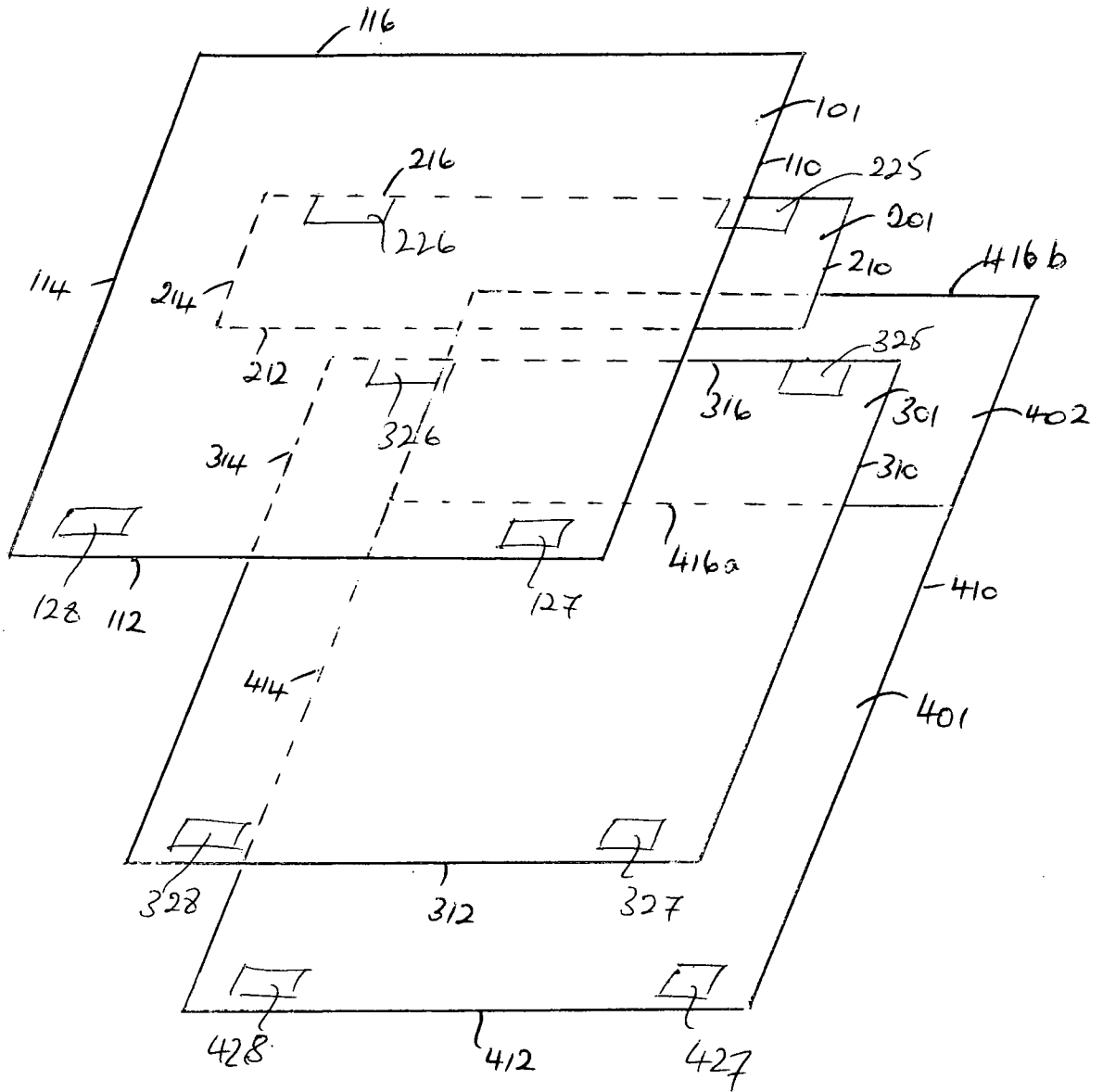


Figure 7

