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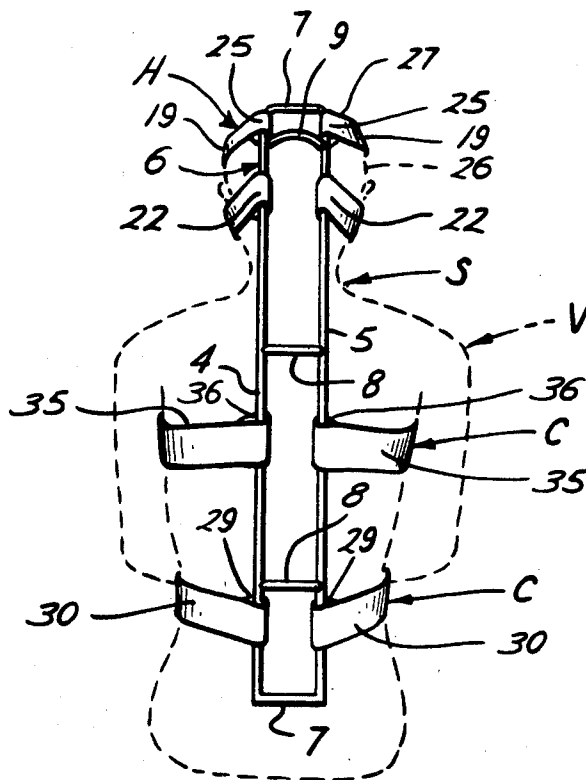
**[54] EXTRICATION BACK SPLINT**  
**1 Claim, 6 Drawing Figs.**

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[51]	Int. Cl.	A61F 5/04
[50]	Field of Search.	128/89, 87, 85, 83, 84, 86, 93, 75, 78, 134

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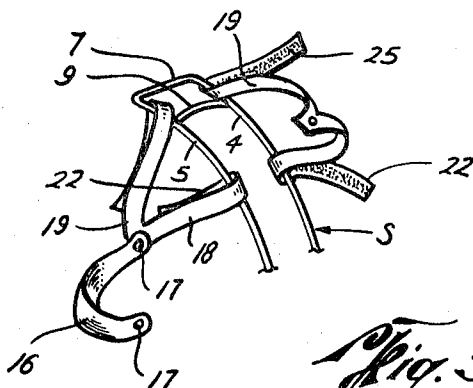
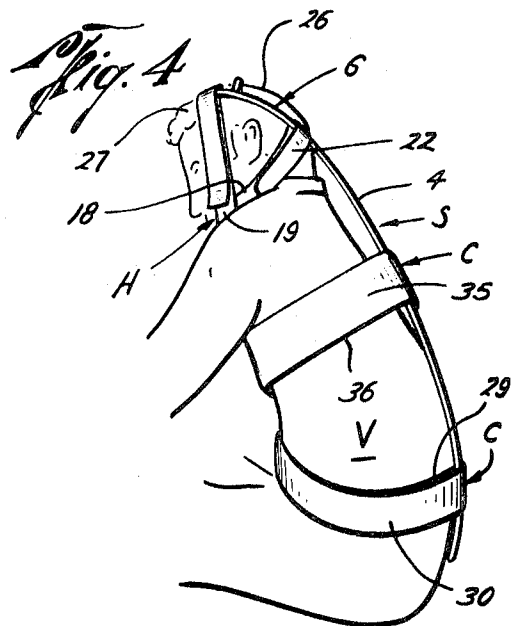
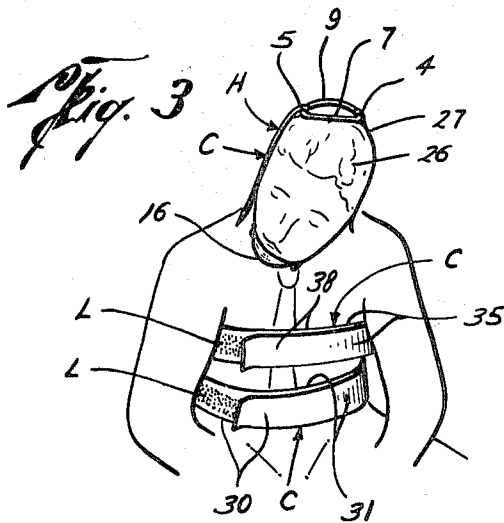
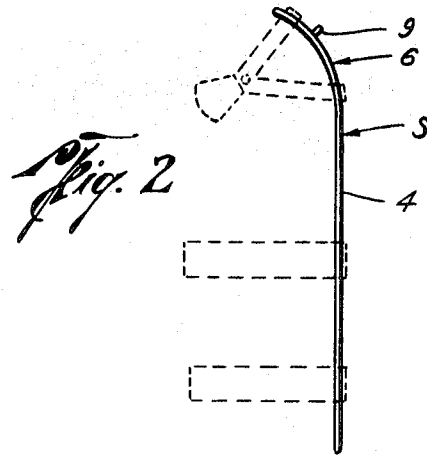
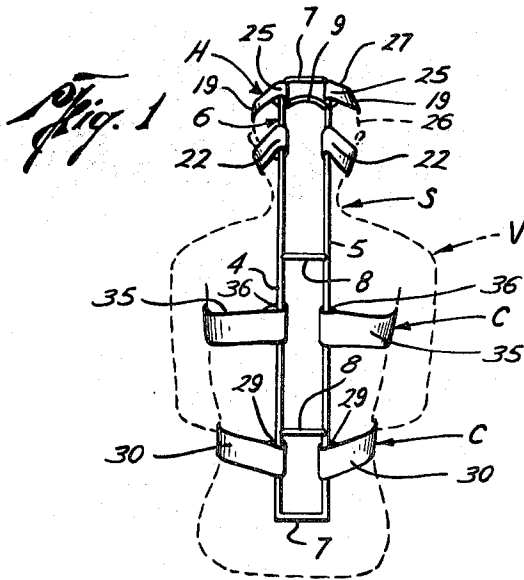
**ABSTRACT:** A back splint of malleable material so that it can be formed at the scene of an accident and secured to the portion of the victim or person without moving the injured portion or the person or victim so as to immobilize the injured part of the person or immobilize the victim or person in the position in which the injury occurs to aid in inhibiting further damage or injury to the vertebral column or associated portions thereof upon extrication and transportation of the victim. The splint comprises longitudinally extending, spaced malleable members preferably curved at one end for fitting on the victim to immobilize the head, neck, and vertebral column of an injured person to retain the person in such immobilized position to inhibit further injury upon extrication and transportation. The construction of the splint is such that it does not significantly interfere with radiological surveys.



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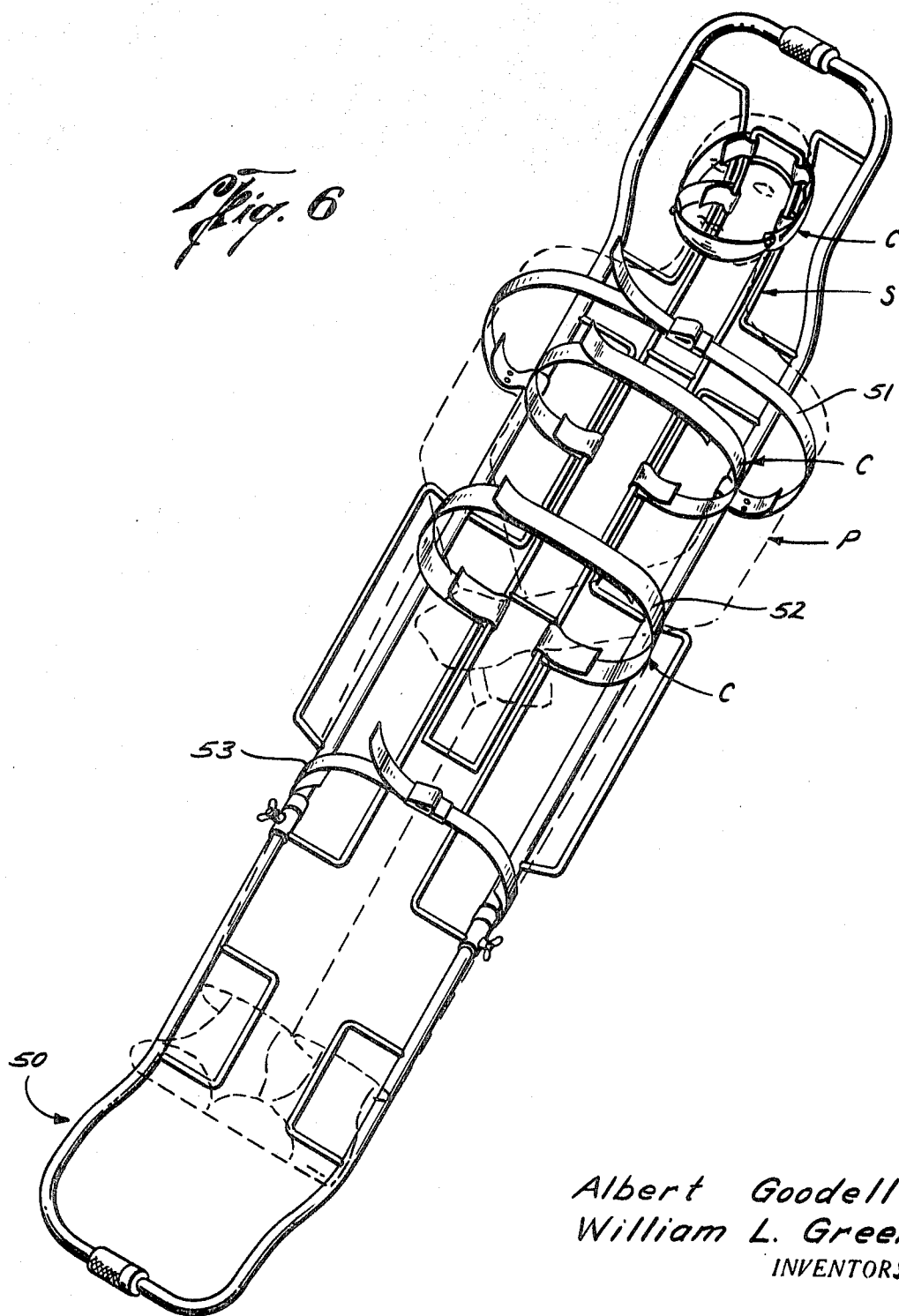
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SHEET 1 OF 2



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## EXTRICATION BACK SPLINT

### CROSS-REFERENCE TO RELATED APPLICATION

The present invention may be used in conjunction with the copending application of William L. Greene for "Safety Litter" filed Oct. 29, 1969 and bearing Ser. No. 771,477.

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

This invention relates to a splint which may be applied to the injured portion of an injured person to immobilize the injured portion of the injured person prior to moving the injured person. The splint can be applied to the extremities, such as the arms or legs of an injured person; however, it is primarily useful for immobilizing the head, neck, and vertebral column of an injured person, to maintain the victim in the exact position in which found, and thereby inhibit further damage to the person which might otherwise be occasioned by movement prior to immobilization.

#### 2. Description of the Prior Art

Applicants are unfamiliar with any specific prior art, except that general practice at the present time is to use standard ambulance and rescue vehicle equipment. This employs a backboard which usually necessitates moving the position of the vertebral column of the victim to a position that generally approximates the plane of the backboard and then attaching the head and upper torso to the board prior to extrication from a vehicle, machinery, or other location and subsequent transportation for treatment or diagnosis.

Thus, with present practice in some instances, the victim or injured person is first moved, requiring mobilizing, or moving, the entire or part of the vertebral column prior to attaching the backboard. In various situations such as by way of example only, aircraft crashes, vehicle accidents, and injuries where a person may fall into machinery or equipment, it can be appreciated that with the prior art device it may be necessary to move the victim or remove the victim even before the backboard of the prior art can be positioned as above described.

Where an injury is present in the vertebral column of the victim, it further can be appreciated that mobilizing or moving the victim before or in the process of attaching the backboard as presently employed may cause further complications of the injury and may even damage the spinal cord to cause partial or total paralysis of the victim.

### SUMMARY OF THE INVENTION

The present invention overcomes the disadvantages of devices heretofore used in that it provides a splint which may be applied to an injured person in whatever position the injured person may be found before moving the victim. The splint of the present invention is of malleable material and is formed to fit and immobilize the head and spinal column of a victim or injured person prior to the time the injured person is extricated, by way of example only, from an aircraft crash, vehicle accident, or situation where the injured person has fallen into machinery or equipment.

More particularly, the present invention provides a splint which not only immobilizes the head, neck, and vertebral column of an injured person in the position in which found when injured, and prior to movement of the injured person, but the splint is constructed and arranged so that it may remain in position after the victim has been removed to a hospital or other location for radiological surveys without substantially interfering therewith to determine the extent and nature of the injury, if any, to the head or any portion of the spinal column.

Another object of the present invention is to provide a splint which is constructed so as to fit or cradle the back and part of the top of an injured person's head and extend downwardly along the spinal column of the injured person, the splint being constructed to receive suitable strap means to aid in retaining the head of the injured person along with the neck and the ver-

tebral column immobilized during and after the splint and strap means have been positioned.

Another object of the present invention is to provide a splint which may be formed so as to be applied to an injured person in the position in which the victim is found even though the head or chin of an injured person may be damaged and even though the head may be turned or twisted relative to the vertebral column of the injured person.

Another object of the present invention is to provide a splint which immobilizes the head, neck, and vertebral column of an injured person even though the head may be twisted or rotated relative to the vertebral column, such splint being configured to employ strap means for securing the head of the injured person as well as the torso to the splint to retain the head and vertebral column immobilized during extrication and transportation.

Still another object of the present invention is to provide a splint which is partially preformed and can be applied to an injured person so as to lock the head, neck, and vertebral column of the injured person in the position in which they are found when injured prior to extrication and/or movement of the injured person.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a back elevational view illustrating the preferred form of the splint of the present invention applied to an injured person in a vehicle or other situation where the victim is in seated position;

FIG. 2 is a side view of the preferred form of the device showing strap means in dotted line;

FIG. 3 is a front view showing an injured person in a seated position slumped forward with the head and neck twisted and at an angle relative to the balance of the vertebral column and with the splint of the present invention applied to retain the victim in the position when found prior to extrication and/or movement;

FIG. 4 is a left side view of FIG. 3;

FIG. 5 is a perspective view of the upper end of splint with the head and chin strap means applied thereto;

FIG. 6 is a perspective view illustrating the splint of the present invention used in conjunction with the body splint or stretcher disclosed and claimed in the copending application of William L. Greene hereinabove referred to.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Attention is first directed to FIG. 2 of the invention where the splint of the present invention is referred to by the letter S. Attention is next directed to FIGS. 1 and 2 which illustrate the present invention as including a pair of longitudinally extending members 4 and 5 which are curved upwardly at their ends 6 relative to their respective longitudinal axis as illustrated in FIG. 2. Preferably, the curved end portion 6 of the members 4 and 5 is in the same plane as the longitudinal axis of the members to aid in forming a cradle for receiving the head of the victim when the splint is applied to the head of the victim as will be described hereinafter. The members 4 and 5 are preferably connected together at their ends by the cross members 7 as shown in FIG. 1 of the drawings and they are spaced so that after the splint S is applied to the portion of the body of the injured person as shown in FIGS. 1, 3, and 4, radiological surveys as necessary may be taken without substantial interference. The spaced relationship of the longitudinally extending members 4 and 5 is maintained by suitable brace means 8 extending therebetween which is positioned and secured at spaced intervals longitudinally of the splint S, and the brace 9 adjacent the curved end portion 6 of each of the members is concave relative to the longitudinal axis of the members 4 and 5 to aid in forming a dish receptacle arrangement to firmly position or lock the head of the injured person relative to the neck and vertebral column when the splint S is applied.

In FIGS. 1, 3, 4, and 5, suitable strap means referred to generally by the letter C are used for securing the splint S to

the injured portion of the injured person. In FIGS. 1, 3, and 4, it will be noted that the splint S is secured to the victim so as to immobilize the head, neck, and vertebral column; however, it can be appreciated that the splint can be used for the extremities of an injured person such as the legs or arms. Preferably, the splint S may be formed of rods or tubing of approximately one-quarter inch in diameter so that they can be readily formed to fit the injured portion of the victim prior to extrication and/or movement.

Where the injured person V is initially found in a seated position as shown in dotted line in FIG. 1, the splint S will be positioned as shown to aid or inhibit further damage to the vertebral column, head, and neck prior to extrication or movement.

The splint S can be inserted either from the side of the victim or pushed down vertically, whichever causes no movement of the victim. When positioned, the curved portion 6 rests against the back and over the rear of the head of the victim so that the head is cradled in the splint S by the rods 4 and 5 and curved brace 9. Specifically, the splint S will immobilize the head, neck, and vertebral column of the injured person and will retain the relationship of the injured portions to inhibit further damage as the splint is locked to the injured portion and during extrication and transportation of the injured person after the splint S is applied. In FIG. 1, the splint S of the present invention is shown as applied, for example, where the victim is in a vehicle accident and is in the vehicle with the head either straight or slumped forward. In such situation, the splint S is first positioned adjacent the spine and over the back of the head. If necessary, the splint S may be bent to fit it to the position of the head and spine of the victim without moving the victim. Thereafter, the straps C can be secured around the torso and head to immobilize the victim. The straps C are provided with a surface L (FIG. 3) sold under the trademark "Velcro," and the ends can be wrapped and secured together around the rods 4 and 5 and then around the torso. In some situations the strap around the upper portion of the torso may be wrapped over the victim's arms instead of under the arms as shown in FIGS. 1 and 3. Thereafter, the other ends of the straps C may be engaged together by means of the Velcro on each of the straps.

The head strap H includes a chin cup 16 which is connected by snaps 17 to straps 18 and 19. The ends 22 of each of the straps 18 can be engaged around the curved portion 6 of rods 4 and 5 and beneath the ears and around the back of and on each side of the head 26 of the victim; the ends 25 of straps 19 are positioned over each cheek and over the top 27 of the head 26 of the victim V.

As more clearly seen in FIG. 4, the pair of straps C is secured about the waist of the victim V and adjacent one end of the splint S as shown in FIG. 1 to aid in immobilizing the lower lumbar and sacral portion of the spine of the victim V.

One end 29 of each of the straps 30 is wrapped around the rods 4 and 5 respectively and then connected to its respective strap 30 by means of the Velcro. The other ends 31 of each of the straps 30 are locked together after wrapping around the victim V as more clearly seen in FIG. 3.

The next adjacent pair of straps 35 also aids in immobilizing the victim. The straps 35 have one end 36 wrapped around the bars 4 and 5 respectively and then connected or locked to its respective strap by means of the Velcro surface L. The straps 35 are extended either under or over the arms and then around the chest of the victim V and their ends 38 locked together by means of the Velcro L. Both of such strips are provided with Velcro as previously described so that the end of the strips may be locked together around the members 4 and 5.

In FIGS. 3 and 4, the splint S of the present invention is shown as applied to a person or victim wherein the head 26 of the victim is slumped and rotated or twisted relative to the vertebral column and as noted before it is desired to maintain such position to aid in inhibiting severing of the spinal cord or further injury during movement of the victim which might

cause severe consequences to the victim. In such situations, the splint S can be positioned so that the upper curved portion receives the head 26 and the curved brace 9 again received against the back of the head. If the back of the head is injured, suitable compress means may be employed to aid in preventing further damage to the head and to pad it against the splint S. Similarly, if the chin of the victim is injured, a suitable compress may be applied before the chin cup is applied. If necessary, the splint may be bent to conform with the curvature of the spine and head. After the chin strap is positioned adjacent the patient with the straps thereon at one end, the straps may be wrapped around the patient, one at the waist and one around the chest as previously described. The head and chin strap H are firmly secured to lock the head in the position in which it is found at the time of the injury before further movement of the patient. The straps 30 and 35 and their ends 29 are secured to rods 4 and 5 as previously described, and the ends 31 then locked together. Also, the ends 36 of straps 35 are locked around 4 and 5 and ends 38 are locked together as previously described. It is generally desirable to first bend or conform the splint S to the position of the victim V and then secure the head and chin strap to the splint S to avoid movement of the head or neck as the straps 30 and 35 are applied.

The members 4 and 5 may be formed of tubular material or of suitable material so that they can be formed and will retain their formed position in use. Forming may be accomplished by bending over the knee or over a portion of a vehicle or other object at the scene of an accident.

In FIG. 6, a body splint or litter is referred to by the numeral 50 which is described and claimed in the copending application of William L. Greene hereinabove referred to, and it will be noted that the splint S of the present invention has been first applied to the injured person or victim represented again by the letter P and shown in dotted line, and in addition to the straps 30 and 35 which are applied adjacent the torso and the head and chin strap H, additional straps are applied to the splint 50; such straps as shown at 51, 52, and 53 immobilize the entire body of the injured victim so that it can thereafter be moved to a treatment station for further treatment or radiological survey.

From the foregoing description, it can be seen that the splint S of the present invention can be applied to the injured person at the scene of the accident without first moving the person or moving one or more portions of the body relative to another. Quite often, it may be that paraplegic therapeutic situations arise because of movement of the head and neck relative to the remainder of the vertebral column which causes further damage to the vertebral column unwittingly. The present invention overcomes this in that it permits the splint S to be applied to the body of the patient, and as shown, to the head, neck, and torso so as to retain the relationship of the cervical spine to the thoracic and lumbar portions of the spine in the condition or position in which the injured person is found. After the splint S has been applied so as to immobilize the head, neck, and vertebral column in the manner as described and shown, the patient can then be placed on the body splint or litter 30 and conveyed to a location as desired.

The foregoing disclosure and description of the invention are illustrative and explanatory thereof, and various changes in the size, shape, and materials as well as in the details of the illustrated construction may be made without departing from the spirit of the invention.

What is claimed is:

1. An extrication splint for retaining the head, neck, and vertebral column of an injured person immobilized in the position in which the injured person is found comprising:

- a pair of longitudinally extending members each of which is curved at one end for engaging over the back and top of the head of the injured person;
- said members being formed of malleable material whereby the splint may be shaped to fit over the back and top of the head to retain the head, neck, and vertebral column of an injured person immobilized in the position in which the injured person is found;

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- c. brace means secured to and extending between said members to position them in spaced relation;
- d. one of said brace means being concave and adjacent the end of the curved ends of said members to cradle the back and top of the head of the injured person in said curved ends of said members; 5
- e. means for securing the splint to the head and torso of an injured person to immobilize the head, neck, and vertebral column of the injured person; and
- f. said securing means including a chin strap for engaging 10

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the chin of the injured person, first strap means secured to said chin strap and adapted to engage each of said curved ends of said members at a position between said concave brace means and the ends of said curved members for holding the top and back of the head of the injured person against said concave brace means and curved ends of said members, and second strap means engaging said longitudinally extending members and adapted to engage around the torso.

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