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(54) BALLISTIC SHIELD AND BALLISTIC SHELTER SYSTEM

BALLISTISCHES SCHILD UND BALLISTISCHES SCHUTZSYSTEM

BOUCLIER BALISTIQUE ET SYSTÈME D'ABRI BALISTIQUE

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Description

[0001] The invention relates to a handheld ballistic shield, to a ballistic shelter system comprising a plurality of handheld ballistic shields and to a method for preparing such system.

[0002] Law enforcement and military personnel are often exposed to violence in the form of ballistic projectiles, such as bullets, shrapnel and other materials expelled by an explosion. One way to protect themselves against such threats is by using ballistic protection devices, made of highly impact resistant material. In the field, such devices are also known as ballistic shields. Depending on the situation, portable or non-portable shields are used. In a dynamic combat situation wherein a high mobility of individual persons is required, portable shields are deployed that provide personal protection. In a more static combat situation wherein the personnel groups together to combat, it may be preferred to stay behind a larger ballistic protection device.

[0003] A ballistic protection device is described in *e.g.* US2018/0073841 A1, where a larger ballistic barrier may be assembled from a plurality of individual panels. During certain combats, for example a guerrilla in urban areas, combat situations may change from dynamic to more static and *vice versa.* This requires the corresponding adaptation of the materials for protecting the personnel. Given the high pressure and danger of combat situations, entire replacement of protection materials is often not possible.

[0004] Therefore, there is a need for ballistic protection devices that may be used in either situation, wherein the conversion form one situation to the other can be performed quickly and reliably, without putting the personnel in an extra danger.

[0005] It has now been found that with a particular personal ballistic protection device, it is possible to build a larger structure when necessary during combat. Accordingly, the present invention relates to a handheld ballistic shield according to claim 1 and a ballistic shelter system according to claim 9.

Figure 1 displays a first view of a handheld ballistic shield not forming part of the invention.

Figure 2 displays a second view of a handheld ballistic shield not forming part of the invention.

Figure 3 displays a first view of a ballistic shelter system according to the invention.

Figure 4 displays a second view of a ballistic shelter system according to the invention.

[0006] A handheld ballistic shield of the invention is a shield that provides personal protection to the person carrying the shield. To this end, it comprises a handle for carrying or holding the shield and is made of a ballistic material, *i.e.* a material of a high impact resistance. The shape, size and weight of the shield are adapted so as to allow the user to hold it during a standstill, to carry it whilst moving from one location to another, and to use it effectively in combat situations.

[0007] The rear face of the shield is defined as the side facing the user of the shield who is to be protected by the shield. For this reason, the handle bar is connected to the rear face.

[0008] The impact face is opposite to the rear face, and this is the face that is actually hit by projectiles during combat.

[0009] The shield is typically of a sheet-like material. It has usually two dimensions that are within one order of magnitude, the length and the width. Its third dimension, the thickness, is usually much smaller than the length and the width. For example, it is more than 10 times smaller, more than 25 times smaller, more than 50 times smaller or more than 100 times smaller than the smallest of the two other dimensions of the shield.

[0010] The shield of the invention has a rectangular shape. This means that it comprises two long edges and two short edges. The shape is not necessarily a rectangle wherein both long edges run exactly parallel and both short edges run exactly parallel. An edge may for example deviate from its opposite edge to an extent of 5° or less, preferably 2° or less. Neither is it necessary that the long edge is exactly perpendicular to the short edge. The angle may for example be in the range of 85°-95°. It is also possible that the edges are not straight, but slightly curved. Preferably, however, the long edges are straight and substantially parallel to the short edges.

[0011] Another variation in the shape of the shield is the presence of a bend. This means that the shield is not flat, but that it may be curved, either in its entirety, or only at one or more specific locations.

[0012] With one or more of the above deviations, the shape of the shield is still rectangular. The shape and size of the shield must be chosen such that it offers enough protection for the person using the shield, and that, when necessary, the hinge members can easily and without delay be connected and disconnected. In addition, upon assembly of a plurality of shields, the shape of a shield has to allow the formation of a shelter system that also offers enough protection for the person(s) using it. Such system should have enough degrees of freedom for the separate shields in it and contain a continuous impact face as whole so that no ballistic material may pass between the shields, for example through a chink.

[0013] By ballistic is meant that projectiles travel at a very high speed with the aim to cause destruction upon impact. A shield of the invention is manufactured of a ballistic material, which is a material with a high impact resistance. The material may be composite material, such as a material comprising two or more layers of different materials. Usually, the ballistic material comprises plastic.

[0014] Each shield comprises connecting means, so that a connection between shields can be made by realizing a fastening between a connecting means of one shield and a connecting means of another shield. The

connecting means are usually interrelated parts, *i.e.* they are designed to be complementary to each and so form the connection. Thus, for the purpose of the invention, by a connection is meant the physical entity that is the result of the fastening of two (complementary) connecting means. Preferably, the connecting means is designed such that it allows a quick assembly and a quick release of the shields. In addition, the connection that is established by the connecting means should be strong enough to withstand the impact of the ballistic projectiles, *i.e.* the shields should not detach from each other upon impact of a projectile, especially not the type of impacts that the shields as such are capable of resisting.

[0015] Especially for a connection along the long edges (horizontal assembly), it may be desired that there is a substantial degree of rotation between two assembled shields. This allows shaping of the shelter, for example as a straight wall or as curved wall. A non-straight assembly, *e.g.* in the shape of a circle (or a part thereof) or with a bend only at the extremities, will be less prone to falling over as a result of *e.g.* an impact.

[0016] The required rotational freedom that is present between the shields of such assemblies requires a hinge-like connection between the shields, *i.e.* one that allows rotation. When the fastening of two shields comprises a plurality of connections, then these connections preferably lie on the same line. In this way, rotation of one shield relative to the other is possible. This line is preferably parallel to the long edges of the shield, but may also deviate from it, for example in an angle of up to 5°.

[0017] As stated above, shields may be assembled along their long edges (horizontal assembly) and/or along their short edges (vertical assembly). Vertical assembly, however, may give a less stable structure than horizontal assembly, because gravity can induce the relative movement of two shields that are connected along a horizontal line (*i.e.* the short edge during normal use). A connection along a vertical line (*i.e.* the long edge during normal use) is not prone to rotation due to gravity. Therefore, for a vertical assembly (*i.e.* along the short edge during normal use), a more sound connection between two shields is required. For example, a plurality of connections is present that lie in a plane rather than in a line.

[0018] The ballistic shelter system of the invention is an assembly of two or more ballistic shields. The system so forms a shelter for the protection of a plurality of persons. In a ballistic shelter system, the shields are preferably assembled in a fashion wherein there still is rotational freedom between the shields. This means that the connection between two shields may act as a hinge. For example, it is then possible to rotate one shield relative to the other by an angle of *e.g.* up to 90°.

[0019] The shields are preferably assembled along the direction of their long edges, for example by fastening two long edges to each other so that the short edges are in extension. In this way, a shelter system is formed that has one dimension (its height) that equals the length of the long edge of the separate shields. The dimension of the shield that is extended by such way of assembling is the short edge of the shield. Given the fact that the shields are in principle used in such manner that the long edges point vertically and the short edges point horizontally, the assembly along the direction of their long edges their long edges is termed a horizontal assembly.

[0020] It is however also possible to extend the shields in a perpendicular direction by assembling them along their short edges. For example, two short edges may then be fastened to each other so that the long edges are in extension. The dimension of the shield that is extended by such way of assembling is the long edge of the shield, and is therefore termed a vertical assembly.

[0021] An assembly is usually made in the horizontal direction, allowing multiple persons to stand next to each other and hide behind the shelter. Such horizontal assembly may be complemented by assembly in the vertical direction. This set-up may in particular be used for blocking doorways. An assembly in the vertical direction without an assembly in the horizontal direction can in principle also be realized, for example in a doorway.

[0022] The position of the connection means is at the long edges and at the surface of the impact face. This allows the connection of a long edge of a first shield to the surface of a second shield. The advantage of this mode of connection is that the two shields have an overlap, which provides extra protection. When the shields are to be connected in a combat situation, then there is less chance on the temporary formation of a gap between two shields during the process of connecting the shields. Further, once connected, there is no chink between the two shields, but they can still rotate relatively to each other (usually, when mutual rotational freedom of the ballistic shields is desired, this introduces the presence of chink). The absence of a chink reduces the chance on penetration through the shelter system, which is of course an advantage. Moreover, the presence of a chink allows people around the shelter system to partially see what is happening behind the shelter system, which is undesired. The overlap blocks this line of sight, so that people who seek protection behind de shelter system remain concealed.

Claims

1. Handheld ballistic shield (1) of a rectangular shape comprising ballistic material, the shield comprising

    - an impact face (2);
    - a rear face (3);
    - a first long edge (4) and a second long edge (4) defining the length of the shield (1);
    - two short edges (5) defining the width of the shield (1);
    - a handle (6) on the rear face (3) for carrying or holding the shield (1);

- connecting means (7) for attaching the handheld ballistic (1) shield to another handheld ballistic shield (1);

wherein

- the connecting means (7) comprises a plurality of first hinge members (7a) comprising a hinge pin and a plurality of second hinge members (7b) comprising a hinge sleeve;
- the hinge pins of two or more first hinge members (7a) are aligned along a first line (11), the first line (11) being substantially perpendicular to the two short edges (5);
- the hinge sleeves of two or more second hinge members (7b) are aligned along a second line (12), the second line (12) being substantially perpendicular to the two short edges (5);
- the hinge pins and the hinge sleeves have a corresponding shape that allows the hinge pins of the handheld ballistic shield (1) to fall into the hinge sleeves of another handheld ballistic shield, so that the two handheld ballistic shields (1) are connected to each other;

characterized in that

- the hinge pins of two or more further first hinge members (7a) are aligned along a third line (13), the third line (13) being substantially perpendicular to the two short edges (5);
- the hinge sleeves of two or more further second hinge members (7b) are aligned along a fourth line (14), the fourth line (14) being substantially perpendicular to the two short edges (5).

2. Handheld ballistic shield (1) according to claim 1, wherein

- the first line (11) and the third line (13) coincide with the first long edge (4) and the second long edge (4), respectively; and
- the second line (12) and the fourth line (14) are both placed on the impact face (2) of the ballistic shield (1) between the first line (11) and the third line (13), respectively.

3. Handheld ballistic shield (1) according to claim 1, wherein

- the first line (11) and the second line (12) coincide with the first long edge (4) and the second long edge (4), respectively; and
- the third line (13) and the fourth line (14) are both placed on the impact face (2) of the ballistic shield (1) between the first line (11) and the third line (13), respectively.

4. Handheld ballistic shield (1) according to any of the preceding claims, wherein the shield (1) comprises a first bend (8) and a second bend (8), wherein

- the first bend (8) runs substantially parallel to the first long edge (4) and is at a distance therefrom that is in the range of 5-25% of the shield's width;
- the second bend (8) runs substantially parallel to the second long edge (4) and is at a distance therefrom that is in the range of 5-25% of the shield's width;
- both bends have (8) the effect that two long edges (4) of the shield are directed to the rear side (3) of the shield (1).

5. Handheld ballistic shield (1) according to claim 4, wherein two lines of hinge pins and/or hinge sleeves, selected from the group of the first line (11), the second line (12), the third line (13) and the fourth line (14), are present at the first bend (8) and at the second bend (8).

6. Handheld ballistic shield (1) according to claim 4, wherein the second line (12) comprising the hinge sleeves and the fourth line (14) comprising the hinge sleeves are present at the first bend (8) and at the second bend (8), respectively.

7. Handheld ballistic shield (1) according to any of claims 4-6, wherein the angle of the first bend (8) and the angle of the second bend (8) are independently of each other in the range of 150°-179°.

8. Handheld ballistic shield (1) according to any of the preceding claims, wherein the shield (1) comprises a observation-hole (9).

9. Ballistic shelter system (10) comprising a plurality of handheld ballistic shields (1) of any of claims 1-8, wherein a first handheld ballistic shield (1) is connected to a second handheld ballistic shield (1) by the connecting means (7), wherein the connection comprises the insertion of two or more hinge pins from the first handheld ballistic shield (1) into two or more hinge sleeves from the second handheld ballistic shield (1).

10. Ballistic shelter system (10) according to claim 9, comprising a plurality of handheld ballistic shields (1) of any of claims 4-7, wherein hinge pins or hinge sleeves are aligned at one of the long edges (4) of the first handheld ballistic shield (1), and wherein these are connected to the corresponding hinge sleeves or hinge pins, respectively, of the second handheld ballistic shield (1), wherein these corresponding hinge sleeves or hinge pins of the second handheld ballistic shield (1) are aligned at one of the

bends (8) of the second handheld ballistic shield (1).

Patentansprüche

1. Tragbarer ballistischer Schild (1) einer rechteckigen Form, der ballistisches Material umfasst, wobei der Schild Folgendes umfasst:

   - eine Aufprallfläche (2);
   - eine hintere Fläche (3);
   - eine erste lange Kante (4) und eine zweite lange Kante (4), die die Länge des Schildes (1) definieren;
   - zwei kurze Kanten (5), die die Breite des Schildes (1) definieren;
   - einen Griff (6) an der hinteren Fläche (3) zum Tragen oder Halten des Schildes (1);
   - Verbindungsmittel (7) zum Anbringen des tragbaren ballistischen (1) Schildes an einem anderen tragbaren ballistischen Schild (1);

   wobei

   - das Verbindungsmittel (7) mehrere erste Scharnierelemente (7a), die einen Scharnierstift umfassen, und mehrere zweite Scharnierelemente (7b) umfasst, die eine Scharnierhülse umfassen;
   - die Scharnierstifte von zwei oder mehr ersten Scharnierelementen (7a) entlang einer ersten Linie (11) ausgerichtet sind, wobei die erste Linie (11) im Wesentlichen senkrecht zu den zwei kurzen Kanten (5) ist;
   - die Scharnierhülsen von zwei oder mehr zweiten Scharnierelementen (7b) entlang einer zweiten Linie (12) ausgerichtet sind, wobei die zweite Linie (12) im Wesentlichen senkrecht zu den zwei kurzen Kanten (5) ist;
   - die Scharnierstifte und die Scharnierhülsen eine entsprechende Form aufweisen, die es den Scharnierstiften des tragbaren ballistischen Schildes (1) ermöglicht, in die Scharnierhülsen eines anderen tragbaren ballistischen Schildes zu fallen, so dass die zwei tragbaren ballistischen Schilde (1) miteinander verbunden sind;

   dadurch gekennzeichnet, dass

   - die Scharnierstifte von zwei oder mehr weiteren ersten Scharnierelementen (7a) entlang einer dritten Linie (13) ausgerichtet sind, wobei die dritte Linie (13) im Wesentlichen senkrecht zu den zwei kurzen Kanten (5) ist;
   - die Scharnierhülsen von zwei oder mehr weiteren zweiten Scharnierelementen (7b) entlang einer vierten Linie (14) ausgerichtet sind, wobei die vierte Linie (14) im Wesentlichen senkrecht zu den zwei kurzen Kanten (5) ist.

2. Tragbarer ballistischer Schild (1) nach Anspruch 1, wobei

   - die erste Linie (11) und die dritte Linie (13) mit der ersten langen Kante (4) beziehungsweise der zweiten langen Kante (4) zusammenfallen; und
   - die zweite Linie (12) und die vierte Linie (14) beide auf der Aufprallfläche (2) des ballistischen Schildes (1) zwischen der ersten Linie (11) beziehungsweise der dritten Linie (13) angeordnet sind.

3. Tragbarer ballistischer Schild (1) nach Anspruch 1, wobei

   - die erste Linie (11) und die zweite Linie (12) mit der ersten langen Kante (4) beziehungsweise der zweiten langen Kante (4) zusammenfallen; und
   - die dritte Linie (13) und die vierte Linie (14) beide auf der Aufprallfläche (2) des ballistischen Schildes (1) zwischen der ersten Linie (11) beziehungsweise der dritten Linie (13) angeordnet sind.

4. Tragbarer ballistischer Schild (1) nach einem der vorhergehenden Ansprüche, wobei der Schild (1) eine erste Biegung (8) und eine zweite Biegung (8) umfasst, wobei

   - die erste Biegung (8) im Wesentlichen parallel zu der ersten langen Kante (4) verläuft und einen Abstand davon hat, der in dem Bereich von 5-25 % der Breite des Schildes liegt;
   - die zweite Biegung (8) im Wesentlichen parallel zu der zweiten langen Kante (4) verläuft und einen Abstand davon hat, der in dem Bereich von 5-25 % der Breite des Schildes liegt;
   - beide Biegungen (8) die Wirkung aufweisen, dass zwei lange Kanten (4) des Schildes zu der hinteren Fläche (3) des Schildes (1) gerichtet sind.

5. Tragbarer ballistischer Schild (1) nach Anspruch 4, wobei zwei Linien von Scharnierstiften und/oder Scharnierhülsen, die aus der Gruppe der ersten Linie (11), der zweiten Linie (12), der dritten Linie (13) und der vierten Linie (14) ausgewählt sind, an der ersten Biegung (8) und an der zweiten Biegung (8) vorhanden sind.

6. Tragbarer ballistischer Schild (1) nach Anspruch 4, wobei die zweite Linie (12), die die Scharnierhülsen umfasst, und die vierte Linie (14), die die Scharnierhülsen umfasst, an der ersten Biegung (8) bezie-

hungsweise an der zweiten Biegung (8) vorhanden sind.

7. Tragbarer ballistischer Schild (1) nach einem der Ansprüche 4-6, wobei der Winkel der ersten Biegung (8) und der Winkel der zweiten Biegung (8) unabhängig voneinander in dem Bereich von 150°-179° liegen.

8. Tragbarer ballistischer Schild (1) nach einem der vorhergehenden Ansprüche, wobei der Schild (1) ein Sichtfenster (9) umfasst.

9. Ballistisches Schutzsystem (10), das mehrere tragbare ballistische Schilde (1) nach einem der Ansprüche 1-8 umfasst, wobei ein erster tragbarer ballistischer Schild (1) mit einem zweiten tragbaren ballistischen Schild (1) durch die Verbindungsmittel (7) verbunden ist, wobei die Verbindung das Einführen von zwei oder mehr Scharnierstiften von dem ersten tragbaren ballistischen Schild (1) in zwei oder mehr Scharnierhülsen von dem zweiten tragbaren ballistischen Schild (1) umfasst.

10. Ballistisches Schutzsystem (10) nach Anspruch 9, das mehrere tragbare ballistische Schilde (1) nach einem der Ansprüche 4-7 umfasst, wobei die Scharnierstifte oder die Scharnierhülsen an einer der langen Kanten (4) des ersten tragbaren ballistischen Schildes (1) ausgerichtet sind und wobei diese mit den entsprechenden Scharnierhülsen beziehungsweise Scharnierstiften des zweiten tragbaren ballistischen Schildes (1) verbunden sind, wobei diese entsprechenden Scharnierhülsen oder Scharnierstifte des zweiten tragbaren ballistischen Schildes (1) an einer der Biegungen (8) des zweiten tragbaren ballistischen Schildes (1) ausgerichtet sind.

Revendications

1. Bouclier balistique portatif (1) de forme rectangulaire comprenant un matériau balistique, le bouclier comprenant

- une face d'impact (2) ;
- une face arrière (3) ;
- un premier bord long (4) et un second bord long (4) définissant la longueur du bouclier (1) ;
- deux bords courts (5) définissant la largeur du bouclier (1) ;
- une poignée (6) sur la face arrière (3) permettant de porter ou maintenir le bouclier (1) ;
- un moyen de raccord (7) permettant de fixer le bouclier balistique portatif (1) à un autre bouclier balistique portatif (1) ;

dans lequel

- le moyen de raccord (7) comprend une pluralité de premiers éléments de charnière (7a) comprenant un axe de charnière et une pluralité de seconds éléments de charnière (7b) comprenant un manchon de charnière ;
- les axes de charnière de deux ou plusieurs premiers éléments de charnière (7a) sont alignés le long d'une première ligne (11), la première ligne (11) étant sensiblement perpendiculaire aux deux bords courts (5) ;
- les manchons de charnière de deux ou plusieurs seconds éléments de charnière (7b) sont alignés le long d'une deuxième ligne (12), la deuxième ligne (12) étant sensiblement perpendiculaire aux deux bords courts (5) ;
- les axes de charnière et les douilles de charnière ont une forme correspondante qui permet aux axes de charnière du bouclier balistique portatif (1) de tomber dans les manchons de charnière d'un autre bouclier balistique portatif, de sorte que les deux boucliers balistiques portatifs (1) sont raccordés l'un à l'autre autre ;

caractérisé en ce que

- les axes de charnière de deux ou plusieurs autres premiers éléments de charnière (7a) sont alignés le long d'une troisième ligne (13), la troisième ligne (13) étant sensiblement perpendiculaire aux deux bords courts (5) ;
- les manchons de charnière de deux ou plusieurs autres seconds éléments de charnière (7b) sont alignés le long d'une quatrième ligne (14), la quatrième ligne (14) étant sensiblement perpendiculaire aux deux bords courts (5).

2. Bouclier balistique portatif (1) selon la revendication 1, dans lequel

- la première ligne (11) et la troisième ligne (13) coïncident avec le premier bord long (4) et le second bord long (4), respectivement ; et
- la deuxième ligne (12) et la quatrième ligne (14) sont toutes deux placées sur la face d'impact (2) du bouclier balistique (1) entre la première ligne (11) et la troisième ligne (13), respectivement.

3. Bouclier balistique portatif (1) selon la revendication 1, dans lequel

- la première ligne (11) et la deuxième ligne (12) coïncident avec le premier bord long (4) et le second bord long (4), respectivement ; et
- la troisième ligne (13) et la quatrième ligne (14) sont toutes deux placées sur la face d'impact (2) du bouclier balistique (1) entre la première ligne (11) et la troisième ligne (13), respective-

ment.

4. Bouclier balistique portatif (1) selon l'une quelconque des revendications précédentes, dans lequel le bouclier (1) comprend un premier coude (8) et un second coude (8), dans lequel

   - le premier coude (8) s'étend sensiblement parallèlement au premier bord long (4) et est à une distance de celui-ci qui se situe dans la plage de 5 à 25 % de la largeur du bouclier ;
   - le second coude (8) s'étend sensiblement parallèlement au second bord long (4) et est à une distance de celui-ci qui se situe dans la plage de 5 à 25 % de la largeur du bouclier ;
   - les deux coudes (8) ont pour effet que deux longs bords (4) du bouclier sont dirigés vers la face arrière (3) du bouclier (1).

5. Bouclier balistique portatif (1) selon la revendication 4, dans lequel deux lignes d'axes de charnière et/ou de manchons de charnière, choisies dans le groupe de la première ligne (11), de la deuxième ligne (12), de la troisième ligne (13) et de la quatrième ligne (14), sont présentes au niveau du premier coude (8) et du second coude (8).

6. Handheld ballistic shield (1) according to claim 4, wherein the second line (12) comprising the hinge sleeves and the fourth line (14) comprising the hinge sleeves are present at the first bend (8) and at the second bend (8), respectively.

7. Bouclier balistique portatif (1) selon l'une quelconque des revendications 4 à 6, dans lequel l'angle du premier coude (8) et l'angle du second coude (8) sont indépendamment l'un de l'autre dans la plage de 150° à 179°.

8. Bouclier balistique portatif (1) selon l'une quelconque des revendications précédentes, dans lequel le bouclier (1) comprend un trou d'observation (9).

9. Système d'abri balistique (10) comprenant une pluralité de boucliers balistiques portatifs (1) selon l'une quelconque des revendications 1 à 8, dans lequel un premier bouclier balistique portatif (1) est raccordé à un second bouclier balistique portatif (1) par les moyens de raccord (7), dans lequel le raccord comprend l'insertion de deux ou plusieurs axes de charnière du premier bouclier balistique portatif (1) dans deux ou plusieurs manchons de charnière du second bouclier balistique portatif (1).

10. Système d'abri balistique (10) selon la revendication 9, comprenant une pluralité de boucliers balistiques portatifs (1) selon l'une quelconque des revendications 4 à 7, dans lequel des axes de charnière ou des manchons de charnière sont alignés sur l'un des bords longs (4) du premier bouclier balistique (1), et dans lequel ceux-ci sont raccordés aux manchons de charnière ou axes de charnière correspondants, respectivement, du second bouclier balistique portatif (1), dans lequel ces manchons de charnière ou axes de charnière correspondants du second bouclier balistique portatif (1) sont alignés à l'un des coudes (8) du second bouclier balistique portatif (1).

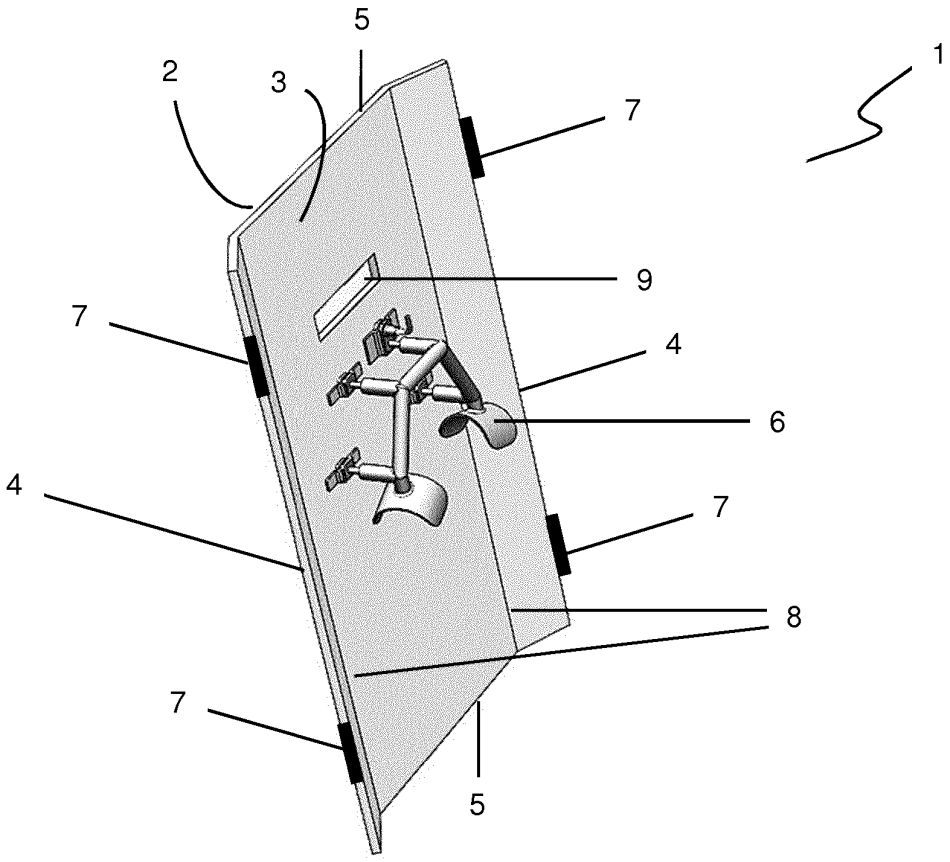

Figure 1

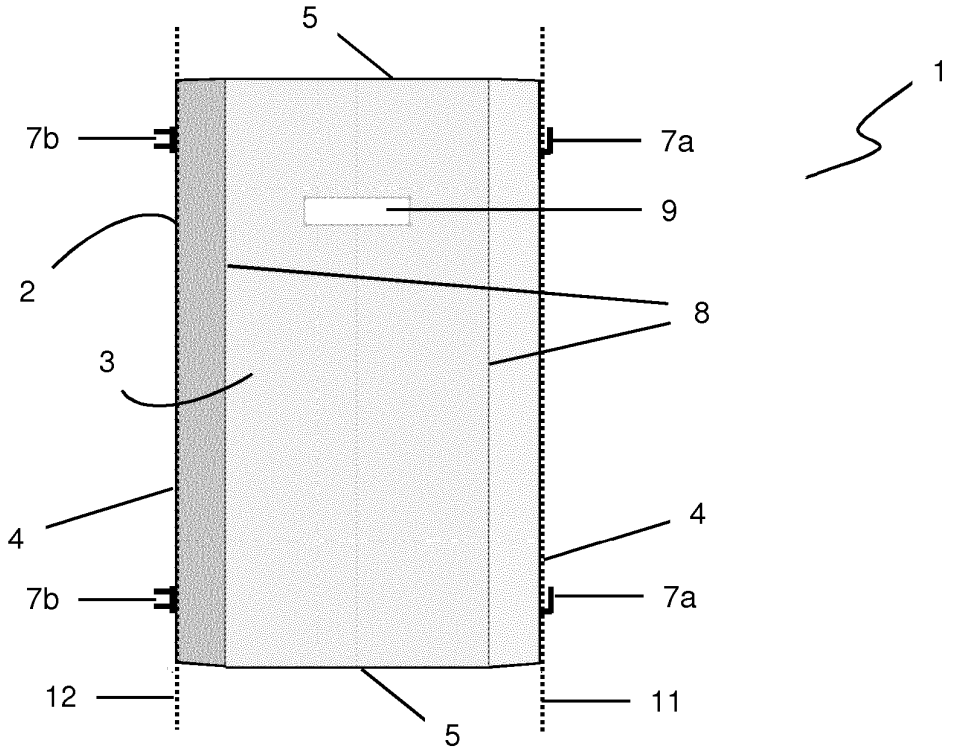

Figure 2

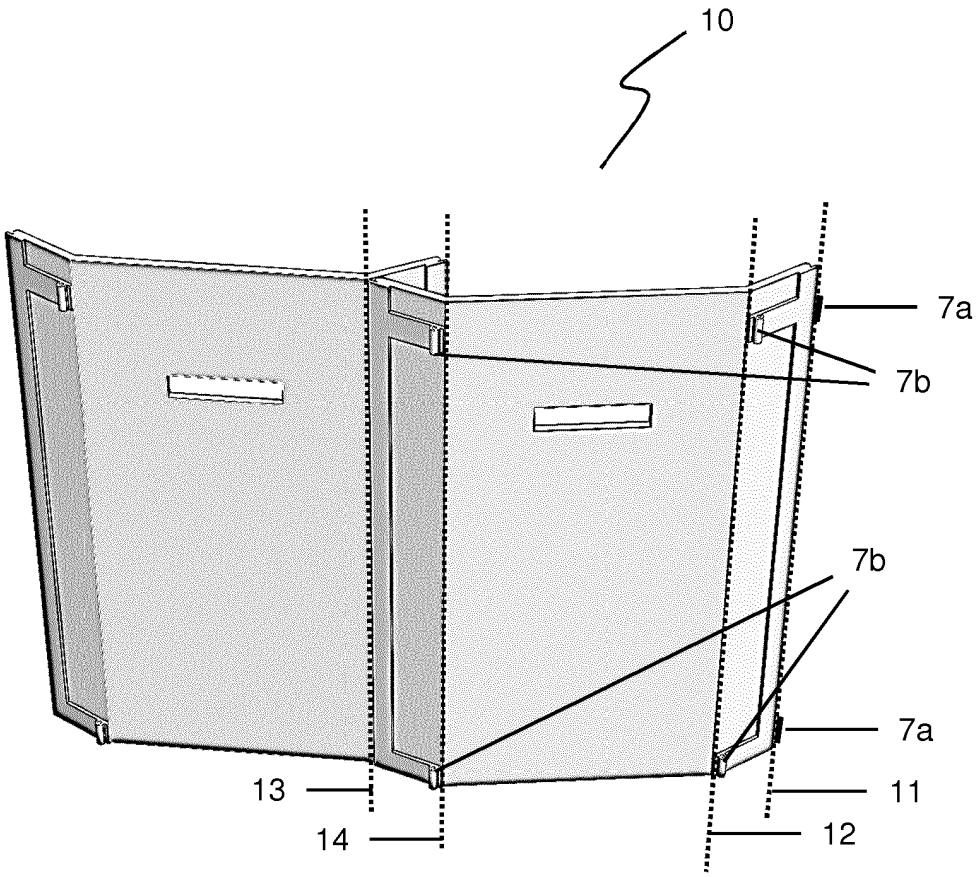

Figure 3

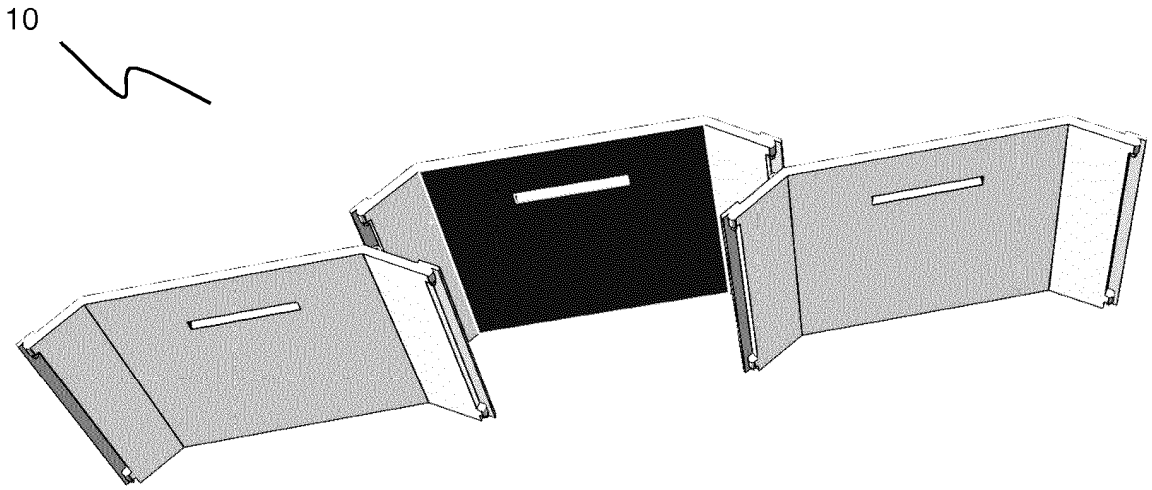

Figure 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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