United States Patent [19]

George et al.

[11] **3,843,969**

[45] **Oct. 29, 1974**

[54] **PERSONNEL ARMOR SUSPENSION SYSTEM**

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[73] Assignee: **The United States of America as represented by the Secretary of the Air Force,** Washington, D.C.

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[52] **U.S. Cl.** **2/2.5**

[51] **Int. Cl.** **F41h 1/02**

[58] **Field of Search** 2/2.5

[56] **References Cited**

UNITED STATES PATENTS

2,743,446	5/1956	Persico et al.	2/2.5
2,747,190	5/1956	Foster	2/2.5
3,452,362	7/1969	Korolick et al.	2/2.5
3,557,384	1/1971	Barron et al.	2/2.5

FOREIGN PATENTS OR APPLICATIONS

388,598	3/1933	Great Britain	2/2.5

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[57] **ABSTRACT**

A personnel armor suspension system having a conventional survival vest modified to support the body armor. The front armor members have a pair of zipper elements secured to the armor carrier with one zipper element and slider on the armor engaging one of the zipper elements on the survival vest and the other zipper member on the armor engaging the slider and the other zipper element on the survival vest. The back armor member fits into a pocket on the back of the survival vest and has a slider and zipper element which engages a zipper element near the neck portion of the survival vest. A Velcro loop patch on the survival vest can be used to engage a Velcro hook patch on the fragmentation armor member to add to the support for the back member.

3 Claims, 9 Drawing Figures



Fig-1

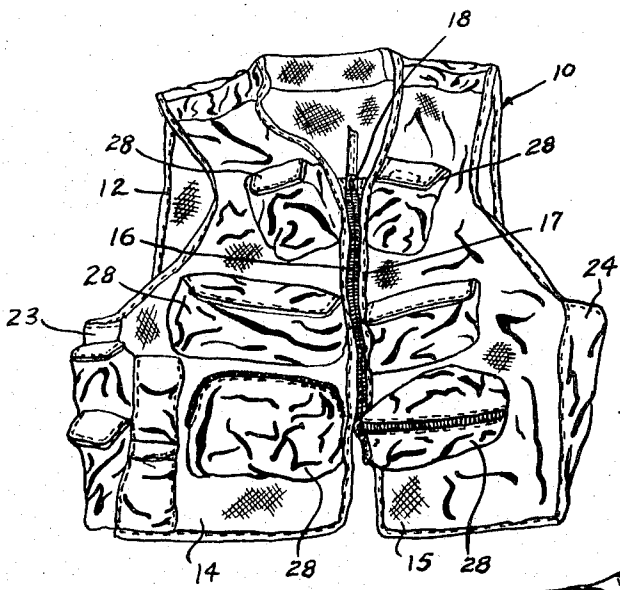


Fig-2

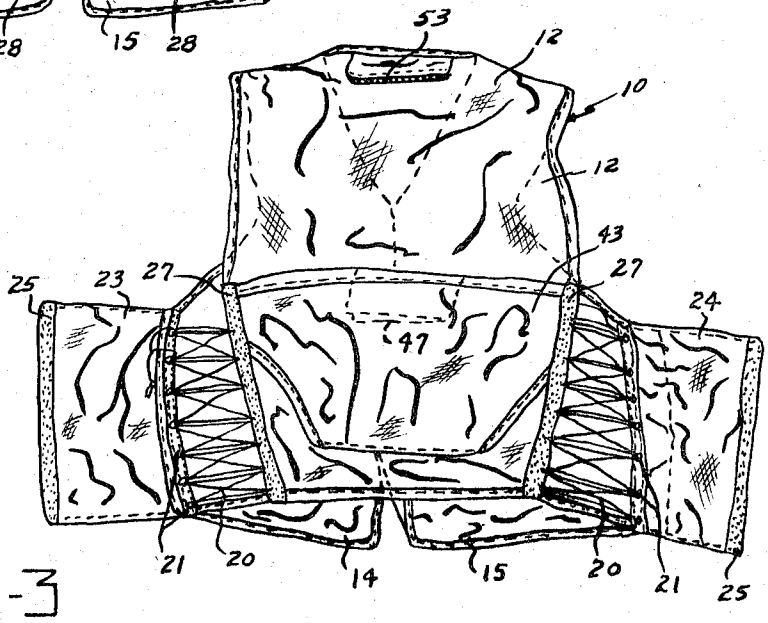


Fig-3

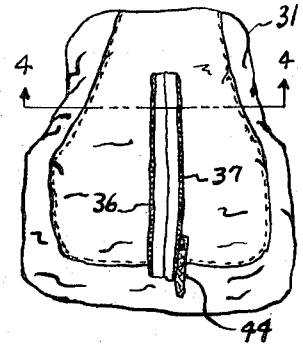


Fig-4

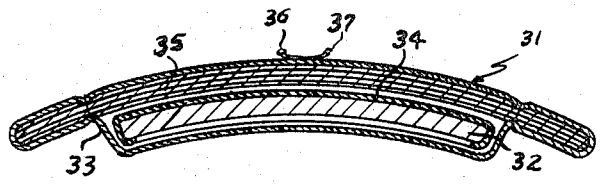


Fig-5

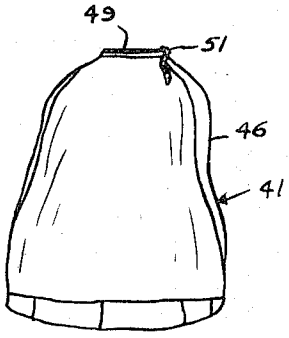


Fig-6

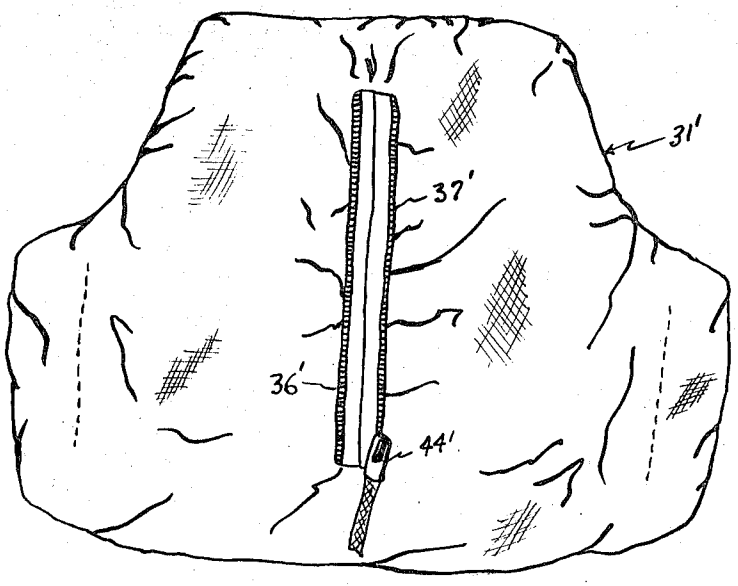


Fig-7

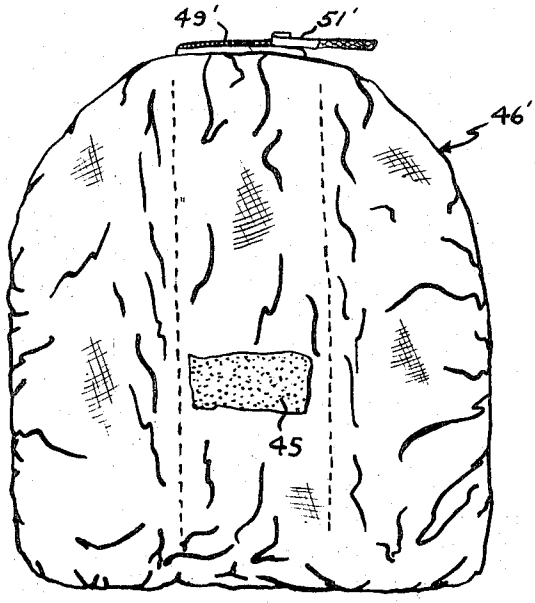
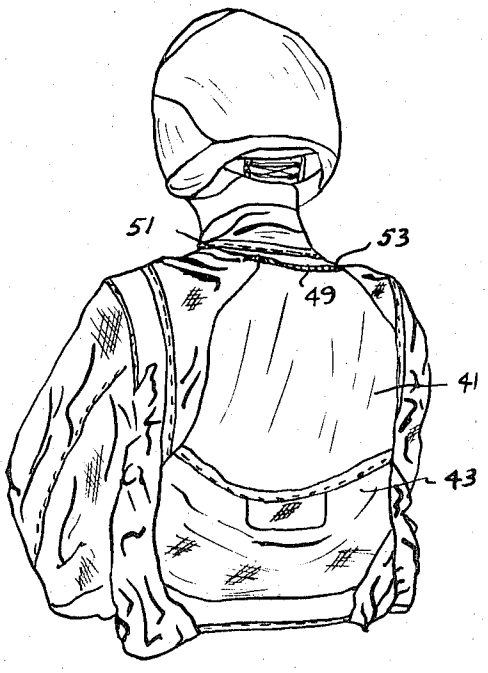


Fig-8



Fig-9



PERSONNEL ARMOR SUSPENSION SYSTEM

BACKGROUND OF THE INVENTION

Body armor is needed which is compatible with all classes of aircraft and flying personnel. Psychological acceptance of armor is a function of ballistic protection offered verses personnel comfort.

Aircrewmen subjected to ballistic hazards in low altitude, slow flying aircraft need maximum area coverage armor and are willing to tollerate the penalties of added weight, reduced mobility and heat stress.

Aircrewmen in high performance aircraft generally feel that body armor is a hindrance and will tolerate only minimal area coverage body armor.

Armor materials used for providing protection against relatively low velocity fragments usually have a light weight material such as layers of nylon ballistic fabrics. Armor used for protection against high velocity fragments such as small arms fire are usually heavier, hard composite materials such as described in the patent to Korolick et al, U.S. Pat. No. 3,452,362. Body armor apparatus is needed which is adaptable to the use of the type of armor which is psychologically acceptable to flying personnel for the particular mission.

BRIEF SUMMARY OF THE INVENTION

According to this invention, a conventional survival vest is modified to integrate either rigid armor members or flexible fragmentation armor members, thus making it unnecessary to provide separate armor support equipment. The survival vest adjustable laces, that are normally positioned on the back, are moved to the side of the garment. Zippers are provided on the armor carriers which mate with the two sides of the zipper normally used on the survival vest. A plurality of pockets are provided on the back of the survival vest for receiving back armor elements which are then secured to the survival vest by a zipper near the collar.

IN THE DRAWINGS

FIG. **1** of the drawing shows a front view of a survival vest which has been modified according to this invention.

FIG. **2** shows a back view of the device of FIG. **1**, with the lace flaps open.

FIG. **3** is a front view of a rigid front armor member with zipper elements attached.

FIG. **4** is an enlarged partially schematic sectional view of the device of FIG. **3** along the line **4—4.**

FIG. **5** is a front view of a rigid back armor member with a zipper element attached.

FIG. **6** is a front view of a front fragmentation armor member with zipper elements attached.

FIG. **7** is a front view of a back fragmentation armor member with zipper element and Velcro hook fasteners attached.

FIG. **8** shows the front rigid armor member of FIG. **3** partially installed in the survival vest of FIG. **1.**

FIG. **9** shows the armor member of FIG. **5** installed in the survival vest of FIG. **1.**

DETAILED DESCRIPTION OF THE INVENTION

Reference is now made to FIGS. **1** and **2** of the drawing which shows a survival vest **10** having a back panel member **12** which is secured to front panel members **14** and **15.** Zipper elements **16** and **17** are secured to the front panel members **14** and **15** and are secured by means of a slider **18.** Lacing **20** passes through eyelets **21,** shown on one side, and is used to adjust the vest to the wearer. The lacing, normally positioned on the back, is positioned on the side of the survival vest to permit securing an armor element on the back. Flaps **23** and **24** are held closed by means of conventional Velcro hooks **25** and Velcro loops **27.** Conventional pockets **28** are provided on the front of the survival vest **10,** for holding conventional life support and survival equipment.

The rigid front armor member **31,** shown in FIG. **3,** has an armor plate **32** held in an armor carrier **33,** as shown in FIG. **4.** The material used for the body armor are commercially available state of the art materials.

In the device constructed, the armor plate **32** is boron carbide composite with a woven roving backing **34.** The armor carrier **33** is made of Nomex fabric and has a secondary fragment protection layer, shown schematically at **35,** sewn into it. The secondary protection layer has five layers of high tenacity nylon and one layer of ballistic felt.

A pair of zipper elements **36** and **37** are secured to the armor carrier **33.** The zipper elements are adapted to mate with zipper elements **16** and **17** on the survival vest. The zipper element **36** is adapted to engage the slider **18** and the zipper element **16,** as shown in FIG. **8.** The slider element **44** and zipper element **37** are adapted to engage zipper element **17** on the survival vest.

The back armor member **41,** shown in FIG. **5,** is constructed similar to the front armor plate. The back armor plate member **41** fits into pocket **43** on the survival vest, as shown in FIG. **9.** A zipper element **49** and slider element **51** engage the zipper element **53** on the survival vest to hold the armor plate in position within the pocket **43.**

The fragmentation armor member of FIG. **6** is supported by the survival vest in somewhat the same manner as the rigid armor member of FIG. **3** by means of slider **44'** and zipper elements **36'** and **37'.**

The back member of FIG. **7** has a patch **45** of Velcro hook elements which engage the patch **47** of Velcro loop elements on the survival vest to aid the zipper elements **49', 51'** and **53'** to hold the armor member **46'** in the pocket **43** of the survival vest. More than one pocket may be provided on the back of the survival vest which are adapted to hold different size back armor members.

There is thus provided a body armor suspension system which makes use of a modified survival vest to support the armor and which is adapted to support different types and sizes of armor, making the armor more psychologically acceptable to flying personnel.

We claim:

1. A personnel armor suspension system comprising: a survival vest having a back panel member and a pair of front panel members; a zipper element secured to each of said front panels; a slider element on one of said zipper elements, adapted to close said survival vest; a plurality of pockets secured to the front panel member, adapted to hold life support and survival equipment; at least one pocket member secured to the back panel member of said survival vest adapted to hold a back body armor member; a zipper element secured to said back panel adjacent the neck portion

thereof; a front body armor member; a pair of zipper elements on said front body armor member with one of the zipper elements adapted to engage one of the zipper element and the slider element on said survival vest and with the other zipper element having a slider thereon adapted to engage the other zipper element on the survival vest; a back body armor member adapted to fit into a pocket on the back of said survival vest; said back body armor member having a zipper element and slider element adjacent the upper end thereof adapted to engage the zipper element on the back panel member of said survival vest.

2. The device as recited in claim **1** wherein said front and back armor members are rigid, high velocity projectile protection body armor.

3. The device as recited in claim **1** wherein said front and back armor members are flexible, low velocity fragment protection body armor; said back armor member having a patch of hook fastener elements; a patch of loop fastener elements on said survival vest adapted to engage said hook fastener on the back armor member to thereby provide additional support for the back armor member.

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