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(54) Title: SELF- ALIGNING MODULAR ACCESSORY STORAGE SYSTEM

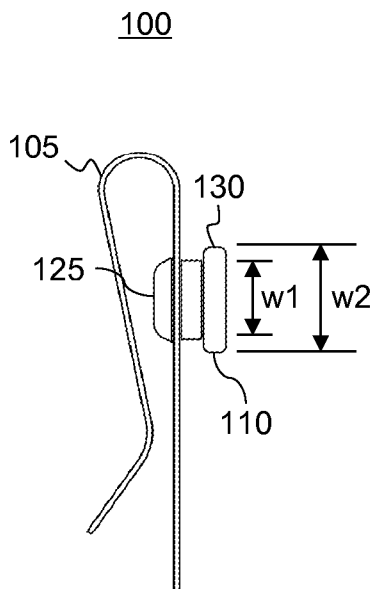


FIG. 1C

(57) Abstract: A self-aligning modular accessory storage system comprising a first and a second module, removably connectable to the first module. The first module includes a base (105), an alignment stud (110) protruding from the base (105), and a permanent magnet (115) positioned in conjunction with the alignment stud (110). The second module includes an accessory container (300) for storing one or more accessories, a receptacle (210) adapted to receive the alignment stud (110) on the first module, and a backing plate (205) mounted behind the receptacle (210) providing an aligning magnetic attraction between the first module and the second module when the alignment stud (110) is positioned in proximity to the receptacle (210).

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SELF-ALIGNING MODULAR ACCESSORY STORAGE SYSTEM

FIELD OF THE INVENTION

The present invention relates to an accessory storage system, and
5 more particularly to a modular accessory storage system providing a magnetic alignment force.

BACKGROUND OF THE INVENTION

It is desirable to be able to attach accessories such as digital
10 cameras and cell phones to a user's belt, or to other objects such as a purse or a car dashboard, so that they can be conveniently transported and accessed. A number of such systems have been developed that are modular in nature, allowing an accessory or an accessory container to be disconnected from a second part that remains connected to the object.

15 For example, many cell phone belt clips feature a first module that is attached to the user's belt, and a second module holding the cell phone that is removably connected to the first module. When the user wants to use the cell phone, he/she can disconnect the second module while leaving the first module connected to the belt. Typically, there is a mechanical release button or lever that
20 must be pushed to initiate disconnection of the modules. Similar modular connections have been used to attach various accessories to other objects such as purses as well.

For example, U.S. Patent Application Publication 2009/0026242 to Kim, entitled "Personal communications device case connector system" discloses
25 a belt connection system incorporating a belt clip having an aperture and a cell phone case having a wafer which can be slid into the aperture. A disengagement button is provided to prevent inadvertent disengagement.

Typically, such modular connections are not very ergonomically friendly, and tend to be quite bulky and heavy. They also tend to be quite difficult to
30 attach and lock in place, and also to release. For example, it is can be difficult to align the two modules for a cell phone belt clip when the user wants to replace the cell phone after he/she is done using it, particularly since the modules are not positioned

where they can be easily viewed when one of the modules is connected to the user's belt. Similarly, it can be difficult to find and operate the mechanical release button when the user wants to disconnect the modules.

A number of modular accessory storage systems have been developed that feature magnetic connections. U.S. Patent 5,025,966 to Potter, entitled "Magnetic tool holder," discloses a magnetic tool holder for a tape measure, which includes a belt clip having a receptacle and a magnetic keeper member mounted on the tape measure. To provide sufficient magnetic force to keep the tool securely fastened to the belt, a large magnet is connected to the tool, adding substantial weight and size. Even with the large magnet, the inventors found it necessary to provide design options which provided an additional mechanical securing means to keep the tool securely connected to the belt.

U.S. Patent Application Publication 2006/0054647 to Kathrein et al., entitled "Magnetic carrying apparatus and method," discloses a modular carrying apparatus including a magnetic coupling between two mating portions. This approach has the disadvantage that the two modules can be easily dislodged due to the low level of magnetic force provided by the relatively small magnets. It can also be difficult to align the two mating portions due to their small size.

There remains a need for a light-weight modular accessory system that provides easy alignment and a secure connection, while being easily separable, having a slim profile and being adaptable to use for securing both soft and hard goods.

SUMMARY OF THE INVENTION

The present invention represents a self-aligning modular accessory storage system, comprising:

a first module including:

a base

an alignment stud protruding from the base; and

a permanent magnet positioned in conjunction with the alignment stud; and

a second module, removably connectable to the first module,
including:

an accessory container for storing one or more accessories;
a receptacle adapted to receive the alignment stud on the
5 first module; and

a backing plate mounted behind the receptacle providing an
aligning magnetic attraction between the first module and the second module
when the alignment stud is positioned in proximity to the receptacle;

wherein the alignment stud has a back portion having a first width,
10 and a front portion having a second width larger than the first width, and wherein
the receptacle has a keyhole shape having a receiving portion being sized so that
the front portion of the alignment stud can be inserted into the receiving portion,
and a retaining portion having a cavity sized to receive the front portion of the
alignment stud, and a retainer positioned in front of the cavity having a retainer
15 width greater than the first width and less than the second width, wherein the
alignment stud can be slid from the receiving portion to the retaining portion
thereby retaining the front portion of the alignment stud behind the retainer.

The present invention has the advantage that the aligning magnetic
attraction provided by the permanent magnet makes it easy to align the two
20 modules when connecting them together.

It has the additional advantage that it provides a secure connection
mechanism that is easy and convenient to connect and release, while being
lightweight and having a slim profile.

25 BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is an exploded perspective view of a belt clip with an
alignment stud according to an embodiment of the present invention;

FIG. 1B is a front view of the belt clip of FIG. 1A;

FIG. 1C is a side view of the belt clip of FIG. 1A;

30 FIG. 2A is an exploded perspective view of a receptacle according
to an embodiment of the present invention;

FIG. 2B is a front view of the receptacle of FIG. 2A;

FIG. 2C is a side section view of the receptacle of FIG. 2A;

FIG. 3A is a front view of an accessory container according one an embodiment of the present invention;

FIG. 3B is a back view of the accessory container of FIG. 3A;

5 FIG. 4A shows an outside front view of a convenience bag including a modular accessory storage system according to an alternate embodiment of the present invention;

FIG. 4B shows an outside side view of the convenience bag of FIG. 4A;

10 FIG. 4C shows an inside section view of the convenience bag of FIG 4A;

FIGS. 5A and 5B illustrate the aligning magnetic attraction between the first module and the second module; and

15 FIGS. 6A-6E illustrate alternate embodiments of the first module containing the alignment stud.

It is to be understood that the attached drawings are for purposes of illustrating the concepts of the invention and may not be to scale. In certain instances, details that are not necessary for an understanding of the invention or that render other details difficult to perceive may have been omitted. It should be
20 understood, of course, that the invention is not necessarily limited to the particular embodiments illustrated herein.

DETAILED DESCRIPTION OF THE INVENTION

The invention is inclusive of combinations of the embodiments
25 described herein. References to “a particular embodiment” and the like refer to features that are present in at least one embodiment of the invention. Separate references to “an embodiment” or “particular embodiments” or the like do not necessarily refer to the same embodiment or embodiments; however, such
30 embodiments are not mutually exclusive, unless so indicated or as are readily apparent to one of skill in the art. The use of singular or plural in referring to the “method” or “methods” and the like is not limiting. It should be noted that, unless

otherwise explicitly noted or required by context, the word “or” is used in this disclosure in a non-exclusive sense.

The present invention represents a self-aligning modular accessory storage system incorporating a first alignment stud module having a magnetic alignment stud, and a second receptacle module including an accessory or an accessory container having a receptacle adapted to receive the alignment stud on the first module. The second module includes a backing plate which provides an aligning magnetic attraction between the first module and the second module when the alignment stud is positioned in proximity to the receptacle.

In some embodiments, the first module is adapted to be connected to an external object. For example, it can be attachable to a belt, a belt loop, a purse, a backpack, a wall, a bicycle, a motorcycle or an automobile. In other embodiments, the first module can be integrated directly as a component of an object such as a convenience bag (e.g., a camera bag).

The accessory container can, for example, be used to store electronic accessories such as digital cameras, video cameras, mobile phones, handheld games, personal digital assistants, digital music players, or global positioning system (GPS) receivers. The accessory container can also be adapted to store other types of accessories including objects related to the above-mentioned electronic accessories (e.g., memory cards, batteries, cell phone hands-free headsets or headphones for digital music players), or various types of non-electronic accessories (e.g., food, eyeglasses, binoculars or maps).

The present invention will now be described with reference to the accompanying figures. FIGS. 1A-1C show various views of a belt clip 100, which represents one embodiment of the alignment stud module according to the present invention. FIG. 1A shows an exploded perspective view of the belt clip 100, showing the various parts in unassembled positions. FIG. 1B and FIG. 1C show front and side views, respectively, of the belt clip 100 in an assembled form. The belt clip 100 includes a spring clip 105 adapted to be connected to a belt (not shown). The spring clip can be made of various materials such as sheet metal or molded plastic, and is configured to be slipped over a belt and held in place by a pinching force. The spring clip 105 serves as a base to which the remaining

components are connected. As will be discussed later, other types of bases can also be used on which alignment studs can be mounted according to various embodiments of the present invention. The other types of bases would include both soft goods (e.g., arm straps or convenience bags) and hard goods (car
5 dashboards).

An alignment stud 110 protrudes from the spring clip 105, being connected to the spring clip 105 using a screw 120 and a stud back 125. A magnet 115 is positioned in the alignment stud 110. In the illustrated embodiment, the magnet 115 is a permanent magnet, and is glued into a cavity formed in the end of
10 the alignment stud. In other embodiments the magnet 115 can be positioned within or behind the alignment stud. Any type of permanent magnet known in the art can be used for the magnet 115. A spring ring 130 is positioned around the alignment stud 110. In one embodiment, the spring ring 130 is formed using a split metal ring which compresses when the alignment stud 110 is slid into the
15 receptacle module, and then expands to provide a retaining force holding the alignment stud 110 in place.

The alignment stud 110 has a back portion having a first width (shown as w_1 on FIG. 1C), and a front portion having a second width larger than the first width (shown as w_2 on FIG. 1C). In the embodiment of FIG. 1C, the first
20 width corresponds to the non-compressed diameter of the spring ring 130, which is positioned around the base of the alignment stud 110.

FIGS. 2A-2C show various views of a receptacle module 200, according to an embodiment of the present invention. FIG. 2A shows an exploded perspective view of the receptacle module 200, showing the various parts in
25 unassembled positions. FIG. 2B shows a front view of the receptacle module 200 in an assembled form. FIG. 2C shows a side section view of the receptacle module 200 corresponding to Section A in FIG. 2B. The receptacle module 200 can be included as a component of an accessory container adapted for storing one or more accessories. Alternatively, it can be included directly as a component of an
30 object such as a digital camera, a video camera, a digital music player, a mobile phone, a handheld game, personal digital assistant or a GPS receiver.

The receptacle module 200 includes a metal backing plate 205, which functions to provide an attractive magnetic force with the magnet 115 in the belt clip 100 when the alignment stud 110 is positioned in proximity to the receptacle module 200. In other embodiments, the backing plate 205 can be made from a magnetic material, or any other material that will provide an attractive magnetic force with the magnet 115.

The receptacle module 200 also includes a receptacle 210, which is inserted into a receptacle backing 215 and held in place with screws 225. The receptacle 210 includes a retainer 220, which is a lip formed in front of a cavity 240 within the receptacle 210. The retainer 220 has a keyhole shaped opening defining a receiving portion 230 and a retaining portion 235. The receiving portion 230 is sized so that the front portion of the alignment stud 110 (FIG. 1) can be inserted into the receiving portion 230. That is the width of the receiving portion 230 (w_3) is somewhat larger than the width of the front portion of the alignment stud (w_2). The cavity 240 in the retaining portion is sized to receive the front portion of the alignment stud 110. In one embodiment, the width of the cavity is the same as the width of the receiving portion 230 (w_3). In other embodiments, the width of the cavity can be somewhat larger or smaller than the width of the receiving portion 230 (w_3). The retainer 220 has a retainer width (w_4) in the retaining portion 235 which is smaller than w_2 , but larger than w_1 , so that the alignment stud 110 can be held in a locking position.

The alignment stud 110 is adapted to be inserted into the receiving portion 230 and slid into the retaining portion 235 where it will be retained by the retainer 220. The keyhole shape of the retainer 220 has a waist region 245 having a width (w_5) which is slightly smaller than w_4 . When the alignment stud 110 is slid through the waist region 245, the spring ring 130 is compressed to a diameter of w_5 . When the alignment stud 110 is positioned in the retaining portion 235, the spring ring 130 returns to its rest diameter (w_1). The spring ring 130 provides a retaining force which locks the alignment stud 110 in the retaining regions 235, preventing inadvertent disconnection. Note that in some embodiments, the spring ring 130 does not necessarily return to its rest diameter (w_1) when it is positioned in the retaining portion 235, but can remain in a slightly compressed state.

FIGS. 3A-3B show front and back views of an accessory container 300 according to one embodiment of the present invention. The accessory container 300 includes a receptacle 310 formed as part of the back side. The accessory container 300 in this example is designed to store a digital camera (not shown), and is formed out of a soft good material such as rubber, leather, imitation leather, cloth or soft plastic. In one embodiment, the receptacle module 200 shown in FIG. 2A is used for the receptacle 310. In this case, the receptacle module 200 can be attached to the accessory container 300 by pinching the soft good material between the receptacle 210 and the receptacle backing 215. The parts can be held together with an adhesive or can use a snap-in feature (not shown). In alternate embodiments, the accessory container 300 can be fabricated using a hard good such as hard plastic or metal.

The accessory container 300 has a flap 305 for securing the digital camera to prevent it from inadvertently falling out. In one embodiment, the flap 305 has a magnetic securing mechanism to hold the flap in a closed position. In other embodiments, various other securing mechanisms can be used such as snaps, zippers or hook and loop securing mechanisms. In alternate embodiments the accessory container 300 does not need to include a flap 305, but rather has an open top.

It will be obvious to those skilled in the art that in other embodiments the placement of the alignment stud module and the receptacle module can be reversed so that the alignment stud module is mounted on the accessory container 300 (or directly on an accessory) and the receptacle module could be included on a belt clip or some other object. In general, the scope of the present invention is a connection system for connecting any two objects, where the alignment stud module can be mounted in association with a first object, and the receptacle module can be mounted in association with a second object.

In addition to the embodiment shown in FIG. 1A where the alignment stud 110 is included on the belt clip 100 so that accessories can be attached to a belt, the present invention can also be used to attach accessories to other types of objects. FIGS. 4A-4C illustrate an example where the accessory container 300 can be attached to a convenience bag 400 in a variety of ways. The

convenience bag 400 can be used to store accessories associated with a digital camera (e.g., cables, memory cards and batteries), or can function as a purse or a briefcase. FIGS. 4A and 4B shows outside front and side views of the convenience bag 400, respectively. External alignment studs 405 are shown
5 positioned on the left and right sides of the convenience bag 400 in FIG. 4A. An accessory container 300 is shown attached to the external alignment stud 405 on the left side. The convenience bag 400 includes a shoulder strap 410, as well as additional storage areas such as cable compartment 415 shown in FIG. 4B.

FIG. 4C shows an inside section view of the convenience bag 400
10 taken through Section B on FIG. 4B. The inside view shows additional internal alignment studs 420 which can be used to attach accessories inside the convenience bag 400. An accessory container 300 is shown attached to one of the internal alignment studs 420.

In other embodiments, alignment stud modules can be incorporated
15 with other types of objects as well. For example, alignment studs can be provided to attach accessory containers 300 to objects such as purses or backpacks. In some embodiments, the alignments stud modules can be built into the object at the time of manufacture. In other cases, alignments stud modules can be adapted to be attached to arbitrary objects with connectors, or adhered to surfaces of arbitrary
20 objects. For example, alignment stud modules can include a hook and loop connector, a suction cup or an adhesive surface for attaching the alignment studs to various surfaces. In one embodiment, an alignment stud module can be attached to the dashboard of an automobile and used to attach a GPS receiver.

FIGS. 5A-5B illustrate how the modules of the present invention
25 combine to provide an aligning magnetic attraction. The alignment stud 110 in the belt clip 100 (FIG. 1A) is shown in proximity to the receptacle module 200. In these figures, the modules are shown in from a top view. In FIG. 5A, the alignment stud 110 is shown to be in alignment with the receptacle 210. In this case the magnet 115 and the backing plate 205 produce a magnetic attraction 510
30 which is perpendicular to the receptacle module 200, thus pulling the alignment stud 110 into the receptacle 210. In FIG. 5B, the alignment stud 110 is shown to be out of alignment with the receptacle 210. In this case the magnet 115 and the

backing plate 205 produce a magnetic attraction 520 which includes a lateral component as well as a perpendicular component relative to the receptacle module 200. This provides an aligning force that pulls the alignment stud 110 toward the center of the receptacle 210. In this manner, the present invention provides a self-aligning characteristic that makes it easier for the user to attach an accessory to an object such as the belt clip 100.

FIGS. 6A-6E illustrate alternate embodiments of the present invention where an alignment stud module is provided on various types of mechanical fastening mechanisms that are adapted to be attached to external objects.

FIG. 6A shows an alternate belt clip 600 design using a clothespin-style clip 610 with an alignment stud 612.

FIG. 6B shows an alignment stud 624 attached to a strap 620 having a hook and loop fastener 622. For example, the strap 620 could be an armband that can be used to attach a digital music player to a runner's arm.

FIG. 6C shows an alignment stud 634 attached to a strap 632 having a snap connector 630. The strap 632 can be conveniently connected to objects such as backpacks or purse straps.

FIG. 6D shows a carabiner 640 having an alignment stud 644 connected to a strap 642. The carabiner 640 can be conveniently attached to objects such as belt loops or backpacks. Similarly, FIG. 6E shows an eyehook 650 having an alignment stud 654 connected to a strap 652, which can function similarly.

PARTS LIST

100	belt clip
105	spring clip
110	alignment stud
115	magnet
120	screw
125	stud back
130	spring ring
200	receptacle module
205	backing plate
210	receptacle
215	receptacle backing
220	retainer
225	screw
230	receiving portion
235	retaining portion
240	cavity
245	waist region
300	accessory container
305	flap
310	receptacle
400	convenience bag
405	external alignment stud
410	shoulder strap
415	cable compartment
420	internal alignment stud
510	magnetic attraction
520	magnetic attraction
600	belt clip
610	clothespin-style clip
612	alignment stud

620	strap
622	hook and loop fastener
624	alignment stud
630	snap connector
632	strap
634	alignment stud
640	carabiner
642	strap
644	alignment stud
650	eyehook
652	strap
654	alignment stud

CLAIMS:

1. A self-aligning modular accessory storage system, comprising:
a first module including:
a base
5 an alignment stud protruding from the base; and
a permanent magnet positioned in conjunction with the alignment stud; and
a second module, removably connectable to the first module, including:
an accessory container for storing one or more accessories;
10 a receptacle adapted to receive the alignment stud on the first module; and
a backing plate mounted behind the receptacle providing an aligning magnetic attraction between the first module and the second module when the alignment stud is positioned in proximity to the receptacle;
15 wherein the alignment stud has a back portion having a first width, and a front portion having a second width larger than the first width, and wherein the receptacle has a keyhole shape having a receiving portion being sized so that the front portion of the alignment stud can be inserted into the receiving portion, and a retaining portion having a cavity sized to receive the front portion of the
20 alignment stud, and a retainer positioned in front of the cavity having a retainer width greater than the first width and less than the second width, wherein the alignment stud can be slid from the receiving portion to the retaining portion thereby retaining the front portion of the alignment stud behind the retainer.
- 25 2. The modular accessory storage system of claim 1 wherein the first module is mounted on an external object.
3. The modular accessory storage system of claim 2 wherein the external object is a purse, a backpack, a belt, a wall, a bicycle, a motorcycle or an
30 automobile.

4. The modular accessory storage system of claim 1 wherein the first module further includes a mechanical fastening mechanism adapted to fasten the first module to an external object.
5. The modular accessory storage system of claim 4 wherein the mechanical fastening mechanism is adapted to fasten the first module to a belt, a belt loop, a purse or a backpack.
6. The modular accessory storage system of claim 4 wherein the mechanical fastening mechanism is a spring clip, a clothespin-style clip, a strap with a hook-and-loop fastener, a strap with a snap fastener, a carabiner or an eyehook.
7. The modular accessory storage system of claim 1 wherein the accessory container is adapted to store a handheld electronic device.
8. The modular accessory storage system of claim 7 wherein the handheld electronic device is a digital camera, a video camera, a digital music player, a mobile phone, a handheld game, personal digital assistant or a global positioning system receiver.
9. The modular accessory storage system of claim 1 wherein the accessory container is adapted to store one or more accessories for a handheld electronic device.
10. The modular accessory storage system of claim 1 wherein the accessory container is adapted to store one or more non-electronic objects.
11. The modular accessory storage system of claim 1 wherein the accessory container is a soft good.

12. The modular accessory storage system of claim 11 wherein the soft good is fabricated using rubber, leather, imitation leather, cloth or soft plastic.

5 13. The modular accessory storage system of claim 1 wherein the accessory container is a hard good.

14. The modular accessory storage system of claim 13 wherein the hard good is fabricated using hard plastic or metal.

10 15. The modular accessory storage system of claim 1 wherein the accessory container has a flap for securing the one or more accessories within the accessory container.

15 16. The modular accessory storage system of claim 15 wherein the flap has a magnetic securing mechanism or a hook and loop securing mechanism.

17. The modular accessory storage system of claim 1 wherein the permanent magnet is positioned inside the alignment stud.

20 18. The modular accessory storage system of claim 1 wherein the backing plate is metallic.

19. The modular accessory storage system of claim 1 wherein the backing plate is made from a magnetic material.

25

20. A self-aligning connection system, comprising:
a first module including:
a first object
an alignment stud protruding from the first object; and
5 a permanent magnet positioned in conjunction with the alignment stud; and
a second module, removably connectable to the first module, including:
a second object;
a receptacle amounted in association with the second object and
10 adapted to receive the alignment stud on the first module; and
a backing plate mounted behind the receptacle providing an aligning magnetic attraction between the first module and the second module when the alignment stud is positioned in proximity to the receptacle;
wherein the alignment stud has a back portion having a first width, and a
15 front portion having a second width larger than the first width, and wherein the receptacle has a keyhole shape having a receiving portion being sized so that the front portion of the alignment stud can be inserted into the receiving portion, and a retaining portion having a cavity sized to receive the front portion of the alignment stud, and a retainer positioned in front of the cavity having a retainer
20 width greater than the first width and less than the second width, wherein the alignment stud can be slid from the receiving portion to the retaining portion thereby retaining the front portion of the alignment stud behind the retainer.

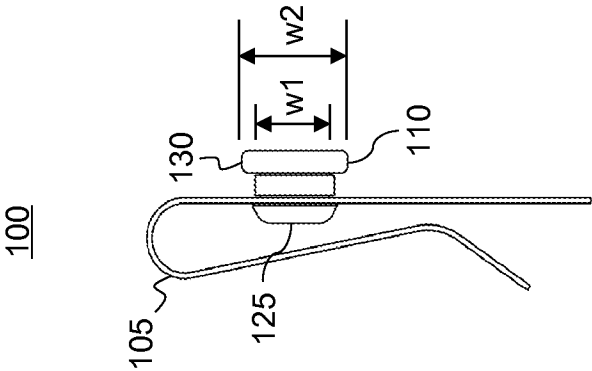


FIG. 1A

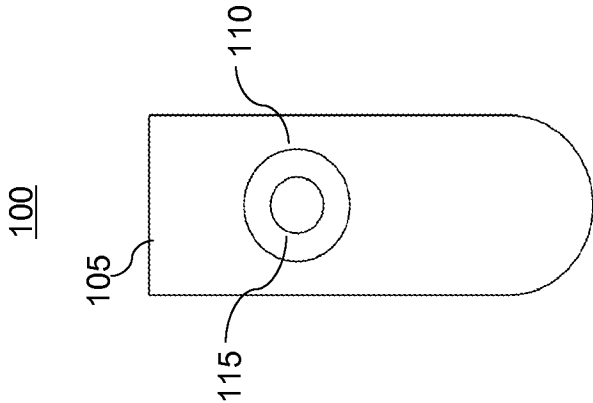


FIG. 1B



FIG. 1C

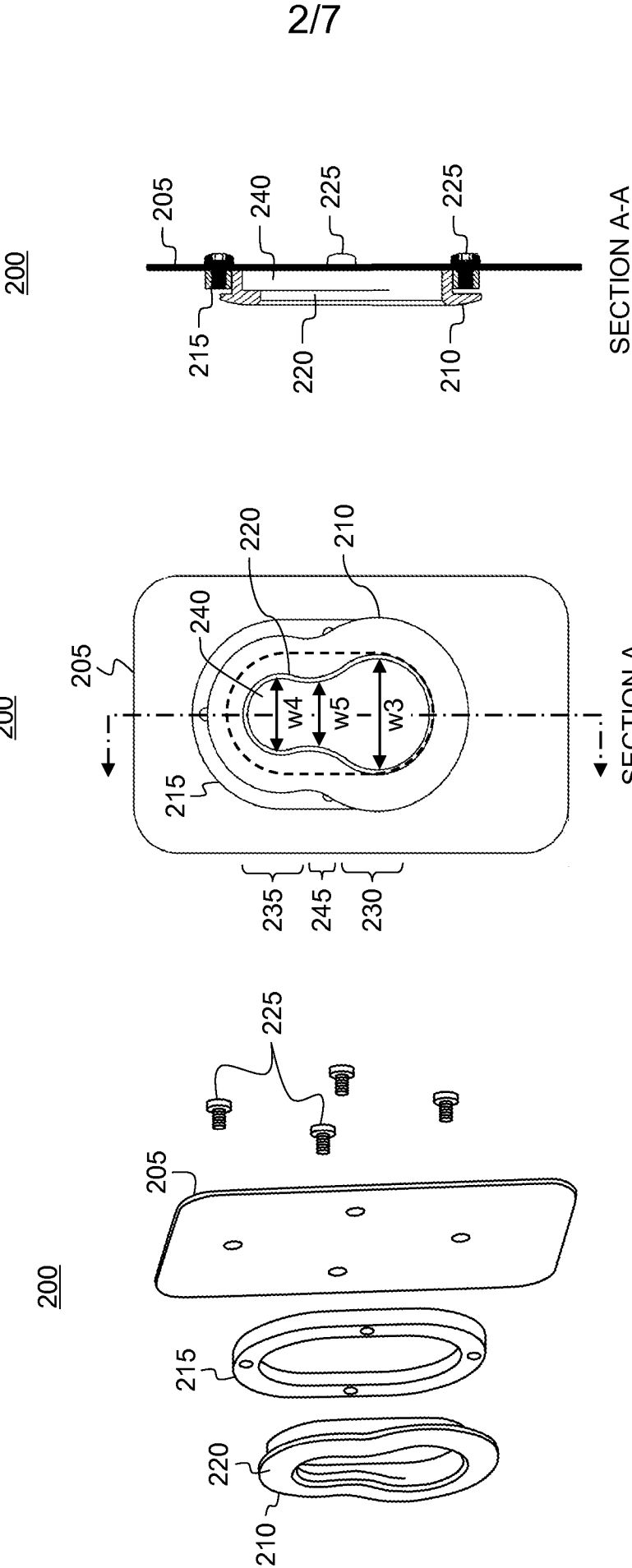


FIG. 2A

FIG. 2B

FIG. 2C

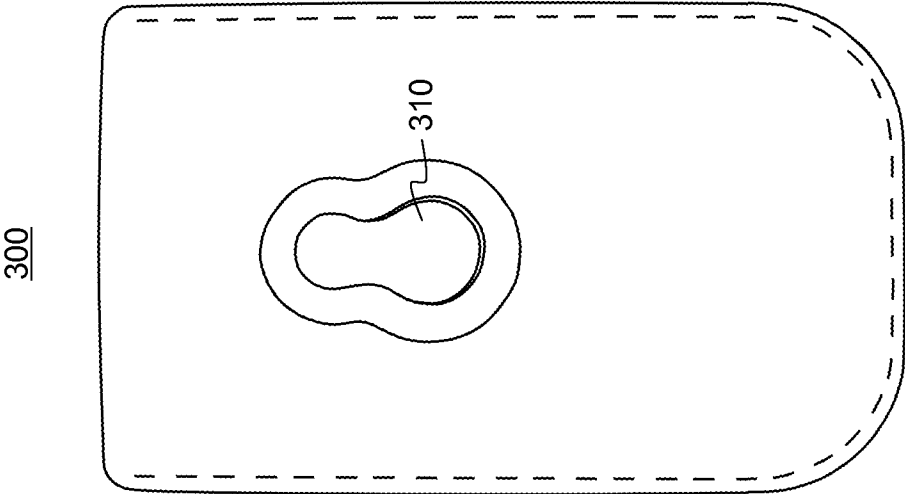


FIG. 3A

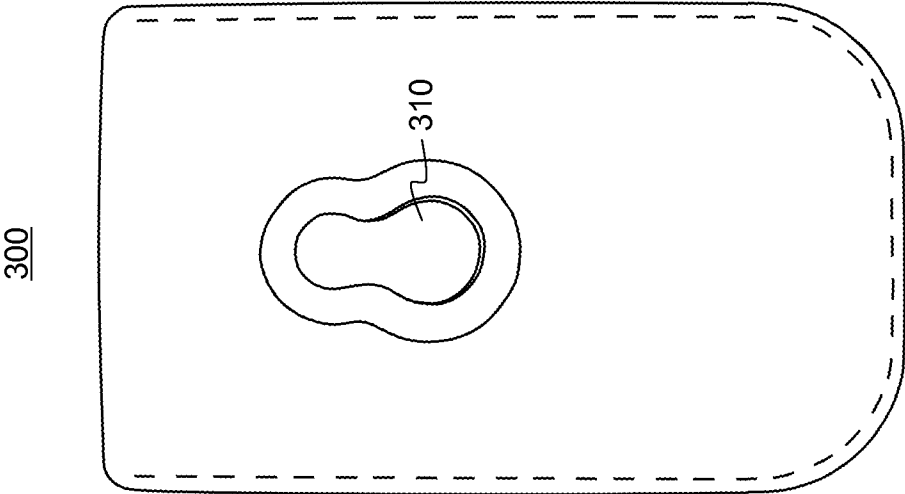


FIG. 3B

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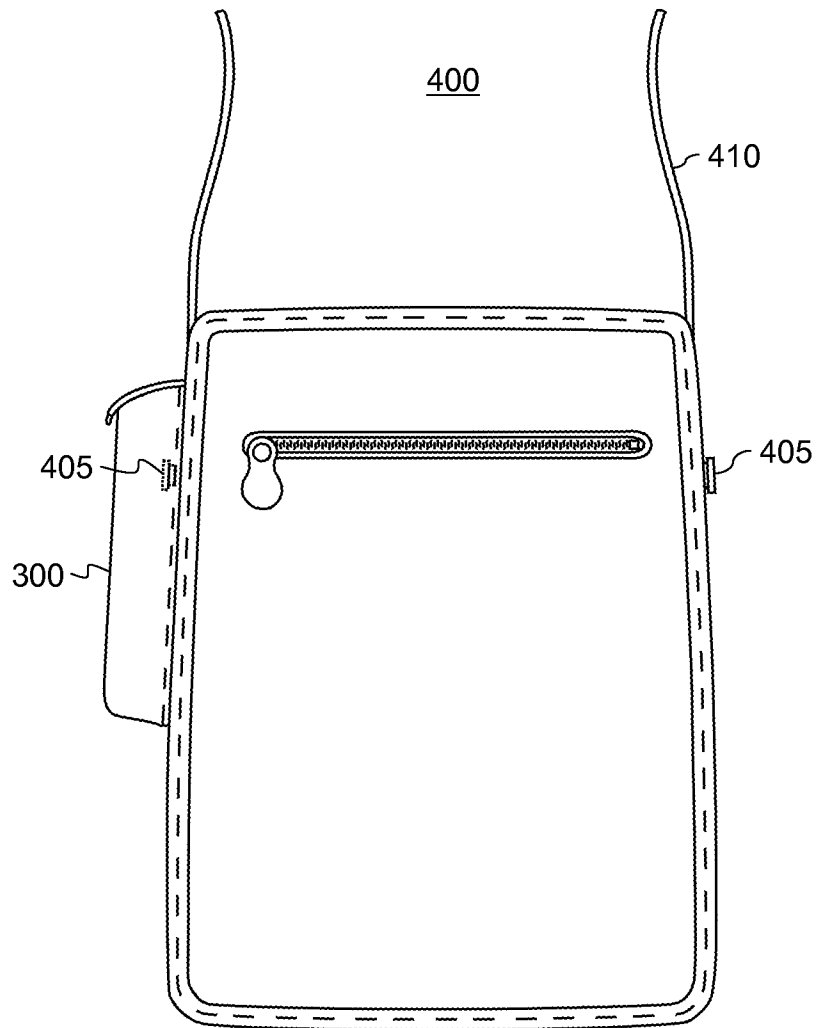


FIG. 4A

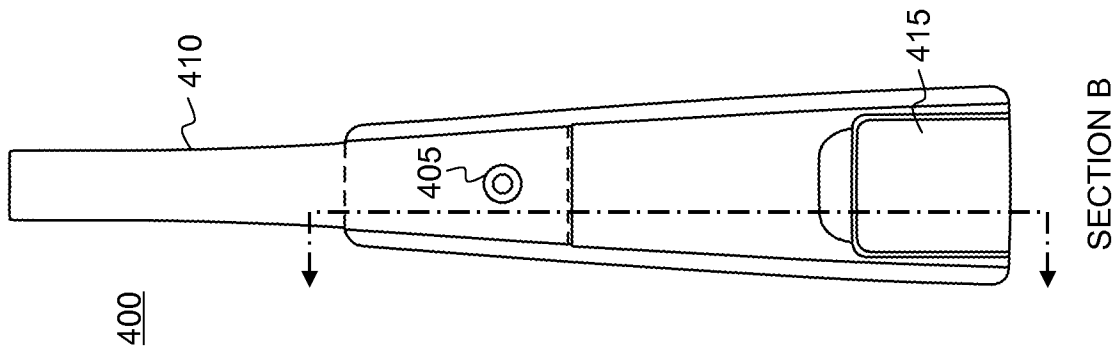


FIG. 4B

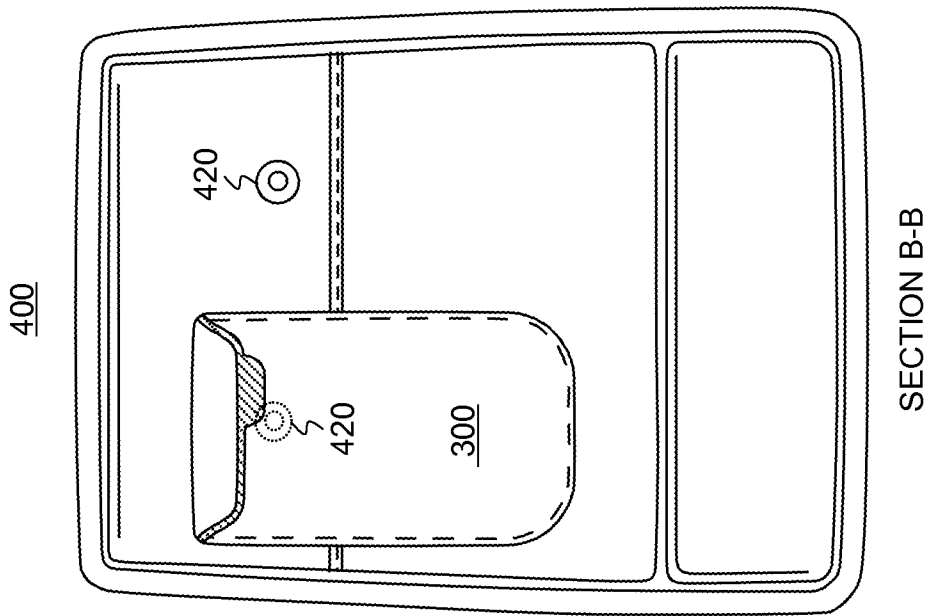


FIG. 4C

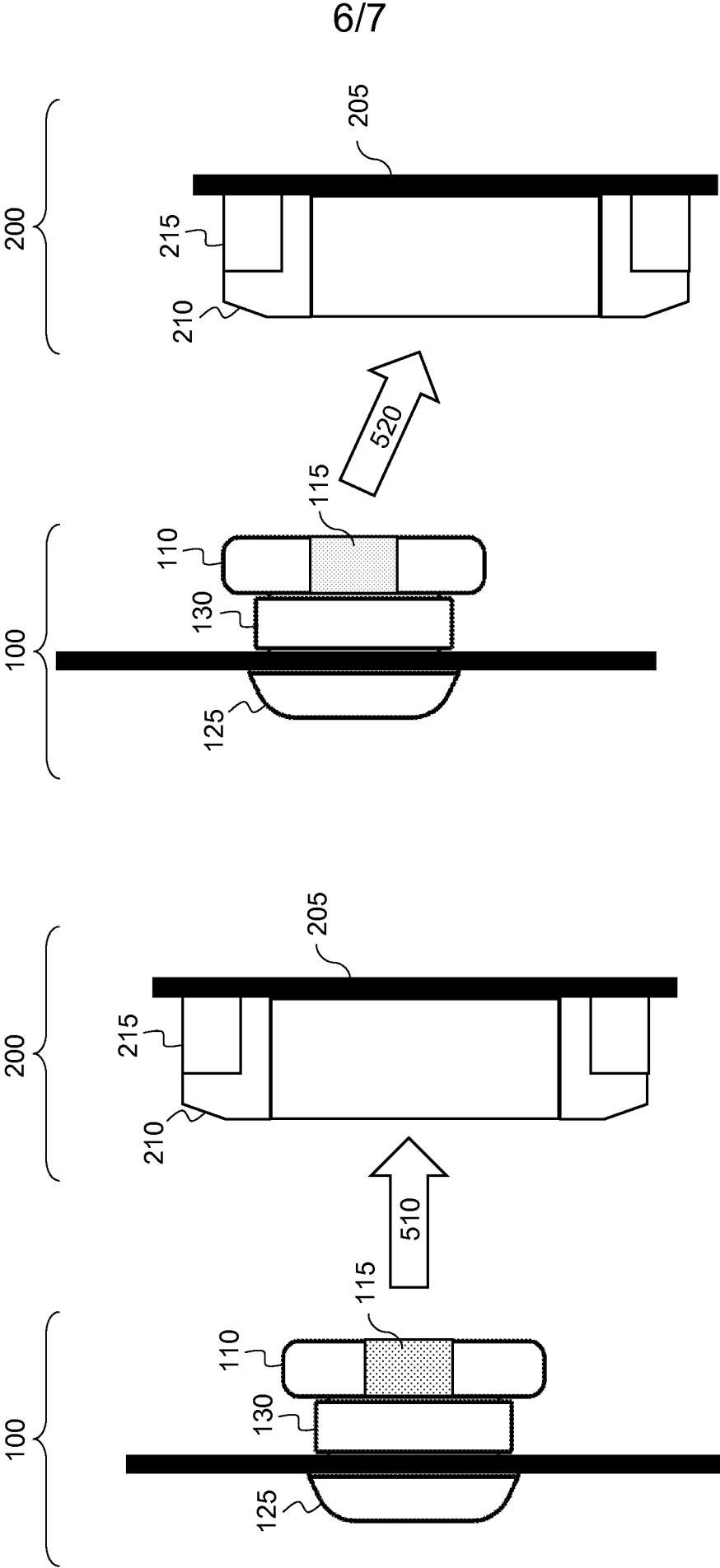


FIG. 5B

FIG. 5A

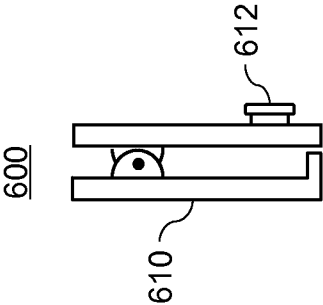


FIG. 6A

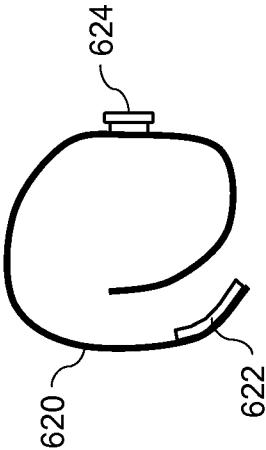


FIG. 6B

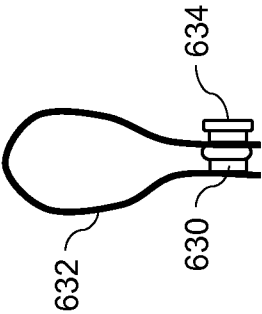


FIG. 6C

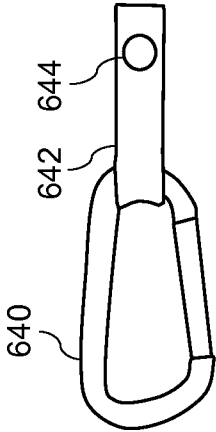


FIG. 6D

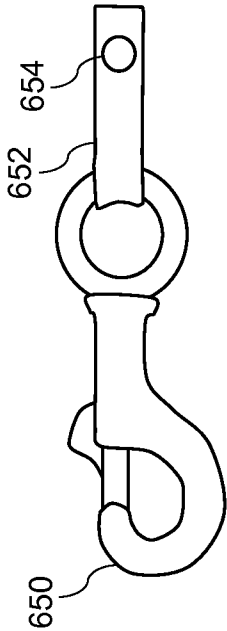


FIG. 6E

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2011/030425

A. CLASSIFICATION OF SUBJECT MATTER
INV. A45F5/02 A45C13/10
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A45F A45C

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

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

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007/099469 A1 (SORENSEN) 3 May 2007 (2007-05-03) the whole document -----	1-20
A	GB 2 301 391 A (TIEN TSE HSIUNG) 4 December 1996 (1996-12-04) the whole document -----	1-20
X,P	US 2010/327029 A1 (KAHN PETER [US]) 30 December 2010 (2010-12-30) the whole document -----	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

8 June 2011

Date of mailing of the international search report

20/06/2011

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2011/030425

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007099469 A1	03-05-2007	NONE	
GB 2301391 A	04-12-1996	AU 663048 B3 FR 2735312 A3 ZA 9504514 A	21-09-1995 13-12-1996 31-07-1996
US 2010327029 A1	30-12-2010	NONE	