BULLET PROOF PROTECTIVE ARMOR

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REFERENCES CITED
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ABSTRACT
A bullet-proof protective armor formed of a flexible support sheet having a large number of equal size, approximately square, flat metal plates secured upon the opposite faces of the sheet. The plates on each sheet face are arranged in a checkerboard pattern, that is, corner to corner, with a plate size space between each group of adjacent plates. The checkerboard pattern of the plates on one face of the sheet are reversely arranged relative to the pattern on the opposite face of the sheet. Thus, the plates on one face of the sheet are aligned with and overlap the spaces formed between the plates on the opposite face of the sheet. Flexible cover sheets are adhesively secured to the exposed faces and edges of the plates and the exposed portions of the support sheets to secure the plates to the support sheets and permit flexing of the armor.

4 Claims, 6 Drawing Figures
BULLET PROOF PROTECTIVE ARMOR

BACKGROUND OF INVENTION

Various types of bullet-proof armors, such as so-called bullet-proof vests or "flack jackets" have been utilized in the past. Many have included metal plates, in some instances joined together by or secured upon or within various cloth materials. However, prior armors of this type have been very heavy, bulky, awkward to wear, too stiff to comfortably conform to the wearer's body, and of limited bullet or fragment stopping capacity.

Thus, the invention herein relates to an improvement of such type armor which obviates many of the prior problems associated therewith, and which may be used as a separate body worn armor or as an insert within cloth-like types of armor such as is disclosed in my prior application, Ser. No. 251,077, filed May 8, 1972, now U.S. Pat. No. 3,783,449.

SUMMARY OF INVENTION

The invention herein contemplates forming a flexible body armor out of a central support sheet having equal size flat plates secured to the opposite faces of the sheet, with the plates arranged in a checkerboard pattern. The pattern of the plates on one face are the reverse of the pattern on the opposite face, so that together, and on opposite faces of the sheet, the plates completely cover the area to be protected with a single layer of plates. With this construction, the armor is quite flexible and the individual plates are relatively movable, to some limited degree, for better absorbing the forces of impacts.

The armor formed here may be used as a sheet sized to protect the wearer's body or portions thereof or may be formed as inserts to be fitted in other body worn supports or may be used for protection of inanimate bodies or articles. This construction forms a relatively lightweight, flexible, relatively inexpensive and effective protection against bullets and fragments and the like.

These and other objects and advantages of this invention will become apparent upon reading the following description of which the attached drawings form a part.

DESCRIPTION OF DRAWINGS

FIG. 1 is an elevational view of an armor sheet formed in the shape of an inverted T for protection of the front and sides of a human torso.

FIG. 2 is a side elevational view of FIG. 1.

FIG. 3 is a view similar to FIG. 2, but showing the armor in a bent or flexed position.

FIG. 4 is an enlarged, fragmentary, cross-sectional view of a portion of the armor.

FIG. 5 is a further enlarged fragment of a portion of the armor.

FIG. 6 is a perspective view illustrating the positioning of the metal plates upon the support sheet.

DETAILED DESCRIPTION

The protective armor, generally designated 10, may be formed in a shape suitable to be worn upon the torso of a person, as for example, in a rectangular shape, or inverted T-shape, as illustrated in FIG. 1, for protection of parts of the sides of the torso. The size and overall shape may vary depending upon the use desired.

The armor is made of a flexible support sheet 11 upon whose opposite surfaces metal plates 12 are positioned. The support sheet may be made of a suitable fabric or cloth-like material which is flexible and yet sufficiently strong for the purpose. An example of a suitable material is a woven nylon cloth formed of a heavy gauge, linearly oriented, nylon thread, of 1,050 denier approximately, with a tight, close weave. Other similar cloths may be found which are strong, relatively lightweight, and resistant to moisture and rotting.

Preferably, the metal plates 12 are formed in a roughly square shape, that is, four sided shape, which are either actually square or somewhat rectangular. Thus, the term square as used herein may include rectangular, e.g., elongated in one direction, as well. An example of a suitable plate is one formed of a medium or low carbon steel, such as 1,010, and of approximately 3 by 3 and 0.080 inch thick. This should stop a 9mm. bullet. Thicker plates, e.g., 0.132 inch can be used to stop a steel jacketed bullet.

As illustrated in FIG. 6, the plates which are all substantially identical in size and shape and are preferably flat, are arranged in a checkerboard pattern on opposite sides of the sheet. That is, patterns generally designated as 13 and 14 are formed of the plates, with one pattern being the reverse of the other so that plates on one side of the face fill the space produced by the plates on the opposite side of the sheet face. Thus, the plates in each pattern are arranged corner to corner and their edges are aligned with the edges of the plates in the pattern on the opposite side of the sheet.

Although the plates may be adhesively secured to the support sheet, preferably they are free of securement thereto, that is, free of direct securement thereto, and instead are secured together by outer cover sheets 16. Such outer cover sheets may be formed of a thin plastic sheeting which is adhesively or similarly bonded to the exposed surfaces and edges of the metal plates and the exposed portions of the support sheet 11. Such cover sheets may be formed of wide, e.g., 3 inch, adhesive tape made of a plastic material with a permanently tacky adhesive applied to one face thereof. Thus, as illustrated in FIG. 5, the cover sheets, whether formed of a monolithic sheet or of strips of plastic tape, are secured by an adhesive layer 17, or other comparable bonding material, to the outer, exposed surfaces of the plates 12, the edges of the plates, and the exposed portions of the sheet 11.

With this construction, the armor is flexible, particularly at the lines defined by the edges of the plates. In addition, each plate has some degree of relative movement, that is, relative to the other plates, upon impact, which helps absorb and distribute the loads of impact as well as to deflect bullets and similar fragments striking the plate.

The alignment of the edges of the plates on opposite sides of the support sheets prevents penetration of bullets at the edges of the plates and further functions to deflect the bullets.

The composite armor construction is capable of stopping conventional handgun and rifle and the like bullets, and if the plates are formed of a proper thickness will stop completely, most, if not all, high powered type bullets. Thus, the armor is useful for various dangerous police and military types of activities.

Having fully described an operative embodiment of this invention, I now claim:
3,894,472

1. A protective armor comprising a flexible support sheet and a plurality of approximately equal size, flat, relatively small metal plates arranged upon the opposite faces of the sheet;
the plates being arranged in a checkerboard pattern upon each of the opposite faces of the sheet, each checkerboard pattern including adjacent metal plates in a corner-to-corner relationship with open spaces between edges of adjacent plates, with the pattern of the plates on one face of the sheet being reversed to the pattern of the plates on the opposite face of the sheet;
said plates on one sheet face filling the spaces on the opposite sheet face with the edges of the plates on one sheet face aligned with the edges of the plates on the opposite sheet face without the plates on one sheet face overlapping onto the plates on said opposite sheet face;

and means for securing each of the plates to the support sheet, wherein the armor may be bent and flexed along the edges of each of the plates and each of the plates is movable relative to the other plates.

2. A protective armor as defined in claim 1, and said means for securing the plates comprising flexible cover sheets arranged upon and overlapping and adhesively secured to the exposed faces and edges of the plates and the exposed portions of the support sheet.

3. A protective armor as defined in claim 2, and such cover sheets being formed of wide strips of a plastic sheeting having an adhesive applied to one face thereof.

4. A protective armor as defined in claim 2, and each plate being otherwise free of direct securement to the support sheet.

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