

Ballistic protection system

Field of Invention

5 The invention relates to a method for using a ballistic protection system comprising a ballistic protective vest. The invention also relates to such a ballistic protection system and a ballistic protective vest that can be used for such a system.

Background

10

Ballistic protective vests have been in use for many years in order to protect the wearer of the protective vest against, for example, the impact of projectiles fired from firearms. Such protective vests are used, for example, by various emergency forces, for instance for crime prevention, and by various units in the armed forces. A ballistic
15 protective vest comprises front armor that protects the vital organs, especially lungs and heart, of the person wearing the protective vest from injury and damage that is or at least may otherwise be fatal. Front armor, also referred to as a breastplate, is arranged in the protective vest in such a way that it is situated at the wearer's front, i.e. in their chest area, when the ballistic protective vest is worn. Ballistic protective
20 vests also have back armor, which is arranged in the ballistic protective vest in such a way that it is positioned on the side of the wearer's torso opposite the front armor, i.e. on their back, when the protective vest is worn. It also serves to protect the wearer's vital organs, particularly the lungs and heart.

25

Various embodiments of front armor and back armor are known from the prior art. They are, for example, in different protective classes. Soft ballistic armor is often sufficient against projectiles from small weapons, such as handguns or small firearms such as pistols. The advantage of these is that they are relatively lightweight and deformable, making them comfortable to wear, even over long periods of time. The
30 disadvantage, however, is that their protective effect is often limited or even insufficient against projectiles with a bigger caliber and/or more kinetic energy, for example those fired from rifles and long guns or semi-automatic weapons.

It is known to use hard ballistic armor to protect against this kind of projectile, which can be used as front and/or back armor. It has the advantage of an improved protective effect, but it is considerably heavier than soft ballistic armor; it is also inflexible and not deformable, meaning that it cannot adapt to the wearer's body and movements, or can only do so to an insufficient degree.

Summary of Invention

Ballistic protective vests usually have a front cover that covers the front armor when the protective vest is in the mounted state. In embodiment examples of the present invention too, these front covers have two side sections that can be connected along a connection line, for example by means of a zipper, in order to close the protective vest. The outer side of the front cover usually features elements to which equipment can be attached, such as flashlights, radio devices, handcuffs or other equipment required by the respective wearer for their deployment, providing the wearer of the protective vest with easy access to these items during their deployment.

The front armor is preferably designed in such a way that it provides equally effective protection at each point of the area to be protected. In particular, this means that it cannot be designed to have two sections without providing special protection or additional armor for the area where the two sections of the front armor meet. A protective vest with multi-section front armor, which, for example, is divided in the same way as the front cover, therefore presents a disadvantage and requires a greater engineering effort than a protective vest with a single-section front armor for the same protective effect. As a result, modern ballistic protective vests have continuous and preferably single-section front armor.

When putting on the protective vest, the front armor is consequently on one side, either right or left, of the protective vest. The wearer puts their arms through the openings provided in the protective vest. The front armor situated on one side of the protective vest is then positioned over the wearer's chest area such that it is completely, or at least almost completely, in the position it is also in when the protective vest is fully mounted. On the inner side of the front cover, the side where

the front armor is not situated features a pouch into which the front armor is pushed or inserted. The front cover is then closed.

5 The disadvantage is that it is not practically possible to reinforce the armor if, during a deployment, it becomes evident that a different, preferably stronger, armor is required or desired. If a further vest with different armor is put on over a protective vest already being worn, all equipment elements arranged on the outer side of the front cover of the first protective vest can no longer be accessed from the outside or would have to be removed from the front cover before putting on another vest and
10 reattached after arranging the additional vest. This takes time, which is usually not available in situations involving the use of firearms.

The invention is therefore based on the task of proposing a ballistic protection system that reduces or completely eliminates these disadvantages.
15

The invention solves the task addressed by way of a ballistic protection system with a ballistic protective vest comprising a first back armor, a first front armor and a front cover, which can be brought into an open and a closed state and covers the first front armor when in a closed state, and with an over-armor comprising a second back
20 armor and a second front armor, wherein the first back armor is connected to the first front armor via a first shoulder strap and to the front cover via a second shoulder strap and the second back armor is connected to the second front armor via two further shoulder straps.

25 The protection system thus comprises a ballistic protective vest and an over-armor. The ballistic protective vest comprises the first front armor and the first back armor, which may exhibit some or all of the named features known from the prior art. The protective vest also has a front cover, which covers the front armor when in a closed state. As known from the prior art, there are preferably ways to position and arranged
30 apparatus and equipment on the outer side of the front cover such that the wearer of the ballistic protective vest can access them easily. This is usually the situation the wearer finds themselves in when the protective vest is being worn.

In the event that the protective effect created by the first front armor and the first back armor is no longer deemed sufficient, the ballistic protection system has an over-armor with a second front armor and a second back armor. The second front armor is connected to the second back armor via two further shoulder straps. The two further
5 shoulder straps, the second front armor and the second back armor thus enclose an opening that the wearer's head is guided through when putting on the over-armor. The aim is to put on this over-armor without removing or weakening the ballistic protective vest and the protective effect it provides. To this end, a first step comprises putting the front cover into the open state.

10

The over-armor is applied when the front cover is in this open state. To this end, the wearer's head is guided through the opening provided in the top-layer cover and formed by the second front armor, the second back armor and the two further
15 shoulder straps. The front cover is then returned to the closed state, thereby covering the second front armor, which is now situated between the front cover and the first front armor. The second front armor is therefore on the side of the first front armor facing away from the wearer's body. The second back armor is on the side of the first back armor facing away from the wearer's body.

20 Items and equipment located on the outer side of the front cover remains accessible and does not have to be removed and reattached to a different front cover, which takes time.

In one preferred embodiment, the front cover has two side elements, which are or
25 can be detachably connected to each other along a connection line. This connection line preferably extends from the top downwards across the wearer's chest, preferably down the middle of the front cover. Press studs, velcro elements or other individual elements may be arranged and provided along this line, which can be used to join the two side elements of the front cover. In one particularly preferable embodiment, a
30 zipper extends along the connection line which is used to join the two side elements in order to bring the front cover from the open into the closed state. Conversely, the zipper is opened in order to bring the front cover from the closed state into the open state.

In one particularly preferable embodiment of the present invention, the front cover has a connecting tab. Said tab is preferably detachably connected to the first front armor. In one preferred embodiment, to this end there is a velcro element on the connecting tab; the corresponding counter-element is on the side of the first front armor facing away from the wearer's body. The connecting tab is preferably arranged on the inner side of the front cover, i.e. the side facing the wearer's body. Preferably, this can be done in a non-detachable manner, for example by sewing it on. As described above, the first front armor is usually only connected to the front cover on one side so as to prevent it from having to be composed of multiple sections, which leads to additional manufacturing effort and/or a reduced protective effect at the connection points. The connecting tab makes it possible to also connect the front armor with the side element of the front cover that is not on the side where the first front armor is connected to the front cover.

Additionally or alternatively, the connecting tab is detachably connected to the second shoulder strap. It has been proven advantageous if, in this case, the side element on which the connecting tab is arranged is also detachably connected to the connecting tab. This additional connection is preferably in the area where the connecting tab is connected to the second shoulder strap. In this embodiment, this results in the following situation: The connecting tab is connected on its inner side, i.e. the side facing the wearer's body, to the second shoulder strap. This connection is created when the ballistic protective vest is put on. If the ballistic protective vest is to be removed, this connection should preferably be detached.

In the area where the inner side of the connecting tab is or can be connected to the second shoulder strap, the outer side of the connecting tab, which lies opposite the inner side, is connected to the side element of the front cover. This connection is detached in order to bring the front cover into the open state, which is necessary if the over-armor is to be used.

All of these connections are preferably achieved using velcro connections, wherein it should be noted that other detachable connections, especially detachable form-fitting connections, are also possible.

Consequently, when putting on the ballistic protective vest, the two side elements of the front cover are not connected to each other along the connection line. In preferred embodiments, the detachable connection between the connecting tab and the second shoulder strap is also detached, meaning that these two elements are not connected to each other. However, the connecting tab is preferably attached on its outer side to the inner side of the side element, where it is preferably sewn on, such that it can be detached. Once the wearer has put on the ballistic protective vest such that it is situated on their torso, the first front armor, which is only connected to the front cover on one side, preferably to one of the side elements of the front cover, is brought into the correct position. To this end, a pouch may be provided on the inner side of the respective other side element into which the first front armor is inserted. The connecting tab is preferably connected to the outer side of the first front armor and holds it in position. The connecting tab is also connected to the second shoulder strap. The two side elements are connected to each other along the connecting line. The front cover is in the closed state.

If the over-armor is to now be used to achieve enhanced protection for the wearer of the system, the front cover is brought into the open state. To do this, the two side elements of the front cover are separated along the connection line, for example by opening a zipper provided there. The connecting tab preferably remains connected to both the first front armor and the second shoulder strap. Particularly preferably, however, the detachable connection between the connecting tab and the second element of the front cover is detached. In this state, the side element of the front cover can be unfolded.

The second side element, which does not necessarily feature a connecting tab, is preferably detachably connected to the first shoulder strap. The first shoulder strap connects the first back armor to the first front armor. Once the connection between the second side element and the first shoulder strap has been detached, this side element can also be unfolded. In this state, the over-armor is mounted as described. The second back armor then covers the first back armor. The second front armor then covers the first front armor.

The front cover is then returned to the closed state. To this end, the second side element is preferably connected to one of the two further shoulder straps. Preferably, the other side element, where the connecting tab is located, is connected to the other of the two further shoulder straps. In this state, the further shoulder strap is therefore
 5 between the connecting tab and the side element of the front cover. At the same time, the connecting tab is situated between the second shoulder strap and the further shoulder strap. The side elements of the front cover are connected to each other along the connection line.

10 Preferably, the over-armor has a side fastening comprising two straps, each with one end attached to the second back armor, the other ends of which can be connected to each other. The two straps have a first end where they are arranged, for example sewn or welded, on the second back armor, preferably in the lower area. Both straps have a second end opposite the first end. These two ends can be connected to one
 15 another. This connection is preferably in front of the front cover, i.e. preferably in the stomach area of the person wearing the protection system. Preferably, there are form-fitting elements arranged at the ends of the straps that are brought into engagement with one another in order to create the connection between the two second ends of the straps, which then constitutes a form-fitting connection. The form-
 20 fitting elements preferably comprise a velcro element and a counter-element. In one preferred embodiment, a velcro element or a counter-element is arranged on the side of the second end of both straps facing towards the wearer's body. A counter-element or a velcro element is then arranged on the side of the second ends of the straps facing away from the wearer's body. If the two second ends are placed on top
 25 of one another, a side facing towards the wearer's body lies against a side facing away from the wearer's body, so that a velcro element and a counter-element rest against one another and are brought into engagement with one another.

The straps can be made of an elastic and/or an inelastic material, such as textile.

30 The material can be made of natural fibers and/or synthetic fibers. One possible material is known as "webbing" and is made, for example, from polypropylene.

When connected, the two straps extend laterally from the second back armor around the wearer's body, which is why the term side fastening is used.

Advantageously, the front cover has two contact areas, wherein one of the other ends, i.e. the second ends of the strap, can be attached to each area. The contact areas preferably comprise form-fitting elements, which are designed to correspond to the form-fitting elements on the side of the second ends of the straps facing towards the wearer's body.

Particularly preferably, the front cover has two flaps, each of which covers one contact area when folded up and, when unfolded, render the respective contact area accessible. In order to close the side fastening, the two flaps are preferably brought into the unfolded state. The flaps are preferably textile flaps with attachment elements on the outer side for attaching and stowing equipment. The flaps are preferably sewn onto the rest of the front cover. If the flaps are unfolded, the contact areas become accessible and the second ends of the straps can be arranged on and connected to the contact surfaces. The flaps are then returned to the folded-up state, in which they cover both the contact areas and the second ends of the straps. This means that any equipment arranged on the outer side of the flaps is once again easily accessible.

The invention also solves the task addressed by way of a ballistic protective vest that can be used in a ballistic protection system of the kind described here.

The front cover preferably comprises a connecting tab. The first back armor is preferably connected via the second shoulder strap to the connecting tab, which is or can be connected to the first front armor. Preferably, the connecting tab is connected, for example sewn, to an inner side of a side element of the front cover. Alternatively, the connecting tab is connected to the inner side of one of the side elements via a textile strip, preferably an elastic textile strip.

The invention further solves the addressed task by way of a method for using a ballistic protection system of the kind described here, the method comprising the following steps:

- a) mounting the ballistic protective vest on the wearer's torso,
- b) bringing the front cover into the open state,

- c) putting on the over-armor by guiding the wearer's head through an opening formed by the second back armor, the second front armor and the two further shoulder straps.
- d) bringing the front cover into the closed state such that the front cover covers the second front armor.

In one preferred embodiment, the front cover has two side elements that are detachably connected to each other along a connection line when the front cover is brought into the closed state.

Preferably, a side element is detachably connected to the second shoulder strap when the front cover is brought into the closed state.

Advantageously, once the front cover is brought into the closed state in step d), the second back armor covers the first back armor. Furthermore, the second front armor covers the first front armor and the two further shoulder straps cover the first shoulder strap and the second shoulder strap.

Brief Description of Drawings

In the following, an embodiment example of the invention will be explained in more detail with the aid of the accompanying drawings. They show:

Fig. 1 to 6 - a ballistic protective vest for a ballistic protection system according to an embodiment example of the present invention,

Fig. 7 to 8 - a ballistic protection system in the mounted state,

Fig. 9 to 11 - an over-armor and

Fig. 12 and 13 - a ballistic protection system in the mounted state.

Detailed Description

Figure 1 depicts the ballistic protective vest in the state it is in when mounted. It shows a first front armor 2 as well as an unfolded front cover, which has a first side element 4 and a second side element 6. The two side elements 4, 6 can be connected to each other along a connection line via a form-fitting element, which is a

zipper 8 in the embodiment example shown. It also shows a first shoulder strap 10 that connects the first front armor 2 to a first back armor 12 which, in the representation shown, is arranged beneath the front armor 2, meaning only a small section is visible. The first front armor has a tab 30 which, for example, is connected to the first shoulder strap 10 using velcro. The first front armor 2 is also connected to the first side element 4 of the front cover via a connector 28. In the embodiment example shown, this connector 28 is an elastic textile strip, but it may also be designed as a seam.

The second side element 6 features a connecting tab 14, which is preferably connected to the second side element 6 such that it cannot be detached, for example it is sewn to it. In figure 1 the connecting tab 14 is unfolded so its inner side is visible, which faces the body of the wearer of the ballistic protective vest when the ballistic protective vest is worn. On said inner side of the connecting tab 14, one can see a form-fitting element, which is designed as a velcro element 16 in the embodiment example shown. The corresponding counter-element 18 is located on the outer side of the first front armor 2, wherein said counter-element can create a form-fitting connection with the velcro element 16, enabling the connecting tab 14 to be connected to the outer side of the first front armor 2. The connecting tab 14 is connected to the second shoulder strap 22 of the first back armor 12. To this end, the connecting tab 14 has a tab 32, which is connected to the second shoulder strap 22 of the first back armor 14 using velcro.

This situation is shown in figure 2. The connecting tab 14 is folded up such that its outer side is now visible. The connecting tab 16 is connected to the inner side of the second side element 6 along a seam 20. A connector, such as an elastic textile strip, can also be used instead of a seam 20. The connecting tab 14 forms part of the front cover, to which the second side element 6 also belongs. Figure 2 also depicts a second shoulder strap 22, by means of which the connecting tab 14, and therefore the first front armor 2, is connected to the first back armor 12. A pouch 24 is also indicated on the inner side of the second side element 6 into which the right end of the first front armor in figures 1 and 2 can be inserted when the ballistic protective vest is mounted. The first shoulder strap 10 and the second shoulder strap 22 also each feature a velcro element, which can engage with a corresponding counter-

element on the inner side of the first side element 4 and the second side element 6. These form-fitting connections are preferably created when the front cover of the ballistic protective vest is brought into the closed state.

5 This situation is shown in figure 3. The first side element 4 and the second side element 6 are connected to each other along the connection line via the zipper 8. Various elements are arranged on the outer side of the two side elements 4, 6 now shown; items of equipments, such as a radio device or a flashlight, can be arranged on said elements. Both side elements 4, 6 have a flap 34, which is depicted in the
10 folded-up state.

Figures 4 to 6 show the first shoulder strap 10 in various states. In contrast to the arrangement shown in figure 3, in figure 4 a front tab 26, which was arranged on the first shoulder strap 10 by means of a velcro connection, has been detached. This is
15 practical, for example, if an over-armor, not depicted, has been mounted and the front cover of the ballistic protective vest is to be brought from the open state into the closed state. Preferably, the zipper 8 is closed first so that the second front armor of the over-armor is located between the first front armor and the two side elements 4, 6 of the front cover. When the zipper 8 is closed, the front tab 26 shown in figure 4 is
20 preferably separated from the first shoulder strap 10, as shown in figure 4. A second shoulder strap, which forms part of the over-armor, then lies on the first shoulder strap 10 and preferably also comprises a counter-element for the velcro element provided on the front tab 26. If the front tab 26 is folded back upwards, it lies on the second shoulder strap such that the velcro element of the front tab 26 is preferably
25 connected in a form-fit manner to the counter-element on the second shoulder strap.

Figures 5 and 6 show that the first shoulder strap 10 is designed as a "Y" velcro connection.

30 Figures 7 and 8 depict a frontal view of a ballistic protection system in the mounted state according to an embodiment example of the present invention. They show the left-hand flap 34 of the first side element in the unfolded position, rendering accessible a contact area 36 beneath. Said contact area is equipped with a form-

fitting element, which is a velcro element in the embodiment example shown. Figure 8 illustrates that a second end 40 of a strap 42 is arranged on the contact area 36.

Figure 9 depicts an over-armor according to an embodiment example of the present invention in the expanded state. It has a second front armor 44, which is connected to a second back armor 46 via two further shoulder straps 50. Two straps 42 of a side closure are arranged at the lower end of said back armor, the second ends 40 of said straps being free. The first ends 38 are not visible as they are covered by a back flap 48. Two connectors 28 are arranged on the second front armor 44 by means of which the second front armor 44, when mounted, can be connected to the front cover, preferably to the two side elements 4, 6.

Figure 10 shows a frontal view of an over-armor. It shows the second front armor 44 with the two connectors 28 arranged thereon and the two further shoulder straps 50. The two second ends 40 of the two straps 42 are brought together in front of the second front armor and connected to one another via the form-fitting elements. The rear view is depicted in figure 11, wherein the back flap 48 is shown in the unfolded state. As a result, the two first ends 38 of the straps 42 are visible, which are arranged on a contact element of the second back armor 46.

Figures 12 and 13 depict a rear view (figure 12) and a frontal view (figure 13) of the ballistic protection system. In figure 12 the over-armor is mounted, but the two straps 42 have not yet been closed at the front of the wearer's body; instead, they are still hanging loose in figure 12. The back flap 48 of the second back armor 46 is shown in the folded-up state and the two further shoulder straps 50 extend over the wearer's shoulders. Figure 13 shows the frontal view, wherein the two side elements 4, 6 are open and not connected via the zipper. It illustrates that the second front armor 46 is worn over the first front armor and that the two further shoulder straps 50 extend over the first shoulder strap and the second shoulder strap.

Reference list

- 2 first front armor
- 4 first side element
- 6 second side element
- 5 8 zipper
- 10 first shoulder strap
- 12 first back armor
- 14 connecting tab
- 16 velcro element
- 10 18 counter-element
- 20 seam
- 22 second shoulder strap
- 24 pouch
- 26 front tab
- 15 28 connector
- 30 tab
- 32 tab
- 34 flap
- 36 contact area
- 20 38 first end
- 40 second end
- 42 strap
- 44 second front armor
- 46 second back armor
- 25 48 back flap
- 50 further shoulder strap

Patent claims

1. A ballistic protection system with

- a ballistic protective vest comprising

5

o a first back armor (12),

o a first front armor (2) and

o a front cover, which can be brought into an open and a closed state
and which, when in a closed state, covers the first front armor (2), and

- an over-armor comprising

10

o a second back armor and

o a second front armor,

wherein the first back armor (12) is connected to the first front armor (2) via a first
shoulder strap (10) and to the front cover via a second shoulder strap (22), and
the second back armor is connected to the second front armor via two further
15 shoulder straps.

2. The ballistic protection system according to claim 1, characterized in that the
front cover comprises two side elements (4, 6), which can be or are detachably
connected to one another along a connection line.

20

3. The ballistic protection system according to claim 1 or 2, characterized in that the
front cover comprises a connecting tab (14), which is detachably connected to
the second shoulder strap (22) and preferably to the first front armor (2), and is
covered by the front cover, preferably a side element (6), when the front cover is
25 in the closed state.

25

4. The ballistic protection system according to one of the preceding claims,
characterized in that the over-armor has a side fastening comprising two straps
(42), each with one end (38) attached to the second back armor, the other ends
(40) of which can be connected to each other.

30

5. The ballistic protection system according to claim 4, characterized in that the
front cover comprises two contact areas (36) to which one of the other ends of
the straps (42) can be attached respectively.

6. The ballistic protection system according to claim 5, characterized in that the front cover has two flaps (34), each of which covers one contact area (36) when folded up and, when unfolded, render the respective contact area (36) accessible.

7. A ballistic protective vest for a ballistic protection system according to one of the preceding claims comprising

- a first back armor (12),

- a first front armor (2) and

- a front cover, which can be brought into an open and a closed state and which, when in a closed state, covers the first front armor (2),

wherein the first back armor (12) is connected to the first front armor (2) via a first shoulder strap (10) and to the front cover via a second shoulder strap (22).

8. The ballistic protective vest according to claim 7, characterized in that the first back armor (12) is connected via the second shoulder strap (22) to a connecting tab (14) of the front cover, which is or can be connected to the front armor (2).

9. A method for using a ballistic protection system according to one of the claims 1 to 6,

the method comprising the following steps:

a) mounting the ballistic protective vest on a wearer's torso,

b) bringing the front cover into the open state,

c) putting on the over-armor by guiding the wearer's head through an opening formed by the second back armor, the second front armor and the two further shoulder straps.

d) bringing the front cover into the closed state such that the front cover covers the second front armor.

10. The method according to claim 9, characterized in that the front cover has two side elements (4, 6) that are detachably connected to one other along a connection line when the front cover is brought into the closed state.

11. The method according to claim 10, characterized in that a side element (6) is detachably connected to the second shoulder strap (22) when the front cover is brought into the closed state.
- 5 12. The method according to one of the preceding claims 9 to 11, characterized in that, once the front cover has been brought into the closed state in step d), the second back armor covers the first back armor and the second front armor covers the first front armor and the two further shoulder straps cover the first shoulder strap and the second shoulder strap.