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Verbesserungen an Beatmungsapparaten

Améliorations apportées à un appareil respiratoire

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Description

[0001] This invention relates to breathing apparatus and more particularly, but not exclusively, is concerned with breathing apparatus for use by fire fighters and the like.

[0002] Conventionally, fire fighters wear a safety belt for the purpose of, for example, preventing them from falling from ladders, buildings etc during the course of their work. Such fire fighters also frequently need to wear breathing apparatus. Conventionally, this apparatus comprises a carrying unit including a harness and a source of breathable gas, such as an air line or one or more containers for holding breathable gas under pressure, secured to the carrying unit. The harness ordinarily also includes a waist belt. Thus, when the breathing apparatus is worn, the fire fighter essentially has two belts around his waist namely the safety belt and the waist belt of the harness of the breathing apparatus carrying unit. This tends to be cumbersome and can cause unnecessary difficulties for the fire fighter.

[0003] It is an object of the present invention to provide a breathing apparatus wherein the conventional waist belt of the carrying unit is replaced by the safety belt.

[0004] It is a further object of the invention to provide a breathing apparatus which can be quickly secured to a waist belt to enable the equipment to be donned and doffed without undue delay.

[0005] According to the present invention there is provided a breathing apparatus comprising a source of breathable gas secured to a carrying unit comprising a harness and two shoulder straps and means of releasably coupling the carrying unit to a waist belt.

[0006] In a particularly preferred embodiment, the waist belt is a safety belt of the DIN standard type.

[0007] By means of the present invention, the fire fighter (or other wearer) is able to attend an incident wearing his safety belt and carry out his normal duties in the usual way. In the event that he requires the assistance of breathing apparatus, he can merely don the apparatus very readily and attach the same directly to the safety belt by means of the releasable coupling means.

[0008] The safety belt forms an integral part of the carrying unit of the breathing apparatus as a consequence of the releasable coupling means. However, if desired, the breathing apparatus and harness can be removed without removing the safety belt.

[0009] In accordance with an embodiment, the means of coupling the carrying unit to the belt includes a strap, on the harness, carrying the male or female portion of a quick release connector. In this case, the waist belt includes a strap carrying the corresponding female or male portion of the quick release connector. The strap of the waist belt may be removably secured to the waist belt by, for example, a two part component capable of being clamped around the belt so that it can be slid along

the belt as desired.

[0010] In an alternative embodiment, the means releasably coupling the harness to the waist belt may be in the form of a sliding buckle.

[0011] In use, the fire fighter may already be wearing his safety belt in which case he can merely don the carrying unit of the breathing apparatus and secure it to the safety belt. Alternatively, he can secure the carrying unit to the safety belt before donning the breathing apparatus and safety belt together.

[0012] The invention also includes a breathing apparatus including a source of breathable gas and a carrying unit including a harness comprising shoulder straps, for carrying the source of breathable gas, characterised in that the apparatus further comprises a means of releasably coupling the carrying unit to a waist belt.

[0013] US-A-3957183 describes apparatus for carrying a tank of compressed breathing gas on the back of a user, having a main back plate moulded portion with handle openings and webs therein, and slits for receiving shoulder straps. The shoulder straps are looped through the back plate slits and webs in a continuous manner to form a combination of shoulder and chest straps, together with a waist belt in a continuum.

[0014] For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings in which:-

Figure 1 is a perspective view of a part of a carrying unit for breathing apparatus in accordance with one embodiment of the present invention,

Figure 2 is a perspective view of a safety belt including a means for securing the same to the carrying unit of Figure 1,

Figure 3 is a side view showing a fire fighter wearing the safety belt and breathing apparatus of Figures 1 and 2,

Figure 4 is a perspective view of a means of releasably coupling the carrying unit of a breathing apparatus to a safety belt in accordance with another embodiment of the invention, and

Figure 5 is a side view of a fire fighter wearing the safety belt and breathing apparatus of Figure 4.

[0015] Referring to Figures 1, 2 and 3, the breathing apparatus comprises a carrying unit to which is attached a container 1 holding breathable gas, such as air, under pressure. The apparatus also includes a demand valve (not shown) and a hose (not shown) linking the container to the demand valve. The carrying unit comprises a back plate 2 and a waist plate 3 to which the container 1 is secured and a harness comprising shoulder straps 4. Each shoulder strap terminates in a loop 4' through which passes the free end of a strap 5 connected to the waist plate 3 by stitching or other suitable means. Each end of the strap 5 has a short length of strap 6 attached thereto and terminates in a female connector portion 7.

[0016] The fire fighter is additionally wearing a safety belt 8 of the DIN standard type. There is provided a component 9 in the form of first and second parts 10 and 11 secured together by nuts and bolts or rivets 12 so that they lie on either face of the safety belt 8 and the component 9 can slide along the belt 8. Secured to the slidable component 9 by, for example, stitching is a short length of strap 13 terminating in a male connector portion 14 corresponding to the female connector portion 7. Two such slidable components 9 are provided one at each of the wearer's sides. The female and male connector portions 7 and 14 respectively together define a quick release coupling.

[0017] In use, the fire fighter will ordinarily be wearing the safety belt 8 whilst attending to his duties. In the event that he finds that he needs the assistance of breathing apparatus, he dons the apparatus by slipping his arms through the shoulder straps 4 of the carrying unit and clips it to the safety belt 8 by engaging the male and female connector portions 14 and 7 at each side. Alternatively, if he is not actually wearing his safety belt at the time, he may secure the carrying unit of the breathing apparatus to the safety belt by means of the male and female connectors 14 and 7 and then don the equipment as a whole.

[0018] Referring now to Figures 4 and 5, parts corresponding to parts of Figures 1, 2 and 3 are denoted by like reference numerals.

[0019] In this case, the waist plate 3 includes, at each side of the wearer, a releasable attachment means 21. The attachment means 21 enables the carrying unit of the breathing apparatus to be quickly removably attached to the safety belt 8. More particularly, it includes a swinging arm 22 pivoted at its lower end 23 to the remainder of the attachment. Towards the upper end of the arm 22 there is provided a cutout 24. The attachment includes a plunger 25 which is slidable in a vertical direction with respect to housing 26. The plunger 25 is resiliently biased by means of a spring (not shown) so that it tends to adopt an upper position with respect to the housing 26. The plunger includes a spigot 27 having an inclined surface 28 and a surface 31 serving as a detent. The relative dimensions of the spigot 27 and cutout 24 are such that the cutout 24 can pass over the spigot and be retained therein, by detent surface 31, under the influence of the spring tending to urge the plunger 25 in an upward direction. More particularly, as the arm 22 is pivoted into contact with the spigot 27, the plunger 25 is forced downwardly by the inclined surface 28 against the pressure of the spring and the plunger can then return somewhat to an upper position wherein the detent surface 31 of the spigot 27 retains the arm 22 against the plunger 25. Thus the arm 22 is essentially locked behind the detent surface 31 of the spigot 27. The attachment 21 is secured, by means of bolts or the like passing through fixing holes 29 to the waist plate 3 of the carrying unit. A loop-defining member 32 is secured to the housing 26 and one of the shoulder straps

4 is secured to the member 32.

[0020] In use, the fire fighter will ordinarily be wearing his safety belt 8. When he requires breathing assistance, he inserts his arms into the shoulder straps of the carrying unit. The he depresses the plunger 25 of each attachment 21 to release the spigot 27 from the cutout 24 and enable the arm 22 to be pivoted away from the plunger 25 to provide a gap 30. He then manipulates his safety belt 8 into the gap as shown in Figure 4. Thereafter he pivots the arm 22 back into engagement with the plunger 25 where it is retained by the cooperating cutout 24 and spigot 27. In order to disconnect the carrying unit from the safety belt, downward pressure is placed on each plunger 25 which enables the cutout 24 to ride over the spigot 27 so that the arm 22 forms the gap 30 with the housing 26 and the unit can then be lifted off the belt 8.

[0021] In the case where the fire fighter is not wearing his safety belt at the time he requires breathing assistance, the carrying unit may be clipped to the safety belt and then the fire fighter can don the whole equipment as an integral unit by slipping his arms through the shoulder straps and attaching the safety belt to his waist. When he no longer requires the assistance of the breathing apparatus, the entire unit comprising the breathing apparatus and the safety belt can be removed together as an integral unit.

Claims

1. A breathing apparatus including a source of breathable gas (1), a carrying unit (2,3) including a harness comprising two shoulder straps (4), for carrying the source of breathable gas, and a waist belt (8), **characterised in that** the apparatus further comprises means of releasably coupling the carrying unit to the waist belt.
2. A breathing apparatus according to claim 1, in which the waist belt (8) is a safety belt.
3. A breathing apparatus according to claim 1 or claim 2, in which
the means of releasably coupling the carrying unit (2,3) to the waist belt (8) comprises connectors each having a portion (7) attached to the harness and a portion (14) attached to the waist belt (8).
4. A breathing apparatus according to claim 3 in which each shoulder strap (4) has a loop (4') provided at its lower end, and
one of the portions (7) of each connector is located at the end of a strap (6) attached to the harness and passing through one of the loops (4') and the other portion of each connector (14) is attached to the waist belt (8).

5. A breathing apparatus according to claim 3 or claim 4 wherein a portion of each connector (14) is slideable along the belt.
6. A breathing apparatus according to claim 1 or claim 2 in which the means of releasably coupling the carrying unit (2,3) to the waist belt is in the form of releasable attachment means each comprising a housing (26) attached to the carrying unit (2,3), an arm (22) pivotally mounted on the housing and a releasable detent means adapted to hold the arm in position with the waist belt (8) held fixed between the arm (22) and the housing (26).
7. A breathing apparatus according to claim 6 in which a cutout (24) is provided in the arm and the detent means has a moveable spigot (27) with a detent surface (31) on one end adapted to engage in the cutout (24).
8. A breathing apparatus according to claim 7 in which the housing (26) includes a spring loaded plunger (25) on which the spigot (27) is mounted.
9. A breathing apparatus including a source of breathable gas (1) and a carrying unit (2,3) including a harness comprising shoulder straps (4), for carrying the source of breathable gas, **characterised in that** the apparatus further comprises a means of releasably coupling the carrying unit to a waist belt.

Patentansprüche

1. Atemgerät, umfassend eine Quelle für Atemgas (1), eine Trageeinheit (2, 3), umfassend einen Gurt mit zwei Schulterriemen (4) zum Tragen der Atemgasquelle, und einen Bauchgürtel (8), **dadurch gekennzeichnet, dass** das Gerät zudem Einrichtungen zum lösbaren Koppeln der Trageeinheit an den Bauchgürtel aufweist.
2. Atemgerät nach Anspruch 1, wobei der Bauchgürtel (8) ein Sicherheitsgürtel ist.
3. Atemgerät nach Anspruch 1 oder 2, wobei die Einrichtung zum lösbaren Koppeln der Trageeinheit (2, 3) an den Bauchgürtel (8) Verbindungsstücke umfasst, die jeweils ein Teil (7) umfassen, das am Gurt befestigt ist, und ein Teil (14), das am Bauchgürtel (8) befestigt ist.
4. Atemgerät nach Anspruch 3, wobei die Schulterriemen (4) am unteren Ende eine Schlaufe (4') besitzen, ein Teil (7) des jeweiligen Verbindungsstücks an dem Riemenende (6) liegt, das am Gurt befestigt ist und das durch eine der Schlaufen (4') geht, und

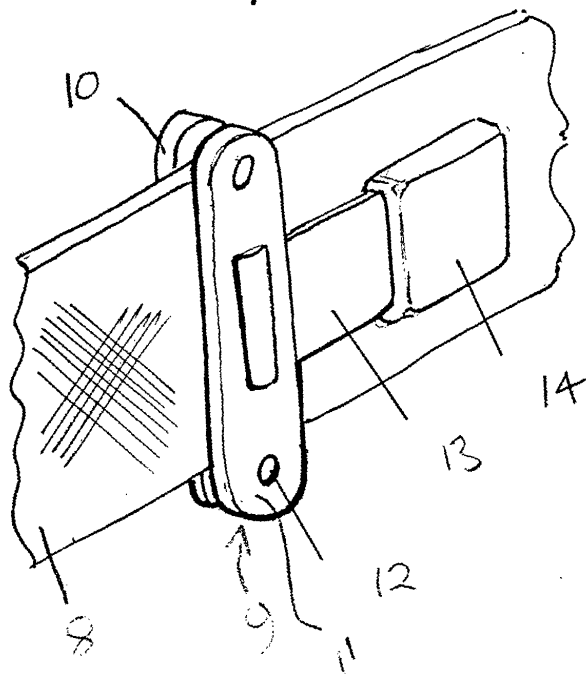
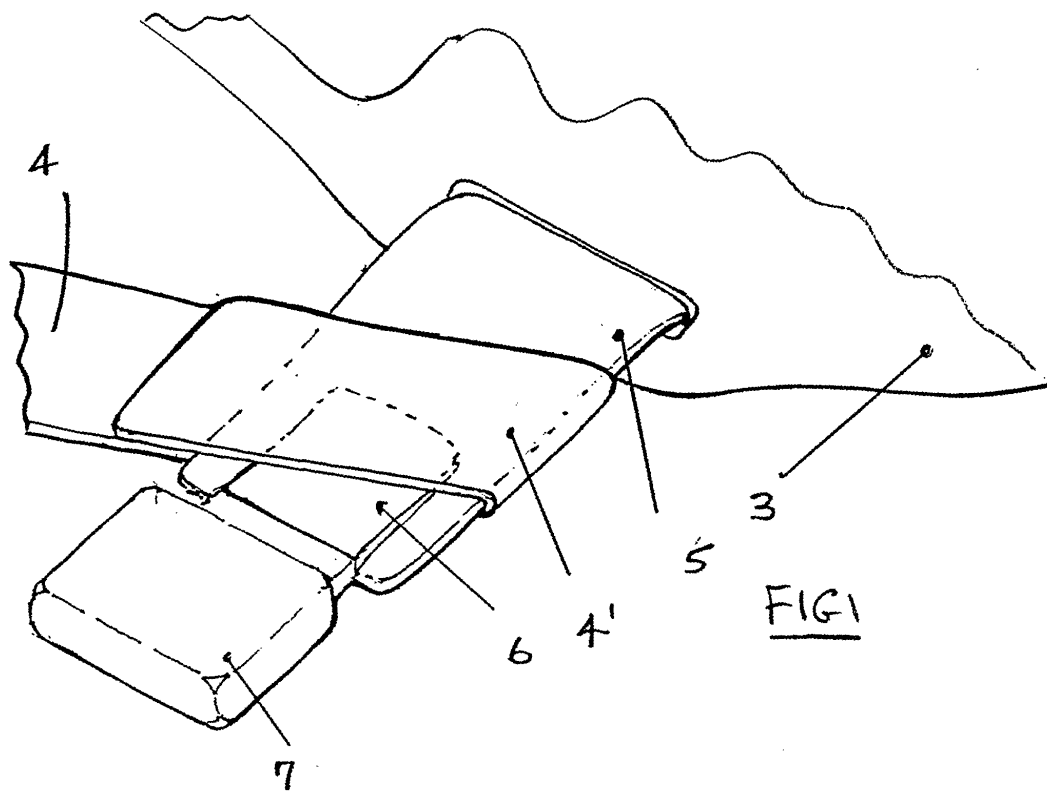
das jeweils andere Teil des Verbindungsstücks (14) am Bauchgürtel (8) befestigt ist.

5. Atemgerät nach Anspruch 3 oder 4, wobei ein Teil des jeweiligen Verbindungsstücks (14) längs des Gürtels verschieblich ist.
6. Atemgerät nach Anspruch 1 oder 2, wobei die Einrichtung zum lösbaren Koppeln der Trageeinheit (2, 3) mit dem Bauchgürtel als lösbare Befestigungseinrichtung gehalten ist, welches jeweils ein Gehäuse (26) aufweist, das an der Trageeinheit (2, 3) befestigt ist, ein Arm (22) schwenkbar am Gehäuse befestigt ist und eine lösbare Riegeleinrichtung eingerichtet ist zum Halten des Arms in Stellung mit dem Bauchgürtel (8), der zwischen Arm (22) und Gehäuse (26) festgehalten wird.
7. Atemgerät nach Anspruch 6, wobei ein Ausschnitt (24) im Arm vorgesehen ist und die Sperreinrichtung einen beweglichen Zapfen (27) aufweist mit einer Sperroberfläche (31) auf einer Seite, eingerichtet zum Eingriff mit dem Ausschnitt (24).
8. Atemgerät nach Anspruch 7, wobei das Gehäuse (26) einen federbelasteten Stempel (25) aufweist, auf dem der Zapfen (27) befestigt ist.
9. Atemgerät mit einer Quelle für Atemgas (1) sowie einer Trageeinheit (2, 3), umfassend einen Gurt mit Schulterriemen (4) zum Tragen der Atemgasquelle, **dadurch gekennzeichnet, dass** das Gerät zudem Einrichtungen aufweist zum lösbaren Koppeln der Trageeinheit an einen Bauchgürtel.

Revendications

1. Appareil respiratoire comprenant une source de gaz respirable (1), une unité de transport (2, 3) comprenant un harnais comportant deux sangles d'épaule (4), afin de transporter la source de gaz respirable, et une ceinture (8), **caractérisé en ce que** l'appareil comporte en outre des moyens destinés à relier de façon libérable l'unité de transport à la ceinture.
2. Appareil respiratoire selon la revendication 1, dans lequel la ceinture (8) est une ceinture de sécurité.
3. Appareil respiratoire selon la revendication 1 ou la revendication 2, dans lequel les moyens destinés à relier de façon libérable l'unité de transport (2, 3) à la ceinture (8) comprennent des connecteurs ayant chacun une partie (7) fixée sur le harnais et une partie (14) fixée sur la ceinture (8).

4. Appareil respiratoire selon la revendication 3, dans lequel chaque sangle d'épaule (4) possède une boucle (4') prévue au niveau de son extrémité inférieure, et une des parties (7) de chaque connecteur est disposée à l'extrémité d'une sangle (6) fixée sur le harnais et passant à travers l'une des boucles (4') et l'autre partie de chaque connecteur (14) est fixée sur la ceinture (8). 5
5. Appareil respiratoire selon la revendication 3 ou la revendication 4, dans lequel une partie de chaque connecteur (14) peut coulisser le long de la ceinture. 10
6. Appareil respiratoire selon la revendication 1 ou la revendication 2, dans lequel les moyens destinés à relier de façon libérable l'unité de transport (2, 3) à la ceinture sont sous la forme de moyens de fixation libérables comportant chacun un boîtier (26) fixée sur l'unité de transport (2, 3), un bras (22) monté de façon pivotante sur le boîtier et des moyens de détente libérables prévus pour maintenir le bras en position avec la ceinture (8) maintenue fixée entre le bras (22) et le boîtier (26). 15 20 25
7. Appareil respiratoire selon la revendication 6, dans lequel une découpe (24) est prévue dans le bras et les moyens de détente possèdent un doigt mobile (27) avec une surface de détente (31) sur une extrémité prévue pour s'engager dans la découpe (24). 30
8. Appareil respiratoire selon la revendication 7, dans lequel le boîtier (26) comprend un plongeur chargé par ressort (25) sur lequel est monté le doigt (27). 35
9. Appareil respiratoire comprenant une source de gaz respirable (1) et une unité de transport (2, 3) comprenant un harnais comportant des sangles d'épaule (4), afin de transporter la source de gaz respirable, **caractérisé en ce que** l'appareil comporte en outre des moyens destinés à relier de façon libérable l'unité de transport à une ceinture. 40 45 50 55



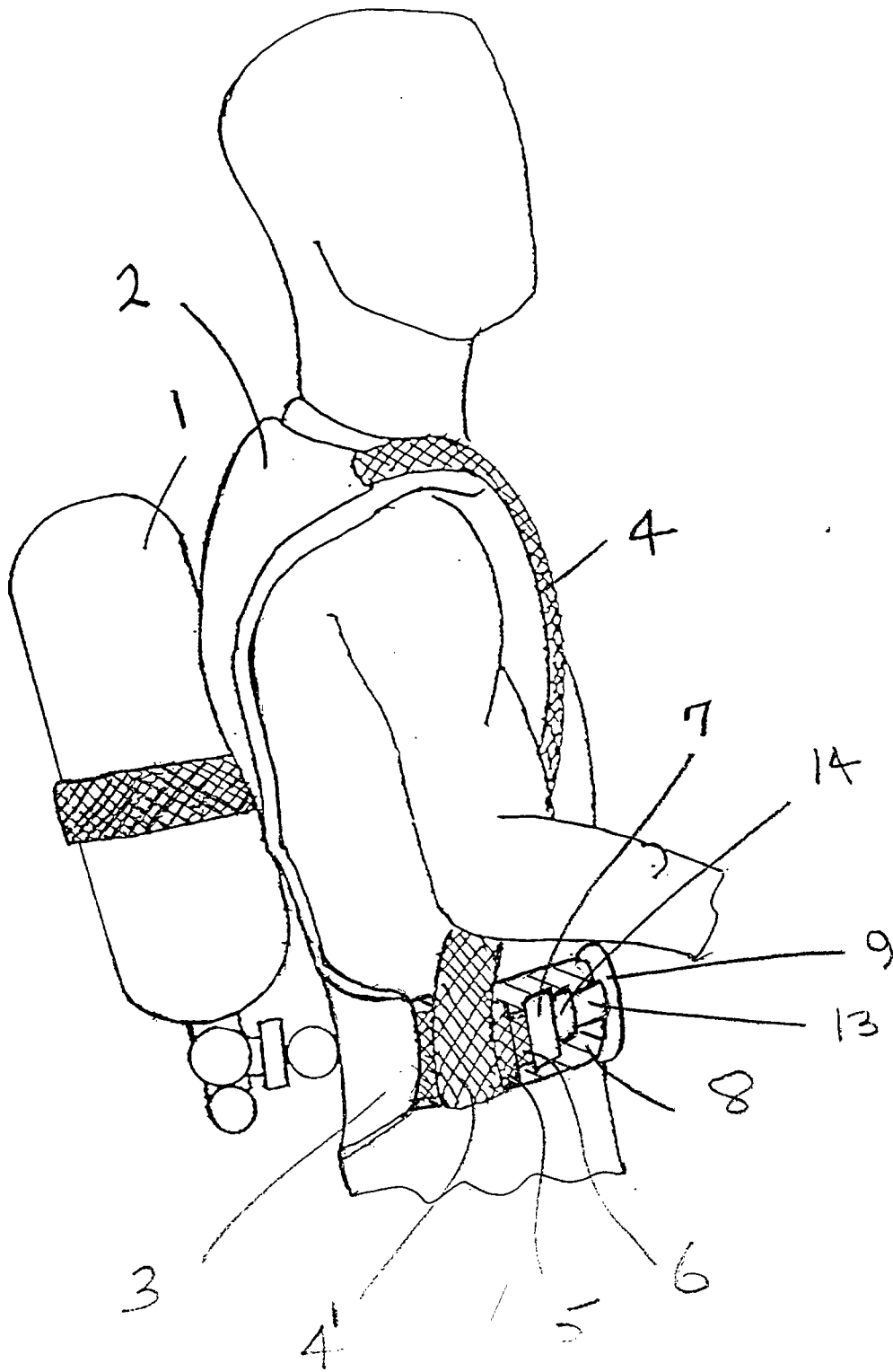


FIG. 3

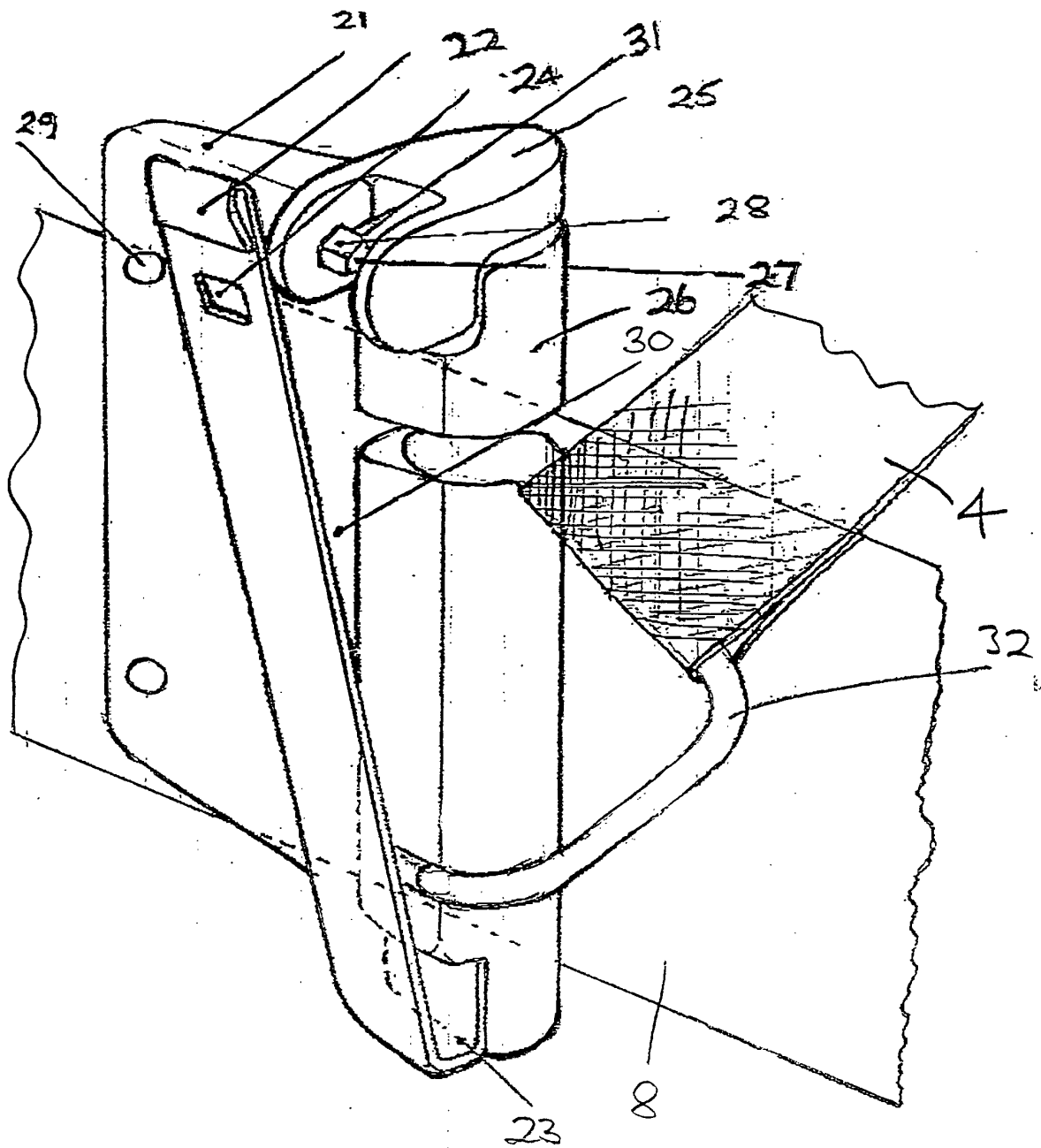


FIG 4

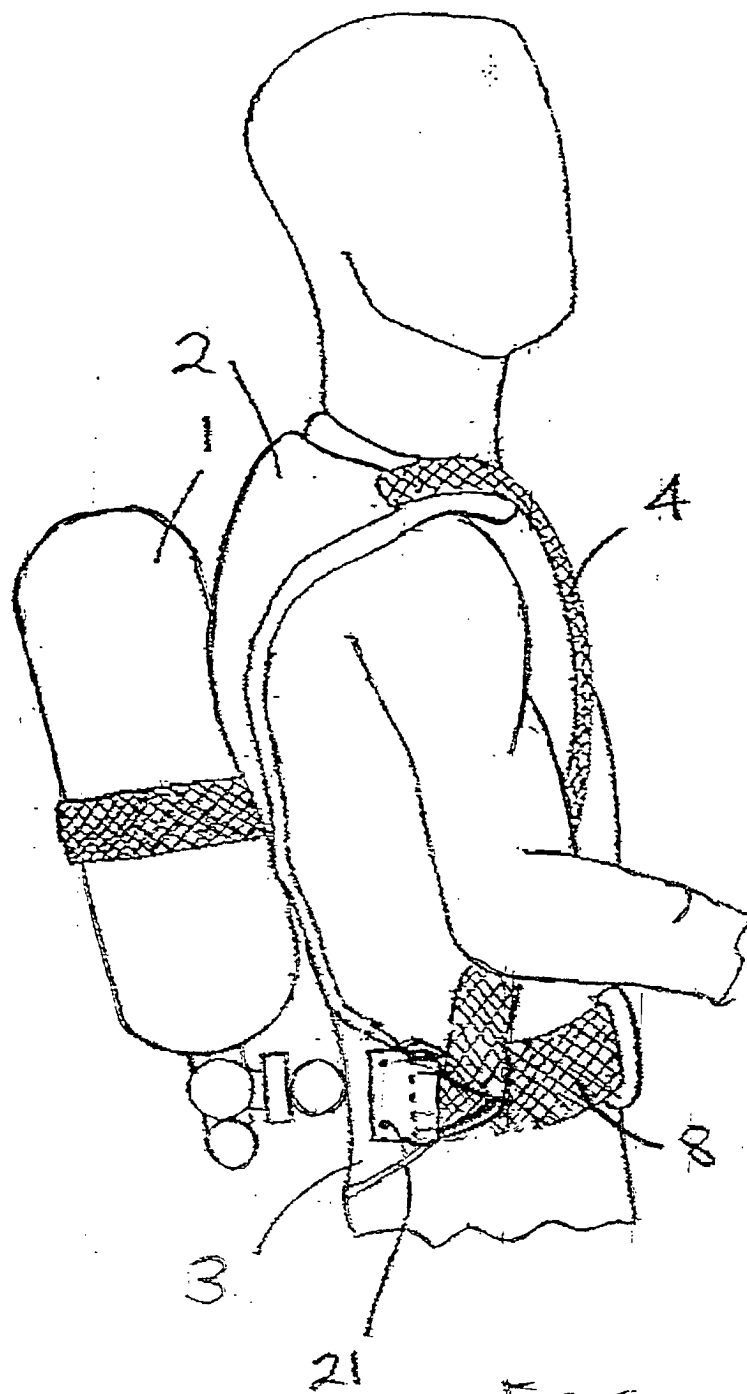


FIG 5