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(54) Protective helmet with a system allowing for attachment of interchangeable accessories

(57) A protective helmet (10) with a system allowing for attachment of interchangeable accessories (10, 16) includes interfaces (20) secured to the helmet and capable of receiving various pairs of brackets (14, 14', 18), each pair of brackets being used to secure a different accessory to the protective helmet. Although the interfaces (20) are located at predetermined locations, the brackets (14, 14', 18) are of varying lengths to ensure a proper pivot axis for the chosen accessory.

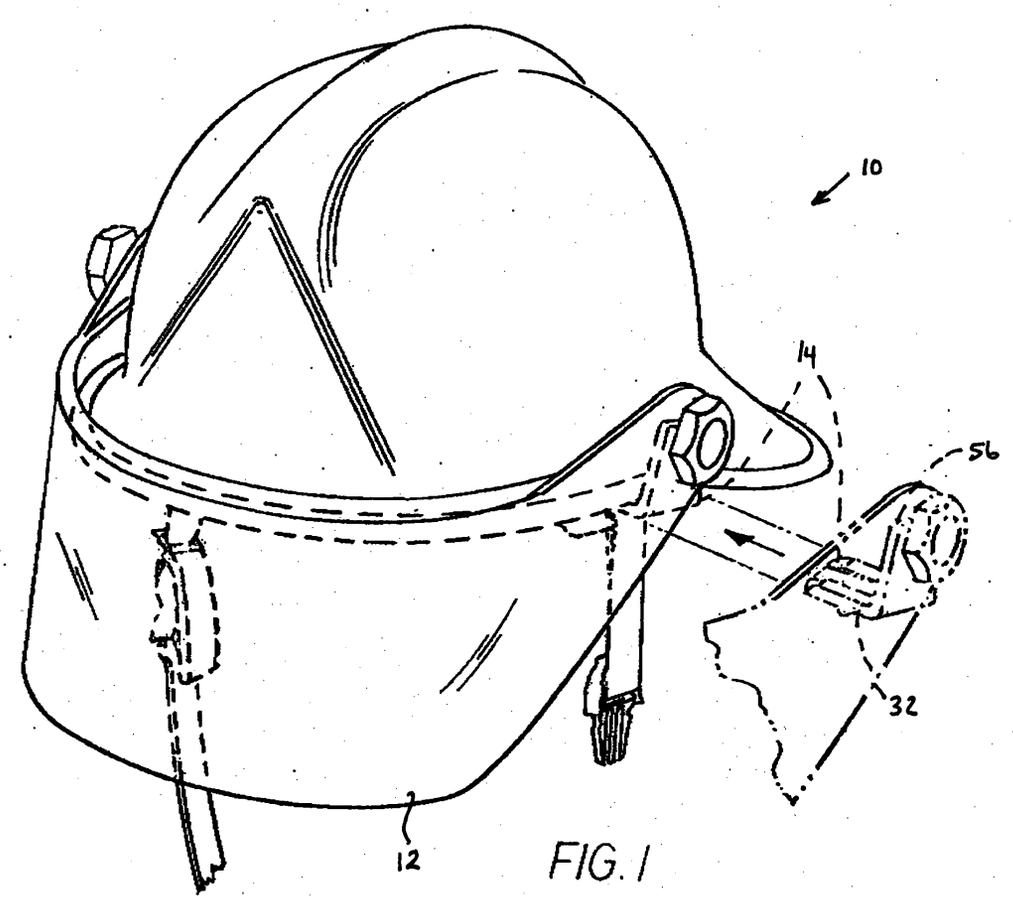

FIG. 1

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Description

[0001] This application claims priority to U.S. Provisional Application Serial No. 60/455,792 filed March 19, 2003, the entire disclosure of which is incorporated herein by this reference.

[0002] The present invention relates to a protective helmet, such as a hard hat or fire helmet, with a system allowing for attachment of interchangeable accessories, such as a faceshield or goggles, to the helmet.

[0003] A protective helmet, such as a fire helmet or a hard hat, commonly includes a shell and a suspension contained within the shell. The shell and suspension cooperate to provide the requisite level of protection. Specifically, the shell of the protective helmet causes any force of impact to be spread across the surface area of the shell. The suspension of the protective helmet separates the wearer's head from the shell such that there is an air gap between the shell and the wearer's head that provides for further attenuation of the force of an impact to the shell. When an object strikes the shell of the helmet, the shell itself flexes inward and the straps of the suspension will stretch. The air gap accommodates the flexing of the shell and stretching of the straps, but, under normal conditions, prevents the wearer's head from contacting the shell of the protective helmet.

[0004] Although such "strap" suspension systems are commonly employed in protective helmets, other force attenuation means may also be used. For example, foam or similar padding may be secured to the internal surface of the shell of the protective helmet. The use of such padding is common in the construction of sports-related helmets, such as baseball helmets, football helmets, and bicycle helmets.

[0005] Depending on the application for which the protective helmet is worn, various accessories may be secured to the protective helmet, for example, a faceshield, goggles, or a visor. Such accessories are typically secured to the outer surface of the protective helmet. Most existing systems do not allow for rapid attachment and detachment of such an accessory from the protective helmet. Furthermore, existing systems do not allow various accessories to be attached at a common location on the outer surface of the helmet.

[0006] Accordingly, there remains a need in the art for a protective helmet incorporating a system which satisfactorily addresses the need for rapid attachment and detachment of accessories to and from the helmet. Additionally, there remains a need in the art for a protective helmet incorporating a system which simplifies attachment of such accessories by allowing attachment at a common location on the outer surface of the helmet.

[0007] According to the present invention there is provided a protective helmet with a system allowing for attachment of interchangeable accessories, comprising at least two interfaces secured to an interior surface of the helmet, characterised by:

at least two pairs of brackets, each pair of brackets being adapted to be received and retained by the interfaces to attach an accessory to the protective helmet,

wherein each bracket includes a pivot point end, the pivot point end for each of one pair of brackets being a first length for establishing a first pivotal axis for one of the accessories, and the pivot point end for each of a second pair of brackets being a second length for establishing a second pivotal axis for a second of the accessories.

[0008] In one exemplary embodiment, an interface is secured on either side of the helmet on an inside surface of the helmet. Each such interface has a structure that defines a slot for receiving a bracket associated with an accessory that is attached to the helmet. Accordingly, each accessory is provided with appropriate brackets for the attachment of that accessory, for example, the faceshield is attached to the helmet with a pair of faceshield brackets and the goggles are attached to the helmet with a distinct pair of goggle brackets.

[0009] Regardless of the accessory, each bracket has a mating end that has three prongs, including a center prong which is capable of limited flexing relative to two side prongs. Each bracket additionally has a pivot point end that is secured to the accessory. To secure an accessory to the protective helmet, the mating end of each bracket associated with the accessory is inserted into a corresponding slot defined by one of the interfaces. As the mating end of each bracket is inserted into the slot, the bottom edge of the helmet interface contacts a wedge-shaped tab extending from the center prong of the mating end, causing a depression or flexing of the center prong relative to the side prongs. However, once the tab is through the slot, the center prong can return from its depressed state, locking the bracket into the interface and securing the accessory to the protective helmet. To detach the accessory, a wearer simply depresses the tab associated with each bracket and withdraws the mating end of each bracket from the slot defined by the respective interface.

[0010] It is important to recognize that the ideal attachment location for various accessories sometimes differs. For example, a faceshield is typically designed to pivot about an axis which is located approximately midway between the front and rear of the helmet resulting in an arc of movement of the faceshield that is generally concentric with the wearer's head. However, the location approximately midway between the front and rear of the helmet is too far forward for the attachment of goggles. Accordingly, in the present invention, although the position of the interfaces is fixed relative to the helmet, the length of the brackets can be altered for each accessory, ensuring a proper pivot axis for that accessory. For example, the pivot point end of each faceshield bracket is designed such that the pivotal axis defined by the brackets of the faceshield is approximate-

ly midway between the front and rear of the helmet, while the pivot point end of each goggle bracket is more elongated to provide a more rearward pivotal axis for the goggle straps.

Figure 1 is a perspective view of an exemplary embodiment of a protective helmet made in accordance with the present invention, the protective helmet having an attached faceshield;

Figure 2 is a perspective view of the faceshield of Figure 1, detached from the protective helmet and illustrating the two brackets that facilitate attachment of the faceshield to the protective helmet of Figure 1;

Figure 3 is a enlarged bottom view of a portion of the helmet of Figure 1, illustrating the attachment of one bracket of the faceshield to the protective helmet;

Figure 4 is a perspective view of the bracket used for attaching the faceshield to the protective helmet of Figure 1;

Figure 5 is a perspective view of the protective helmet of Figure 1, having goggles, rather than a faceshield, attached thereto;

Figure 6 is a rear perspective view of the protective helmet of Figure 5;

Figure 7 is a perspective view of the bracket used for attaching goggles to the protective helmet of Figure 5; and

Figure 8 is a bottom view of a portion of the helmet of Figure 5, illustrating the attachment of one bracket of the goggles to the protective helmet.

[0011] The present invention is a protective helmet with a system allowing for attachment of interchangeable accessories, such as a faceshield or goggles. This system includes interfaces secured to the helmet and capable of receiving various brackets, each bracket being used to secure a different accessory to the protective helmet.

[0012] Referring first to Figures 1 and 5, an exemplary embodiment of the protective helmet 10 is illustrated, in this case, a fire helmet. Figure 1 illustrates the helmet 10 with a faceshield 12 attached thereto using a pair of faceshield brackets 14, 14' (faceshield bracket 14' is shown in Figure 2), and Figure 5 illustrates the helmet 10 with goggles 16 attached thereto using a pair of goggle brackets 18 (although only one goggle bracket is shown).

[0013] Referring now to Figures 3 and 8, an interface 20 is secured to an inside surface 22 of the protective helmet 10. Although only one side of the helmet 10 is shown in Figures 3 and 8, there is a second interface that is the mirror-image of the first interface 20 on the opposite inside surface of the helmet 10. In this exemplary embodiment, each interface 20 includes a crossbar 24 with two substantially parallel legs 26, 28 extending therefrom. The respective legs 26, 28 are integral with or otherwise mounted to the helmet 10, thereby defining a slot 30 that is interposed between the inner surface 22 of the helmet 10 and the crossbar 24 of the interface 20. In this exemplary embodiment, the legs 26, 28 and associated crossbar 24 actually extend from and are integral with an inner ring 23 that supports the suspension 13 of the protective helmet 10.

[0014] Also, although not essential to the present invention, in this exemplary embodiment and as illustrated in Figures 3 and 8, there is an additional structural member 25 that is secured to the upper surface of the crossbar 24 which is used as an attachment point for a portion of a chinstrap 60 (as illustrated in Figure 3). Bolts or similar fasteners 61, 62 pass through the structural member 25, the legs 26, 28 of the interface 20 (which are integral with the inner ring 23) and the shell of the protective helmet 10 to secure these components relative to one another.

[0015] Turning now to the brackets 14 for attaching the faceshield 12 to the protective helmet 10, and with reference to Figure 4 (in which one bracket is illustrated), the bracket 14 is generally L-shaped and has a mating end 32 adapted to be received in the slot 30 defmed by one of the helmet interfaces 20. The mating end 32 of the bracket 14 includes three prongs 36, 38, 40, the center prong 36 being capable of limited flexing or movement relative to the side prongs 38, 40. Additionally, the center prong 36 of the bracket 14 has an integral tab 48, which has a wedge shape, the importance of which will be discussed below.

[0016] Referring now to Figures 2 and 4, the faceshield 12 includes two lateral appendages 52, 52', which extend to engage the protective helmet 10. The faceshield brackets 14, 14' each have pivot point ends 56, 56' which are pivotally secured to the distal ends of the respective appendages 52, 52'. In this exemplary embodiment, a threaded bolt or similar fastener (not shown) is passed through each pivot point end 56, 56' of the faceshield 12 and each bracket 14, 14', and is secured by a nut (not shown) to effectuate the pivot connection.

[0017] As best illustrated in Figure 3, to secure the faceshield 12 to the protective helmet 10 requires only the insertion of the mating end 32 of each bracket 14 into the slot 30 defined by one of the helmet interfaces 20. As the mating end 32 of each bracket 14 is inserted into the slot 30, the bottom edge of the helmet interface 20 contacts the wedge-shaped tab 48 extending from the center prong 36 of the mating end 32, causing a depression or flexing of the center prong 36 relative to the side prongs 38, 40. However, once the tab 48 clears the crossbar 24 of the helmet interface 20, the center prong 36 can return from its depressed state on the other side of the helmet interface 20. This action locks the bracket 14 into the interface 20, thereby securing the faceshield 12 to the protective helmet 10 with the back of the tab 48 of the center prong 36 resting against the edge of the crossbar 24 of the helmet interface 20.

[0018] Referring now to Figure 7, the brackets 18 for attaching the goggles 16 to the protective helmet 10 are also generally L-shaped and have a mating end 34 adapted to be received in the slot 30 defined by one of the helmet interfaces 20. The mating end 34 of the bracket 18 includes three prongs 42, 44, 46, the center prong 42 being capable of limited flexing or movement relative to the side prongs 44, 46. Additionally, the center prong 42 of the bracket 18 has an integral tab 50, which has a wedge shape, the importance of which will be discussed below.

[0019] As illustrated in Figures 5 and 6, the goggles 16 include two straps 58, one extending from either side of the goggles 16 (although only one strap is illustrated in the Figures). Each of the goggle brackets 18 include a pivot point end 62 which is secured to one of the straps 58 by a bolt, rivet or similar fastener.

[0020] As best illustrated in Figure 8, to secure the goggles 16 to the protective helmet 10, the mating end 34 of each bracket 18 is inserted into the slot 30 defined by one of the helmet interfaces 20. As the mating end 34 of the bracket 18 is inserted into the slot 30, the wedge-shaped tab 50 of the center prong 42 is depressed relative to the side prongs 44, 46. Once the tab 50 clears the crossbar 24 of the helmet interface 20, the center prong 42 returns from its depressed state on the other side of the helmet interface 20, thereby securing the bracket 18, and thus the goggles 16, to the protective helmet 10.

[0021] To detach the faceshield 12 or goggles 16, a wearer simply depresses the tabs of the associated brackets, and then withdraws the bracket from the slots 30 defined by the interfaces 20. Such detachment can be easily accomplished even while the protective helmet 10 is being worn.

[0022] It is important to recognize that the ideal attachment location on the protective helmet 10 for various accessories sometimes differs. For example, one of the challenges in creating a protective helmet with a system allowing for attachment of interchangeable accessories is that the ideal attachment location is different depending on the chosen accessory. For example, a faceshield 12 is typically designed to pivot about an axis which is located approximately midway between the front and rear of the helmet 10 resulting in an arc of movement of the faceshield 12 that is generally concentric with the wearer's head. However, the location approximately midway between the front and rear of the helmet 10 is too far forward for the attachment of goggles 16. In this regard, if the distal ends of the goggle straps 58 were attached at this midpoint location on the helmet 10, there would not be a sufficient distance between the attachment points and the goggles 16 to allow adjustment of the length of the straps 58 on each side to permit a comfortable and effective fit for a range of head sizes, or to permit sufficient elongation of the straps 58 for storage of the goggles 16 on the front of the helmet 10 when not in use. Furthermore, when the exemplary system of the present invention is used with a protective helmet 10 having a brim that is somewhat wider than the goggles 16, there is a tendency for the straps 58 to be pulled slightly outward from the goggles 16 to the attachment point on the helmet 10. If the attachment point on the helmet 10 is too close to the goggles 16, it can cause the goggles 16 to be stretched outward as the straps 58 are tightened, preventing the goggles 16 from sealing securely against the wearer's face, particularly at the ends. However, if the attachment point on the helmet 10 is distanced to the rear, the straps 58 can be tightened to allow the goggles 16 to securely seal against the wearer's face.

[0023] The helmet interfaces 20 of the exemplary embodiment of the present invention are located approximately midway between the front and rear of the helmet 10. In this regard, the interfaces 20 are located at the ideal points for pivotal attachment of the two lateral appendages 52, 52' of the faceshield 12, approximately midway between the front and rear of the helmet 10. However, the interfaces 20 are not located at the ideal points for pivotal attachment of the goggle straps 58. Accordingly, as best illustrated in Figures 5 and 6, the pivot point end 62 of each goggle bracket 18 is elongated to provide a more rearward pivotal attachment location for each goggle strap 58 on the helmet 10. In this exemplary embodiment, the brackets 18 move the pivot axis for the goggles 18 approximately 2.25 inches behind the interfaces 20.

[0024] In summary, both the faceshield bracket 14 and the goggle bracket 18 are designed to mate with the helmet interface 20; however, by using differing lengths of the brackets 14, 18, the location of the pivot axes are altered and can be adjusted depending on the chosen accessory to be mounted to the protective helmet 10.

[0025] Lastly, although a faceshield 12 and goggles 16 are shown in the Figures and referred to in this description, the present invention contemplates that the system of the present invention could be used to secure various accessories the protective helmet 10, with the length of the bracket associated with each such accessory ensuring a proper pivot axis for that accessory. For example, the ideal attachment location for a visor may be a more frontward attachment location on the protective helmet.

[0026] It will be obvious to those skilled in the art that further modifications may be made to the embodiments described herein without departing from the spirit and scope of the present invention.

Claims

1. A protective helmet with a system allowing for attachment of interchangeable accessories, comprising:

at least two interfaces (20) secured to an inte-

rior surface (22) of the helmet, **characterised by**:

at least two pairs of brackets (14, 14', 18), each pair of brackets being adapted to be received and retained by the interfaces (20) to attach an accessory (10, 16) to the protective helmet,

wherein each bracket (14, 14', 18) includes a pivot point end (56, 56', 62), the pivot point end (56, 56') for each of one pair of brackets being a first length for establishing a first pivotal axis for one of the accessories (10), and the pivot point end (62) for each of a second pair of brackets being a second length for establishing a second pivotal axis for a second of the accessories (16).

2. The protective helmet of claim 1, wherein the interfaces (20) are secured to opposite sides of the protective helmet substantially midway between a front and a rear of the helmet.

3. The protective helmet of claim 1 or 2, wherein the first pivotal axis is substantially midway between the front and the rear of the helmet.

4. The protective helmet of claim 1, 2 or 3, wherein the second pivotal axis is more forward relative to the first pivotal axis.

5. The protective helmet of claim 1, 2 or 3, wherein the second pivotal axis is more rearward relative to the first pivotal axis.

6. The protective helmet according to any one of claims 1, 2, 3 or 5, wherein the first of the accessories is a faceshield (10) and the second of the accessories is goggles (16).

7. The protective helmet according to any one of claims 1 to 6, wherein each of said interfaces (20) secured to the interior surface (22) of the helmet defines a slot (30), with each bracket having a mating end (32) adapted to be received in one of said slots (30).

8. A protective helmet according to claim 1 to 7, wherein the mating end (32) of each bracket includes a prong (36) with an essentially wedge-shaped tab (48), said prong (48) flexing when the bracket mating end (32) is inserted into one of the slots (30) defined by said interfaces, and then returning from its flexed state when the wedge-shaped tab (48) emerges through said slot (30), securing the bracket to said interface.

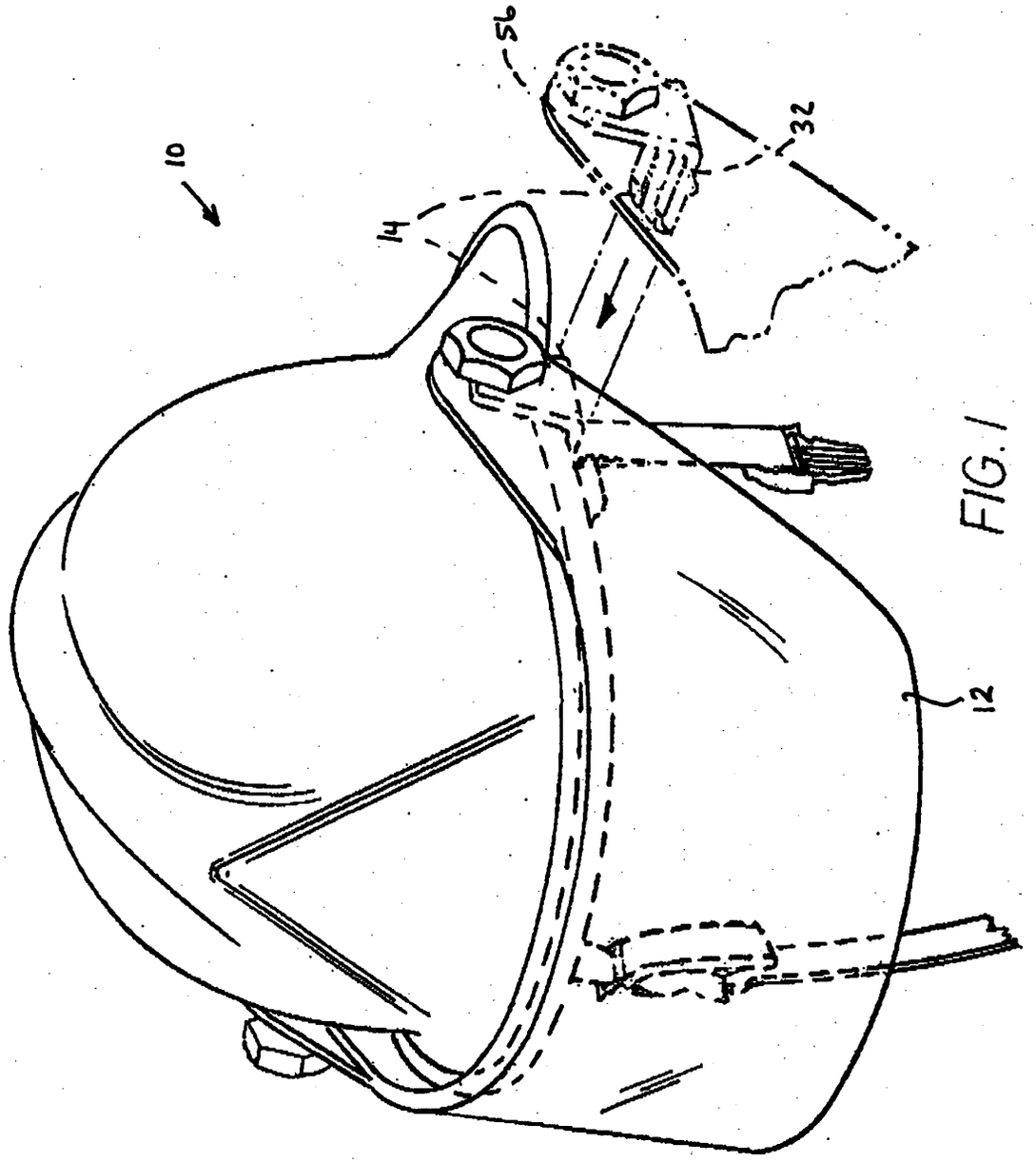

FIG. 1

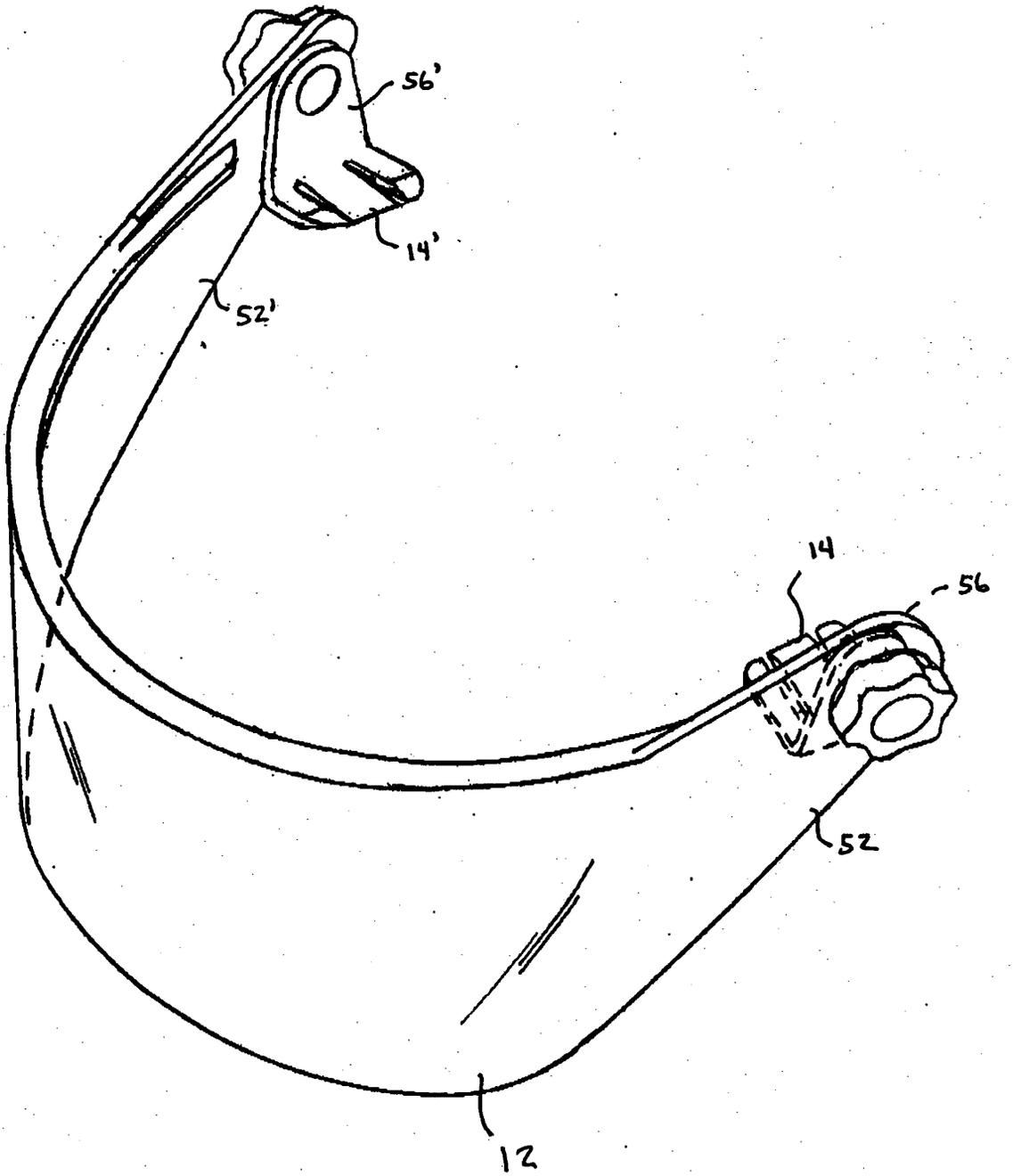

FIG. 2

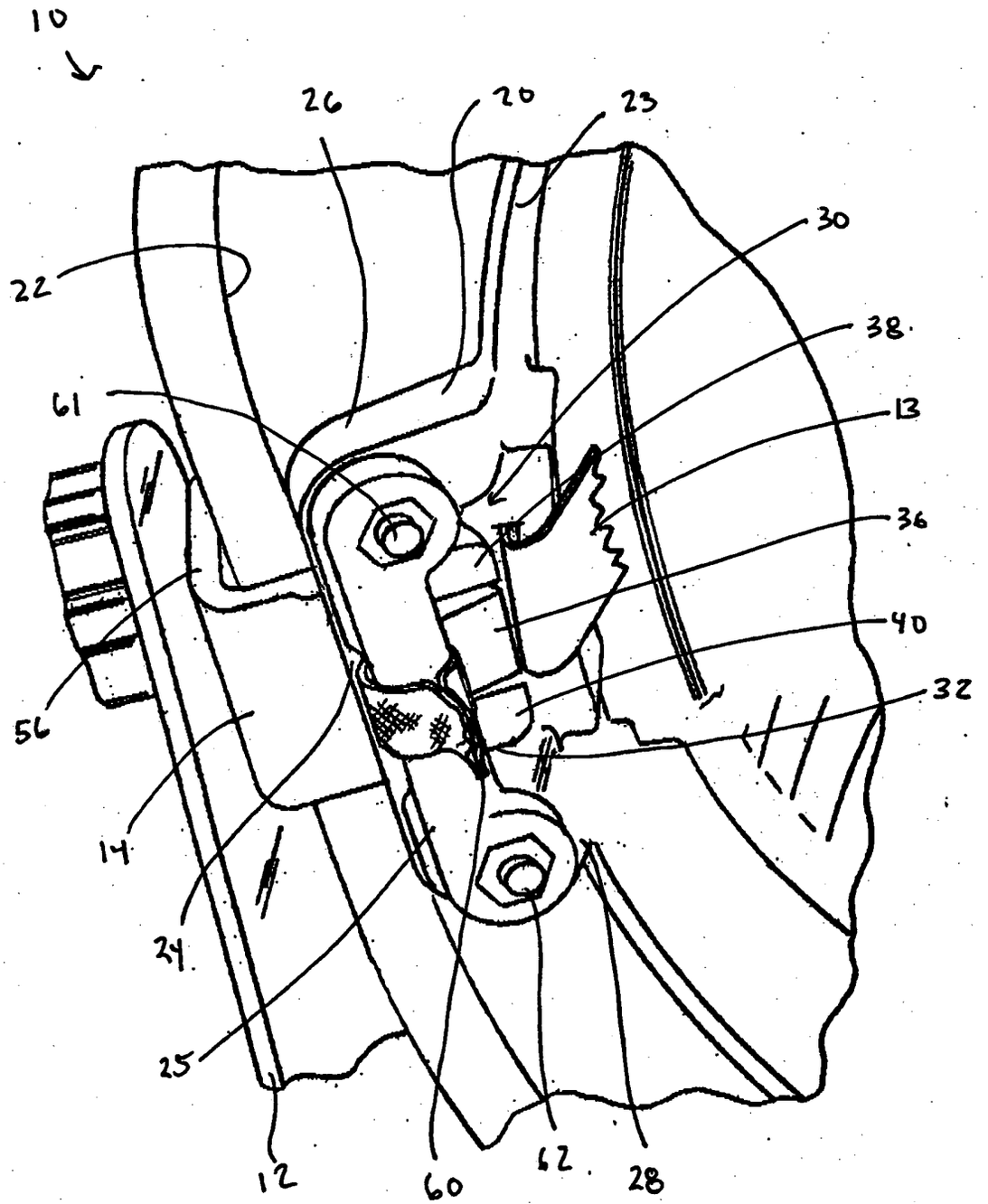

FIG. 3

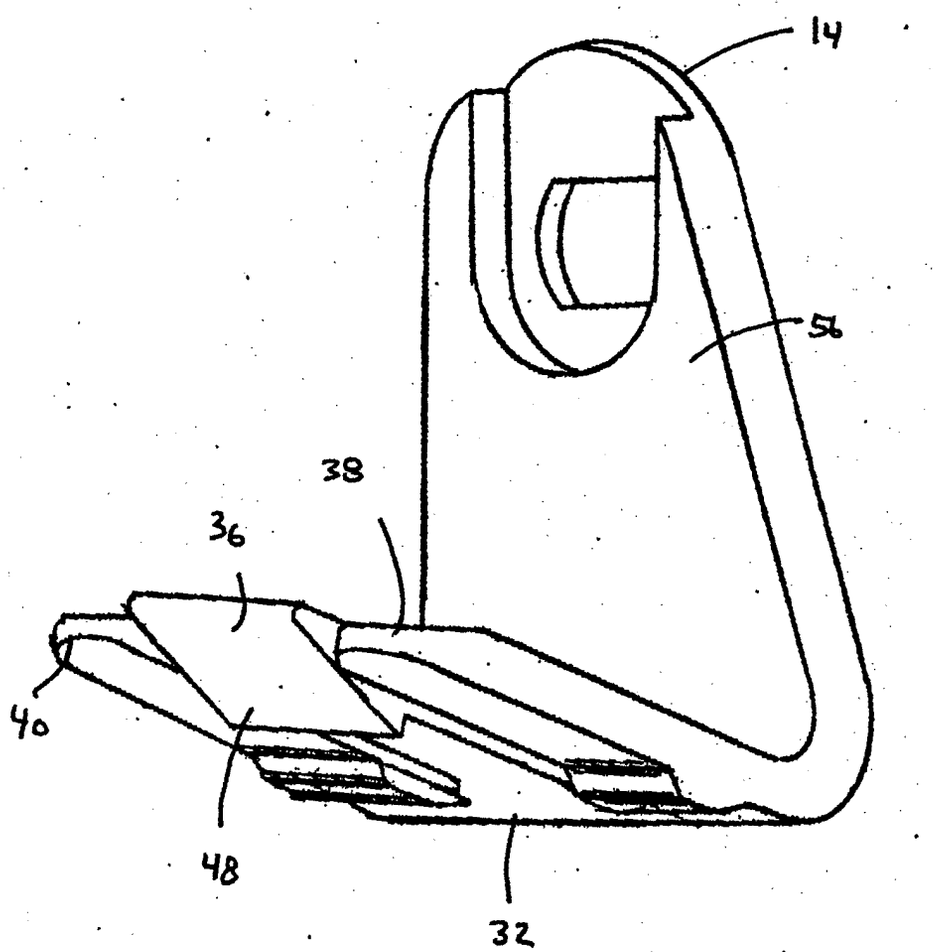

FIG. 4

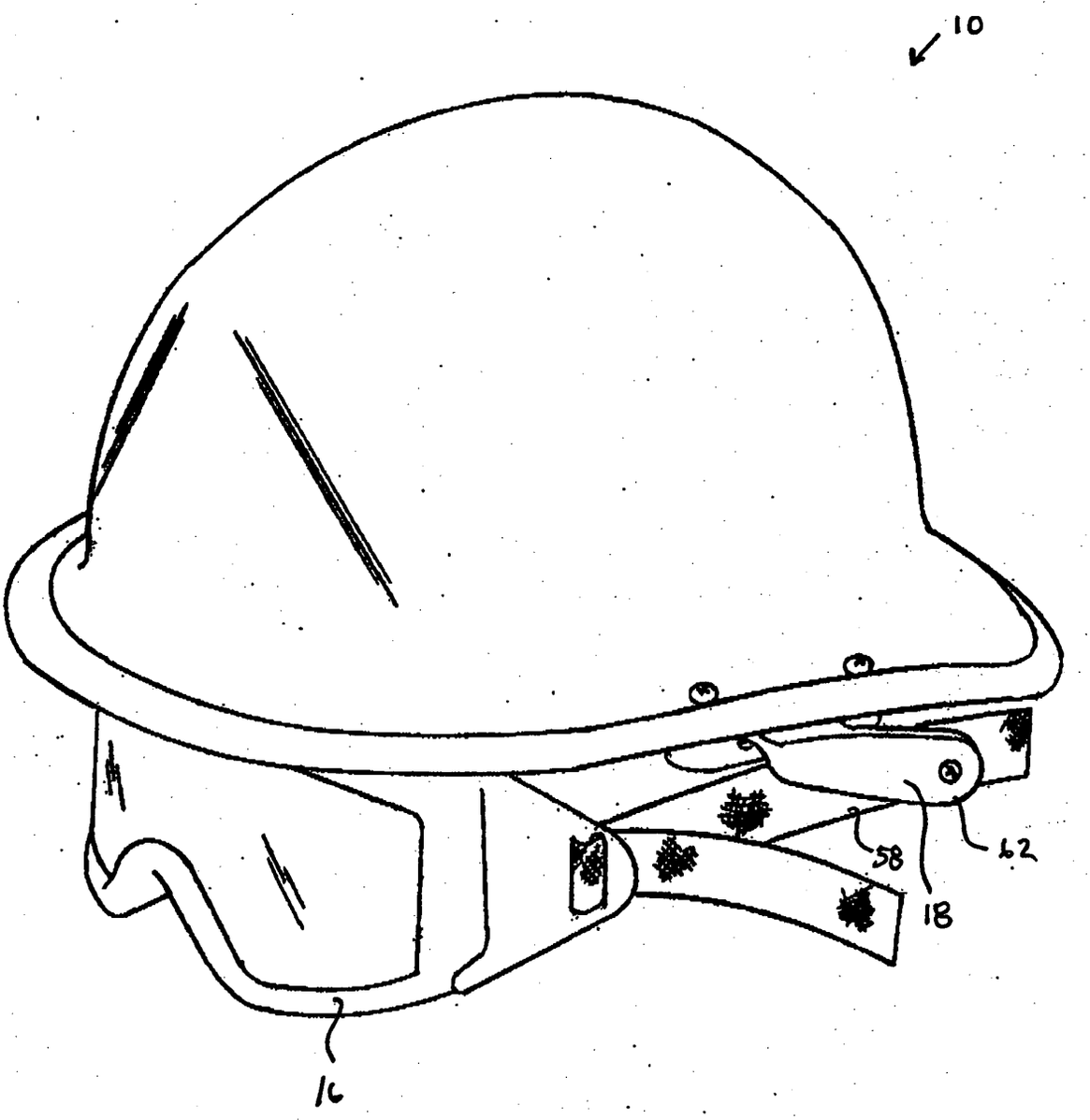

FIG.5

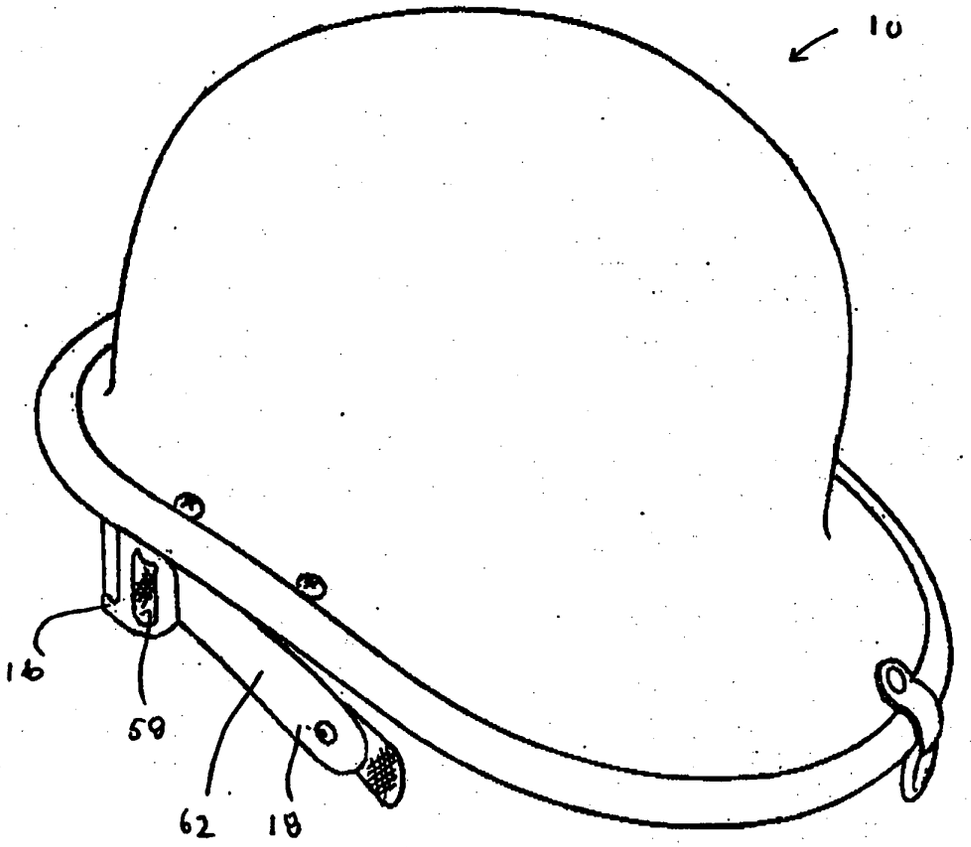

FIG. 6

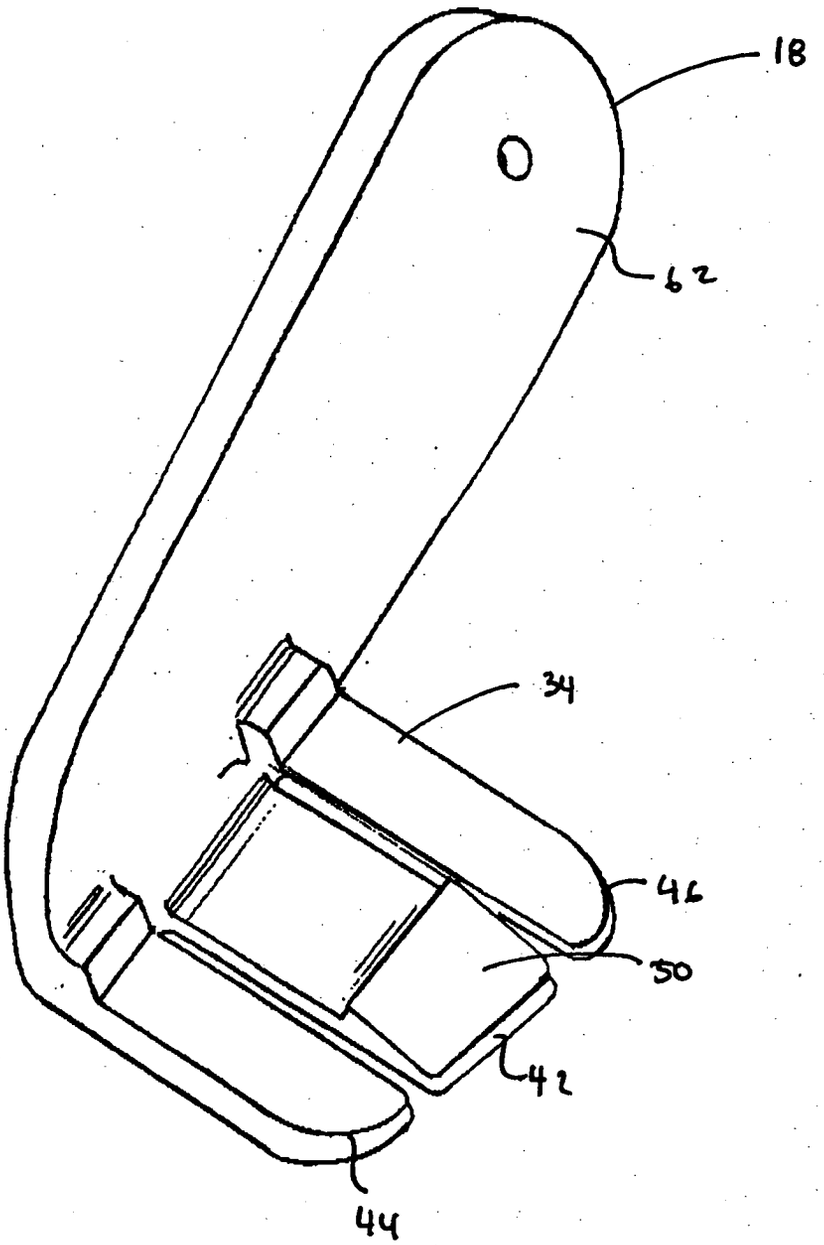

FIG. 7

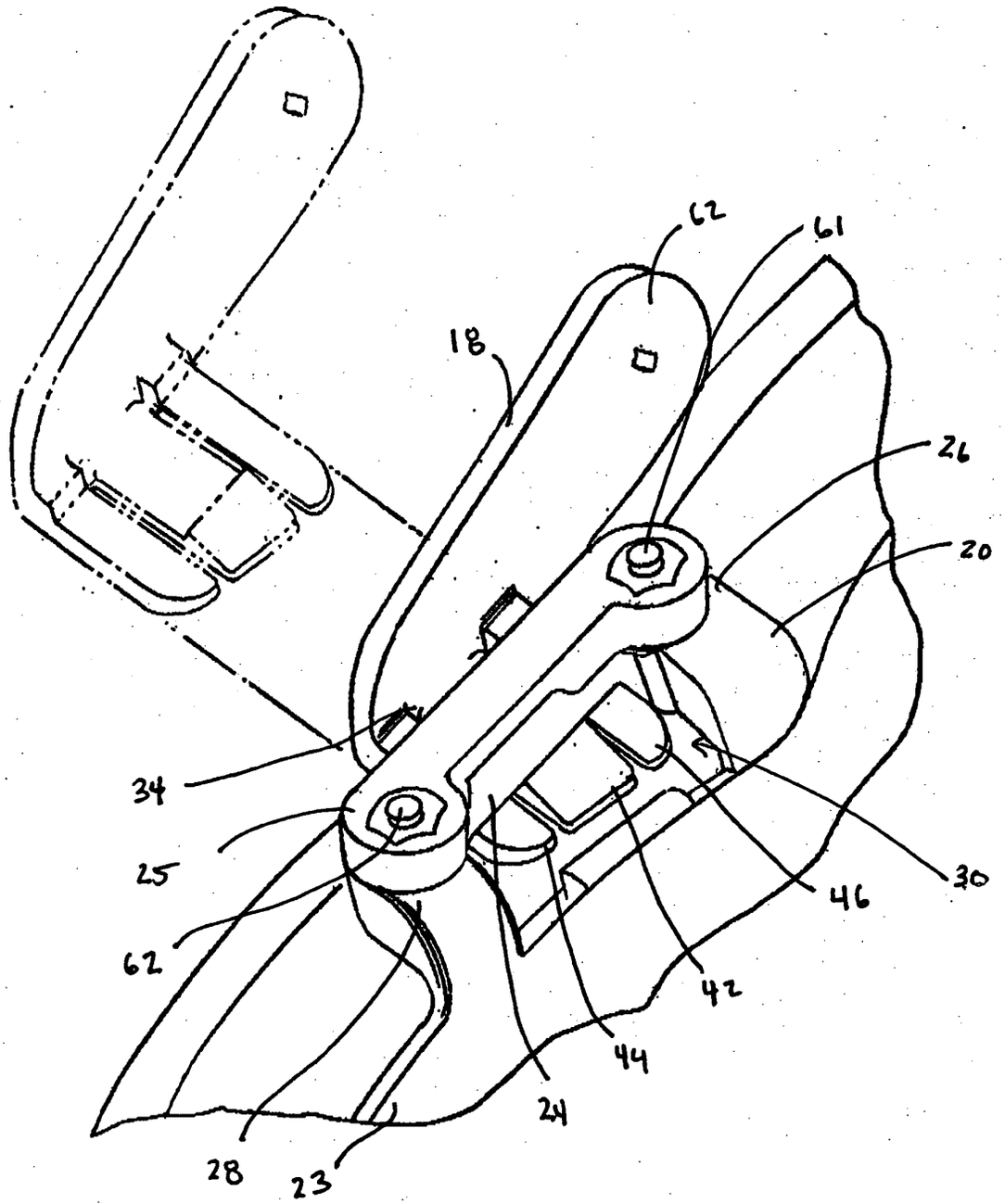

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 04 25 1271

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7) A42B A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 June 2004	D'Souza, J

CATEGORY OF CITED DOCUMENTS

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