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ABSTRACT
A protector for motorcycle riders of generally a jacket type that includes a rigid vest with interlocking front and back plates which are hinged together along one side edge and are latched together on an opening side edge. A generally divergent collar is integral with and extends from the upper portions of the front and back plates and a rigid skirt with leg openings and hinged along one edge and latched upon another edge is attached to the lower portions of the front and back plates. A two-pieceed halo of tubing is attached to the rear plate and extends over the collar. Padding means which is optionally inflatable for size adjustments is attached to at least interior portions of the vest, skirt, and collar.

15 Claims, 8 Drawing Figures
ARMORED JACKET FOR MOTORCYCLE RIDERS

BACKGROUND OF THE INVENTION

The invention relates to apparel, but more particularly, the invention relates to improved guards and protectors that safeguard the head, torso, and hips of a motorcycle rider.

A number of states now require motorcycle riders to wear safety helmets. While a helmet offers some protection against head injury, it does not protect the neck from “whiplash” nor does it provide sufficient stopping distance for the head in a high speed impact. While helmets provide some protection for the head, protectors for the neck, chest, and hips have heretofore been somewhat inadequate.

Early protectors such as disclosed in U.S. Pat. No. 558,812 provide an impact resistant shield for the front portion of the body. However, the shield does not protect the back or body from being crushed. Such shielding devices offer no protection for the hips, back, or neck.

Another early type of protector for cycle riders is disclosed in U.S. Pat. No. 1,144,150. The protector offers some cushioning for the entire body of a cycle rider, it does not offer impact or crush protection for the torso. The device offers good impact protection for the head but it limits head movement and visibility.

Modern protectors for athletics such as disclosed in U.S. Pat. No. 3,500,472 offer sportsmen protection against injuries when they are struck by blows of other players or objects. However, the protectors are placed over just certain portions of the body to permit maximum freedom of movement or agility for the sportsman. Such protectors do not provide encircling protection for a torso.

SUMMARY OF THE INVENTION

An armored protector generally of the jacket type is provided. The jacket includes a rigid vest and skirt shell which are each made in two parts that are hinged together along a side seam. Interfacing edges of the vest and skirt mechanically interlock to provide an outer shell. A collar diverges from the vest shell to restrict excessive head movements. A halo-like structure extends over the collar and is attached to the back part of the vest offering improved protection for a head. Appropriate padding is positioned on interior portions of the vest, skirt, and collar to further protect the rider as well as offering a means for adjusting the jacket to different body sizes. Optionally, detachable sleeves may be used with the vest.

An object of the invention is to offer an impact resistant protector for the chest and hips of a motorcycle rider.

Another object of the invention is to provide an interlocking shell structure that is impact resistant.

Another object of the invention is to provide a jacket for motorcycle riders that offers stopping distance protection for the head without impairing vision or head movements.

Still another object of the invention is to provide a means for restricting head movement of a helmeted motorcycle rider to reduce injuries to the neck.

Another object of the invention is to provide a protector that is adjustable to the size of the wearer with a minimum discomfort.
portions of a helmet (not shown) as worn by a rider. Preferably, the entire front portion of the collar is padded 46 along its interior to give protection to the neck and face of a rider.

A halo-like structure such as of steel tubing is attached to the rear plate over the head and collar opening. The tubing define a head protector 12 spaced from the helmet of a wearer. The head protector has a first circular part 48 that has a diameter greater than the opening of the collar. The protector extends generally horizontally beyond the head of a user. A second segmented circular member 50 has one end attached to the front portion of the first circular member and a second portion attached to the rear of the circular member. Brace members 52 are included to strengthen the structure. The head protector may be fixedly or removably attached to the rear plate. Preferably, the head protector is removably attached to the rear plate with removable clamps 54 and removable fasteners 56. This provides an option of use by the wearer. Two portions of the first circular member 48 are attached in spaced relation on the rear plate 22. An extension of the second circular member attaches 58 to the back plate at least at a third point. Three points of attachment define a rigid triangular planar structure that is not easily displaced.

The second circular segment member extends away and generally vertically from the collar in general alignment with the facing part of the vest. This is because most injuries to motorcycle riders occur when they impact in a direction that follows the direction of a moving motorcycle.

Of course, the head protector 12 may be attached to the rear plate by any convenient means. More points of attachment may be included and more integral brace structure 60 may be included.

On extreme impacts, the tubing may bend absorbing a force that otherwise would be transmitted to a wearer's body. The attachment points should allow for the tubing bending so as not to transmit excessive stress to the vest shell.

The first circular member 48 is arranged to be above the general line of sight and spaced away from the head of the wearer. A diameter of generally 60 cm and a cant of 30 degrees appear to be satisfactory for the first circular member 48. A diameter of 60 cm is also satisfactory for the second circular member 50. The 60 cm diameters provide generally 15 cm between the helmeted head of a wearer. This clearance establishes a stopping distance for the head in a high speed impact which may be referred to as a "crush distance."

Energy absorbing padding is provided along the interior portions of the vest shell as a shock absorbing or cushioning means for a wearer. The padding is of two general types. Padding 62 on the interior of the shoulder yoke has a fixed nominal thickness and made of material such as energy absorbing foam while the padding adjacent to the thorax of a wearer is adjustable in thickness such as with inflatable bags 64 or the like. Examples of such inflatable structures are air mattresses or the padding as shown in U.S. Pat. No. 3,500,472. The inflatable padding 64 permits the vest to be somewhat sized to the stature and comfort of the wearer. Preferably, the inflated bags are nominally 4 cm thick and encapsulate a layer of foam 66 with suitable energy absorbing qualities. The encapsulated foam layer serves as a back-up energy absorbing lining should a leak develop in the inflatable bags. The bags may be optionally removable for cleaning and repair.

Valves 68, 69 are included at convenient locations so that the padding may be easily inflated. A mouth valve 68 near the front plate has proven appropriate for the front padding.

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It is important that the front 20 and back 22 plates define a rigid structure for maximum impact resistance. Rigidity is achieved by the configuration of the interfacing pairs of edges 26, 28, 30, 32. At least portions of the pairs of interfacing edges interlock with each other to achieve a "hoop-like" structure. Preferably, one of each pair of edges has a shoulder 70 that receives its mating pair. The shoulder and interfacing edge are contiguous with each other along the separable seam of the side and shoulders.

The vest is hinged 24 along one pair of edges to permit easy donning and doffing of the jacket without sacrificing rigidity. Piano or belt type hinges may be easily used for this purpose. Although hinges are not specifically required, they are preferred as they allow for easy handling of the front and back plates when in use.

The unhinged edge is provided with a latching means. The latch may be of any desirable configuration. For example, straps 72, 74 may be attached to both the front and back plates. The straps are easily joined together with a buckle 76. The edges may be held in their interlocking manner by means of a toggle or buckle 78. The toggle may be easily snapped. However, the buckle must be of the type that is resistant to opening when impacted.

Optionally, the lower portion of the vest shell is fitted with a skirt 16 that has front 80 and back 82 portions. The waist opening of the skirt is larger than the torso opening 38 of the vest to permit it to be "telescoped" therewith. Spaced notches 84, 86 are provided in the front skirt shell 80. The notches provide openings for the thighs of a rider seated on a motorcycle. A crotch portion 88 of the skirt extends between the two notches to protect the groin of a wearer. Pads 90 are provided along at least portions of the skirt. The pads are of the configuration previously described for the vest shell. The pads may be of either of the fixed or inflatable types.

The skirt 16 is adjustable and flexibly attached to the vest. Preferably, strap 92 material is used for the flexible attachment. The flexible attachment permits bending movements by the wearer. A series of looped straps 94 and interlocking D rings 96 provide means for adjustably telescoping the skirt up and down over the vest.

The back portion 82 of the skirt also provides a rest 98 which is capable of supporting the entire weight of the vest when it is in use. The skirt is adjusted at the rear attachment strap loops 94 so that it contacts the seat of the motorcycle (shown in dotted form). The skirt is adjusted to a position below the vest shell to have a majority weight of the jacket carried by the skirt rest 98 at the seat. The front 80 and back 82 skirt shell portions are separable from each other along interfacing pairs of interlocking edges 100, 102 like the vest 14. The skirt shell is hinged on the same side as the vest shell, and it is latched like the vest on the same side as the vest shell as shown in FIG. 4. Obviously, the edges of the skirt are in general alignment with the edges of the vest shell.

When the jacket is to be used, the latches are released to permit the front shell and skirt to be hinged
away from the back plate and rear skirt as shown in FIG. 4. The forwardly extending shoulder yoke 40 of the rear plate permits the opened jacket to be easily rested upon the shoulders of the wearer while the front plate is being closed. Also, the wide arm openings of the rear plate allow freedom of arm movement. The latches are closed and the outer vest and skirt shells interlock defining an impact and crush resistant structure. The rear skirt is adjusted for length to fit the wearer and a motorcycle seat. When the inflatable padding is used, it is inflatable to the desired dimension fitting the comfort level of the wearer. The domed jacket provides improved protection for the head, neck, thorax, and hips of a wearer.

Most motorcycle accidents occur when the rider is traveling in a forward manner. The machine usually stops for some reason such as impact with another vehicle or object and the wearer continues his forward motion. When impact occurs, the head protector 12 provides an extended protection from the helmet of the wearer further protecting the head. Head movement is limited when the helmet of the wearer contacts the sides of the diverging collar. Should the head be thrown forward, the divergent collar portion 42 from the front plate limits head movement while the padding 46 absorbs shock. The rigid vest shell in combination with the padding reduce localized peak pressures or forces to the body by spreading them over large body areas. This prevents localized forces from displacing or deforming critical body organs which can cause injury thereto. The vest shell is also crush resistant which protects a wearer such as when hit by a "flying" motorcycle when he is on the ground. In a similar manner, the skirt protects the lower portions of the body. Summarily, injuries are reduced in severity, if not eliminated, as the protective jacket of the invention envelops the body of a wearer with a structure which helps to maintain the shape of the body.

**ADDITIONAL SPECIES**

It is desirable that the jacket need be brightly colored for easy recognition. The jacket may also be provided with reflective materials for use at night. In some climates, it may be desirable that the jacket have removable sleeves 104. The sleeves are attachable to the arm openings of the vest such as by Velcro material and may be of a material which is abrasion resistant. The sleeves may just be worn for comfort and warmth by the wearer in reaction to climatic conditions.

The foregoing detailed description was made for purpose of illustration only and is not intended to limit the scope of the invention which is to be determined from the appended claims.

What is claimed is:

1. An armored jacket for protecting a wearer against injury comprising:

   a substantially rigid vest shell having head, arms, and torso openings, the shell including front and back plates separable from each other on two pairs of interfacing edges extending generally along the sides and front shoulders of the vest shell;

   a rigid collar extending generally divergently from the head opening, the collar including a front portion extending from the front plate and a back portion extending from the back plate;

   means for mechanically interlocking at least portions of the two pairs of interfacing edges of the front and back plates;

   means for hinging the front and back plates at the side of the vest between one pair of interfacing side edges;

   means for latching together the unhinged pair of interfacing edges of the front and back plates, the interlocking means, front and back plates cooperating to define the substantially rigid vest shell; and

   padding means distributed along at least some interior portions of the jacket shell for providing a cushion for the wearer.

2. An armored jacket for protecting a wearer against injury comprising:

   a substantially rigid vest shell having head, arms, and torso openings, the shell including front and back plates separable from each other on two pairs of interfacing edges extending generally along the sides and front shoulders of the vest shell;

   means for mechanically interlocking at least portions of the two pairs of interfacing edges of the front and back plates;

   means for hinging the front and back plates at the side of the vest between one pair of interfacing side edges;

   means for latching together the unhinged pair of interfacing edges of the front and back plates, the interlocking means, front and back plates cooperating to define the substantially rigid vest shell; and

   padding means distributed along at least some interior portions of the jacket shell for providing a cushion for the wearer.

3. A jacket set forth in claim 2 comprising:

   at least one adjustable strap disposed between the overlapping telescoping portions of the back plate and rear skirt, the strap having one end attached to the back plate near the torso opening and the other end attached to an upper portion of the rear skirt portion, for limiting skirt shell movement in relation to the vest shell; and

   a plurality of straps having end portions attached to the vest shell and end portions attached to the skirt
shell, the adjustable strap and plurality of straps constituting the means for attaching the skirt shell to the vest shell.

4. A jacket as set forth in claim 1 in which the front and rear collar portions have interfacing pairs of edges that are in general alignment with interfacing pairs of edges of the front and back plates, the front collar portion diverging at an angle that is greater than the rear collar portion and further including padding means distributed along at least an interior portion of the collar for cushioning the head of a wearer.

5. An armored jacket for protecting a wearer against injury comprising:

- a substantially rigid vest shell having head, arms, and torso openings, the shell including front and back plates separable from each other on two pairs of interfacing edges extending generally along the sides and front shoulders of the vest shell, and the rear plate extending forward near the head opening into in its entirety define a shoulder yoke over the arm openings;
- means for mechanically interlocking at least portions of the two pairs of interfacing edges of the front and back plates;
- means for hinging the front and back plates at the side of the vest between one pair of interfacing side edges;
- means for latching together the unhinged pair of interfacing edges of the front and back plates, the interlocking means, front and back plates cooperating to define the substantially rigid vest shell;
- padding means distributed along at least some interior portions of the jacket shell for providing a cushion for the wearer.

6. An armored jacket for protecting a wearer against injury and of the type having a substantially rigid vest shell with front and back portions and having head, arms and torso openings wherein the improvement comprises:

- a first generally circular member having a diameter greater than the head opening;
- a second generally circular segment member of at least the same general diameter as the first circular member, the second circular member arranged generally diametrically of and generally at right angles to the first circular member, the second circular member having end portions joined to the first circular member, the circular members together defining a head protector; and
- means for rigidly attaching a portion of the head protector to the rear portion such to have the first circular member extend forwardly of the front portion over and above the head opening and to have the second circular member extend away from the head opening.

7. A jacket as set forth in claim 6 wherein the means for attaching the head protector includes removable fasteners for detaching the head protector from the rear portion.

8. A jacket as set forth in claim 1 comprising:

- at least two flexible straps having first end portions attached to the front plate and second end portions attached to the back plate, the straps constituting the hinging means between the front and back plates.

9. A jacket as set forth in claim 1 comprising:

- at least one strap having one end portion attached to the front plate;
- at least one strap having one end portion attached to the back plate;
- buckles for joining the straps of the front plate to the straps of the back plate, the straps and buckles constituting the latching means.

10. A jacket as set forth in claim 1 comprising:

- shoulder-like portions extending along one of each pair of interfacing edges, the shoulder-like portions defining rabbets nestable with the paired interfacing edge and constituting the interlocking means.

11. An armored jacket as set forth in claim 11 wherein each inflatable means encapsulates a foam pad.

12. A jacket as set forth in claim 11 wherein each inflatable means comprises:

- a substantially rigid vest shell of corrugated fiber glass embedded in a plastic resin having head, arms, and torso openings, the shell including front and back plates separable from each other on two pairs of interfacing edges extending generally along the sides and front shoulders of the vest shell;
- means for mechanically interlocking at least portions of the two pairs of interfacing edges of the front and back plates;
- means for hinging the front and back plates at the side of the vest between one pair of interfacing side edges;
- means for latching together the unhinged pair of interfacing edges of the front and back plates, the interlocking means, front and back plates cooperating to define the substantially rigid vest shell; and
- padding means distributed along at least some interior portions of the jacket shell for providing a cushion for the wearer.

13. An armored jacket for protecting a wearer against injury comprising:

- a substantially rigid vest shell having head, arms, and torso openings, the shell including front and back plates separable from each other on two pairs of interfacing edges extending generally along the sides and front shoulders of the vest shell; and
- means for mechanically interlocking at least portions of the two pairs of interfacing edges of the front and back plates;
- means for hinging the front and back plates at the side of the vest between one pair of interfacing side edges;
- means for latching together the unhinged pair of interfacing edges of the front and back plates, the interlocking means, front and back plates cooperating to define the substantially rigid vest shell; and
- padding means distributed along at least some interior portions of the jacket shell for providing a cushion for the wearer.

14. A jacket as set forth in claim 2 wherein the rear skirt portion and the skirt attaching means define a rest along a lower edge that is capable of supporting the jacket.

15. An armored jacket for protecting a wearer against injury comprising:

- a substantially rigid vest shell having head, arms, and torso openings, the shell including front and back plates separable from each other on two pairs of interfacing edges extending generally along the sides and front shoulders of the jacket shell, the upper portions of the front and back plate extending up from the head opening and in a divergent manner to define an integral collar, having interfacing pairs of edges that are in general alignment with interfacing pairs of edges of the front and back plates, the front collar portion diverging at an angle that is greater than the rear collar portion;
- a head protector including a first generally circular member having a diameter greater than the head opening and collar, a second generally circular segment member of generally the same diameter as the first circular member, the second circular member arranged generally diametrically of and generally perpendicular to the first circular member, the second circular member having end portions joined rigidly to the first circular member, the head protector removably and rigidly attached to the rear plate;
a substantially rigid skirt shell including front and rear skirt portions separate from each other along interfacing pairs of side edges, the shell skirt having a slightly larger diameter than the external diameter of the torso opening and the front lower skirt portion having spaced notches that define spaced leg openings, the skirt adjustably attached to telescope over the opening of the jacket, and the pairs of side edges of the skirt arranged to be in general alignment with the interfacing pair of edges of the vest, the interfacing pairs of edges of the vest and skirt shells interlocking with each other to define two rigid structures; means for hinging the front and back plates, front and rear skirt portions, along one side of the interfacing pairs of side edges; means for latching together the unhinged pairs of skirt and vest side edges; and padding means distributed along at least portions of the collar, vest shell, and skirt shell, for providing a shock absorbing area along the interior of the jacket.