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(54)

Babies' safety helmet

(57)

Babies safety helmet having a substantially flexible structure (2) between a non operating condition, wherein it presents a substantially plane development (3), and an operating condition, wherein it presents a curved development (3) suitable for the ovoidal shape of a cranium (1b) of a baby (1a). The structure (2) includes: at least a basic portion (4) associable to a cranial circumference (1c) of a baby (1a); a first upper portion (5) transversely associated with the basic portion (4)

and associable in correspondence with a forehead/nape arch (1d) of the cranium (1b) of the baby (1a); a second upper portion (6) associable in correspondence with an ear/ear arch (1e) of the cranium (1b) of the baby (1a) and transversely developing with respect to the first upper portion (5); and fixing means (7) for holding the structure (2) in the operating condition. The second upper portion (6) is movably associable to the basic portion (4) in a plurality of operating positions, for varying the length of the ear/ear arch (1e).

FIG.3

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Description

[0001] The present invention relates to a babies safety helmet including the features stated in the preamble of claim 1. The present invention falls within the field of goods dedicated to the babyhood ed in particular to the babies safety during their deambulation. As it is known, during the first months of the babies life, the braincase is not completely closed and shows fontanelles and sutures which join the bony parts of the skull by allowing its expansion through the action of the brain pressure in the course of development. At this initial condition of partial ossification of the braincase, babies of an age ranging between six and eighteen months begin to walk, first by crawling then by toddling. During the babies movements, these latter are frequently subject to even violent falls, due to the loss of the balance and to an incomplete familiarity with the mechanisms of the motion. These undesirable events may cause physical injuries of various type, especially when the impact with a solid foreign body concerns the babies head which, because of the high mass relative to the rest of the body, tends to violently strike the floor or the solid surrounding bodies, causing dangerous head injuries.

[0002] It is also known that infantile head injuries, which represent the main cause of mortality in infants of age below two years, are mostly due to accidental falls from domestic resting places, such as dressing tables, beds and/or couches, or during play, run and the environmental exploration. Head injuries result even more dangerous when the injuries concern non-protected zones of the bone structure, such as for instance the fontanelles or the suture zones, or when the bumps of the braincase occur against pointed bodies, such as the corners of furniture and/or doors.

[0003] A series of products for protecting the babies during their deambulation are now available on the market.

[0004] Some of these products, such as for instance protective sheaths, apply directly on the angular bodies in order to avoid that possible impacts against the same can hurt the body of the babies. Other products, such as for instance safety helmets, are applied directly on the babies head so as to offer a permanent protection capable of deadening and/or absorbing possible impacts due to accidental falls.

[0005] Referring to the safety helmets now on the market, these latter present a structure made of a soft material for covering the more delicate parts of the braincase, such as the fontanelles, the sutures, the forehead and the nape. The structure of such helmets usually consists of three different portions. A basic portion, for circumferentially winding the cranium of the baby. A first upper portion, perpendicularly integral to the basic portion according to an upside-down "T" configuration and arranged for engaging the sagittal arch of the baby cranium, from the forehead to the nape. A second upper portion, perpendicularly integral to the first one, accord-

ing to a cross-shaped configuration and arranged for engaging a transverse arch of the baby cranium extending from ear to ear.

[0006] In the operating condition, the ends of the basic portion of the helmet are inserted within respective buttonholes obtained in correspondence with the ends of the second upper portion, so that the structure of the helmet assumes a curved configuration. The ends of the basic portion of the helmet are then joined by way of proper hooking elements, at the free end of the first upper portion to hold the curved configuration.

[0007] The second upper portion of the helmet further presents, in correspondence with its own ends, additional buttonholes for the engagement of a submandibular lacing element which, by means of proper buckles and/or similar sliding elements of regulation and blocking, is apt to firmly holding the helmet on the baby's head.

[0008] The Applicant has found that although the known safety helmets protect the more delicate parts of the babies braincase during their possible accidental falls, they are not lacking in some drawbacks, mainly with reference to the limited adaptation properties of the helmets to the various shapes and dimensions of the babies cranium, the not completely adequate protection of some parts, as well as the potential dangerousness of the same in strangulation situations of the babies due to an insufficient structural compliance of the sub-throat elements in such situations.

[0009] In particular, it appeared that the known helmets can be regulated along three main dimensions, that is to say: the circumference of the braincase of the baby which is determined by the overlapping of the ends of the basic portion; the forehead/nape sagittal arch which is determined by the overlapping of the free end of the first upper portion with the ends of the basic portion; and the submandibular arch which is determined by the adjustment of the blocking sliding elements. The known helmets do not foresee, however, the required adjustment of the ear/ear crown. In fact, the second upper portion is firmly engaged with the first upper portion in order to form with the same a single cross-shaped structure, which rather limits the adaptability of the safety helmets to any type of cranium. In some cases, this lack may be partly prevented by an excessive adjustment of the lacing element which anyway involves an unwanted displacement of the basic portion from its ideal position, by consequently penalizing the baby's safety in correspondence with the circumferential zone of the cranium previously covered, as well as a considerable and troublesome pressure of the baby's head.

[0010] It should also be considered that the safety helmets such as the one above described may easily entangle in the bulges of the solid bodies usually present in the domestic environment, causing dangerous situations wherein the babies may run into strangulations and/or suffocations due to the submandibular lacing element. More particularly, as the lacing elements are rather resistant and firmly connected to the structure of

the helmet, they do not easily come unlaced nor break down, by remaining joined to the structure thereof in any situation and by contrasting its removal.

[0011] The object of the present invention is to solve the problems found in the known art by proposing an effective babies safety helmet which is readily suited to any type of cranium and presents at least a yielding portion in the case of a holding thereof.

[0012] These and other objects, which better result during the following description, are substantially attained by a safety helmet including the features defined in one or more of the following claims. Further features and advantages will more result from the detailed description of a preferred, but not limiting, embodiment of a babies safety helmet according to the present invention. Such description will be shown hereinafter with reference to the enclosed figures, which are given by way of example only but not limitation, wherein:

figure 1 is a plane development of a babies safety helmet, according to a first embodiment of the present invention;

figure 2 is a perspective view of the safety helmet of figure 1 in a preparation condition;

figure 3 is a perspective view of the safety helmet of the preceding figures in a further preparation condition;

figure 4 is a perspective view of the safety helmet of the preceding figures in an operating condition;

figure 5 is a perspective view of the safety helmet of the preceding figures in an operating condition on a baby's cranium;

figure 6 is an enlarged perspective view of a detail of the safety helmet of the preceding figure;

figure 7 is a plane development of a safety helmet, according to a second embodiment;

figure 8 is a plane development of a safety helmet, according to a third embodiment.

[0013] With reference to the enclosed figures, by 1 a babies safety helmet 1a according to the present invention is generally shown.

[0014] The helmet 1 has a structure 2 made of a soft material, substantially flexible and pliable at least between a non operating condition, wherein it presents a substantially plane development 3 (figures 1, 7 and 8), and an operating condition, wherein it presents a curved development 3 (figures 2-6) suitable for engaging the ovoidal shape of a cranium 1b of a baby 1a.

[0015] As it can be seen in the enclosed figures, the structure 2 of the helmet 1 includes at least a basic portion 4 for engaging the cranial circumference 1c of the cranium 1b of the baby 1a so as to cover, at least partly, bony zones of the latter, such as the frontal bone, sphenoid bone, temporal bone, parietal bone and the occipital bone, and completely, zones without bones, such as the sphenoid and mastoid fontanelles and the squamous sutures. Particularly, the basic portion 4 presents

a substantially straight development which, for ergonomics reasons, is slightly curved in correspondence with a central zone 4a of the basic portion 4 and opposite ends 4b substantially rounded. Advantageously, the basic portion 4 presents a cross edge defining a protection portion 4c which can be overlapped to the basic portion itself for constituting a double-layer zone 4d assigned for covering the frontal bone of the baby 1a. Preferably, the protection portion 4c is a single piece with the basic portion 3 and is separate from the latter by a crease line 4e substantially extending in parallel to the longitudinal development of the basic portion 4.

[0016] The structure 2 further presents a first upper portion 5 transversally associated with the basic portion 4 opposite with respect to the protection portion 4c of the latter and destined to engage the forehead/nape sagittal arch 1d of the cranium 1b of the baby 1a for protecting at least the front and the back fontanelles, as well as the sagittal suture of the latter. In particular, the first upper portion 5 extends from the basic portion 4 according to a substantially straight development and ends, opposite with respect to the basic portion 4, with a substantially rounded free end 5a such as the opposite ends 4b of the basic portion 4.

[0017] The structure 2 is also provided with a second upper portion 6 for engaging the ear/ear arch 1e of the cranium 1b of the baby 1a in order to coat both the sphenoid and front fontanelles and the coronal suture. Advantageously, the second upper portion 6 is operably engaged at the first upper portion 5 in such way to result movable with respect to the same according to transverse directions. As shown in the enclosed figures, the second upper portion 6 is firmly engaged at the basic portion 4 opposite with respect to the protection portion 4c, between one of the opposite ends 4b of the basic portion itself and the first upper portion 5. The second upper portion 6 develops from the basic portion 4 according to a substantially equal extent to the longitudinal development of the first upper portion 5, so as to end, opposite with respect to the basic portion 4, with a substantially rounded free end 6. The first upper portion 5 and the second upper portion 6 are preferably integral, in a one-piece, with the basic portion 4, but they could also be different elements joinable to the basic portion 4 by fixing means 10.

[0018] It should be noted, however, that the longitudinal dimensions of each portion 4, 5 and 6 of the structure 2 of the helmet 1, as well as the proportions therebetween, may change depending on the cranial conformation of the babies 1a to which the helmet 1 are directed and on the structural and aesthetical features required to their commercialization.

[0019] Advantageously, the first and the second upper portions 5 and 6 are relatively movable due to the working interposition of proper guide means 7. Preferably, the guide means 7 are associated with the first upper portion 5 for guiding the second upper portion 6 along a cross direction with respect to the longitudinal devel-

opment of the first upper portion 5.

[0020] In particular, the guide means 7 are defined by at least a buttonhole 8 longitudinally obtained through the first upper portion 5 according to an extent not less than the maximal cross dimension of the second upper portion 6, whereby when the structure 2 is in the operating condition, the second upper portion 6 pass transversally through the buttonhole 8 with respect to the longitudinal development of the first upper portion 5.

[0021] In the embodiments shown in the enclosed figures, the guide means 7 preferably consist of at least two substantially parallel buttonholes 8, extending along the longitudinal development of the first upper portion 5. The buttonholes 8 define a slide loop 8a on which the second upper portion 6 glides during the helmet 1 preparation (figures 2 and 3) from the non operating condition (figures 1, 7 and 8) to the operating condition (figures 4 and 5).

[0022] For the purpose of the use and constructive practicality, it is preferable that the structure 2 of the helmet 1 is made of a single piece, as shown in the enclosed figures. However, it is not excluded that the structure 2 may also consist of discrete portions 4, 5, 6 and arranged for being properly joined during the helmet preparation from the non operating condition to the operating condition. In this case, it may result advantageous to release the second upper portion 6 from the rest of the structure 2, so that the helmet 1 has a reduced bulkiness in a non operating condition.

[0023] Always referring to the enclosed figures, the safety helmet 1 further includes a submandibular lacing element 9 able to ensure the engagement of the helmet 1 to the cranium 1b of the baby 1a. The lacing element 9, which is also made of flexible material, presents a fixed end 9a firmly engaged at the basic portion 4 close to the protection portion 4c and a free end 9b, opposite to the fixed end 9a, which can be movably engaged at the basic portion 4 for keeping the helmet 1 engaged at the cranium 1b of the baby 1a.

[0024] The helmet 1 is further provided with fixing means 10 for keeping the structure 2 in the operating condition (figures 4 and 5), that is to say in an operating position. The fixing means 10 include a plurality of hooking means 10a, 10b, 10c, 10d, such as for example Velcro™ or other different seam elements suitable for the purpose and arranged for joining two superimposed surfaces, which are properly distributed on the structure 2. In particular, the fixing means 10 include a first hooking means 10a operably interposed between the ends 4b of the basic portion 4 for keeping these latter engaged according to an overlapped configuration when the structure 2 is in the operating condition. Preferably, the first hooking means 10a includes at least a hooking element arranged in correspondence with at least one of the ends 4b of the basic portion 4, apt to interact with the material constituting the structure 2 for firmly holding the latter. The fixing means 10 also foresee a second hooking means 10b operably interposed between the free

end 5a of the first upper portion 5 and the basic portion 4 for keeping these latter engaged when the structure 2 is in the operating condition. Similarly to the first hooking means 10a, the second hooking means 10b includes a hooking element arranged in correspondence with the first upper portion 5, arranged for interacting with the material constituting the structure 2 for firmly holding the latter in the desired position. The fixing means 10 further comprise a third hooking means 10c operably interposed between the free end 6a of the second upper portion 6 and one of the ends 4b of the basic portion 4, for holding these latter overlapped in the operating condition. In particular, the third hooking means 10c includes a respective hooking element placed in correspondence with the end 4b of the basic portion 4 opposite to the end 4b supporting the hooking element of the first hooking means 10a. Preferably, the hooking element of the third hooking means 10c is apt to interact with the material forming the structure 2 of the helmet 1, in order to firmly hold the latter in the operating condition.

[0025] Advantageously, the fixing means 10 are provided with a fourth hooking means 10d operably interposed between the free end 9b of the lacing element 9 and the basic portion 4 of the structure 2. Likewise with the other hooking means 10a, 10b, 10c, the fourth hooking means 10d foresees a single hooking element placed in correspondence with the free end 9b of the lacing element 9, capable of holding the basic portion 4 by interacting with the material forming the structure 2.

[0026] It is further possible that the fixing means 10 also include a fifth hooking means (not shown) operably interposed between the protection portion 4c and the basic portion 4, in order to keep the protection portion 4c adhesive to the basic portion 4 once the helmet 1 is worn on the cranium 1b of the baby 1a.

[0027] According to a first embodiment of the present invention shown in figures 1-6, the first upper portion 5 of the helmet 1 substantially develops perpendicularly from a middle point 4f of the basic portion 4, while the second upper portion 6 develops according to an inclined direction towards the first upper portion 5. In other words, the second upper portion 6 is progressively close to the first upper portion 5 away from the basic portion 4.

[0028] According to a second embodiment of the present invention shown in figure 7, in opposition to the first embodiment, the second upper portion 6 of the helmet 1 substantially develops perpendicularly from the basic portion 4, while the first upper portion 5 develops according to an inclined direction towards the second upper portion 6. More particularly, the first upper portion 5 is progressively close to the second upper portion 6 away from the basic portion 4.

[0029] According to a third embodiment of the present invention shown in figure 8, the structure 2 of the helmet 1 is an intermediate shape between the first and the second embodiment, wherein the basic portion 4 is similar to that of the second embodiment, while the arrangement of the first upper portion 5 and of the second upper

portion 6 are similar to those of the first embodiment. In this case, in order to ensure the desired functionality, the buttonholes 8 and the loop 8a present a longitudinal development above the required dimension for the engagement of the second upper portion 6, so that the latter is free of sliding, also partly, along the longitudinal extension of the first upper portion 5. In other words, according to this arrangement, the second upper portion 6 can pass through the buttonholes 8 transversely with respect to the first upper portion 5, by gliding on the loop 8a and running longitudinally on the latter along a transverse direction to the second upper portion itself. In a varying embodiment, not illustrated in the figures, the second upper portion 6 is movably joinable to the basic portion 4 in a plurality of discrete operating positions (for changing the length of the ear/ear arch), in correspondence with both its ends, by way of the fixing means above illustrated. In this case, such second upper position 6 may be an element per se or it may also be symmetrically fixed to the first upper portion 5.

[0030] The present invention solves the problems found in the known art and attains the proposed aims.

[0031] First of all, the helmet 1 according to the present invention allows an excellent protection of the braincase of babies 1a from possible impacts against angular bodies, as well as from potential dangerous situations such as strangulations and/or suffocations due to unexpected holding of the helmet 1 during accidental falls of the toddling babies 1a.

[0032] In particular, the adaptability of the helmet 1 according to the present invention to any type of cranium 1b allows the same to conform to the head of the baby, by protecting the more delicate parts without however omitting other parts which anyway need a proper covering. In fact, the possibility of carry out a regulation of the ear/ear coronal arch, by intervening directly on the third hooking means 10c, allows from one side to conform the structure 2 of the helmet 1 in the operating condition, and from the other side to avoid forced deformations thereof in order to adapt itself to the cranium 1b of the baby 1a.

[0033] It should also be noted that the predisposition of a hooking means 10d, such as for example Velcro™ between the free end 9b of the lacing element 9 and the basic portion 4, or anyhow the structure 2 of the helmet 1, allows the release of the lacing element 9 when the helmet 1 is hold by an angular body. In other words, the hooking means 10d defines on the lacing elements 9 a structural zone with a limited strength, which jerkily sink, by the action of the stresses during the holding of the helmet 1 in the event of an accidental fall of the baby 1a. The compliance of the lacing element 9 allows to avoid dangerous situations of accidental suffocation and/or strangulation, by imparting to the helmet 1 high protective properties. Additionally, the presence of the protection portion 4c defining a double-layer zone 4d of the structure allows to increase the protective power of the helmet 1 in correspondence with the forehead of the

cranium 1b of the baby 1, by defending this zone from possible impacts with solid bodies.

5 Claims

1. Babies safety helmet having a substantially flexible structure (2) between a non operating condition, wherein it presents a substantially plane development (3), and an operating condition, wherein it presents a curved development (3) suitable for the ovoidal shape of a cranium (1b) of a baby (1a), said structure (2) including:

at least a basic portion (4) associable to a cranial circumference (1c) of a baby (1a);
a first upper portion (5) transversely associated with said basic portion (4) and associable in correspondence with a forehead/nape arch (1d) of the cranium (1b) of the baby (1a) ;
a second upper portion (6) associable in correspondence with an ear/ear arch (1e) of the cranium (1b) of the baby (1a) and developing transversely, in said operating condition, with respect to said first upper portion (5);
fixing means (7) for holding said structure (2) of said helmet (1) in the operating condition,

characterized in that said second upper portion (6) is movably associable to said basic portion (4) in a plurality of operating positions, for varying the length of said ear/ear arch (1e).

2. Helmet according to claim 1, **characterized in that** said second upper portion (6) is movably associable to said basic portion (4) in correspondence with at least one free end (6a) thereof or both its ends.
3. Helmet according to claims 1 or 2, **characterized in that** said first and second upper portions (5, 6) are fixed to each other.
4. Helmet according to claims 1 or 2, **characterized in that** said first and second upper portions (5, 6) are movable one with regard to each other.
5. Helmet according to claim 4, **characterized in that** it further comprises guide means (7) operably interposed between said first and second upper portions (5, 6) for ensuring their relative movement according to transverse directions.
6. Helmet according to claim 5, **characterized in that** said guide means (7) are associated with said first upper portion (5) for guiding said second upper portion (6) along a transverse direction with respect to the development of said first upper portion (5), or they are associated to said second upper portion

(6) for guiding said first upper portion (5) along a transverse direction with respect to the development of the second upper portion (6).

7. Helmet according to claim 6, **characterized in that** said guide means (7) include at least a slide loop (8a) defined by at least a buttonhole (8) longitudinally obtained in said first upper portion (5), said second upper portion (6) running through said buttonhole (8) transversely to said first upper portion (5) in said operating condition, or conversely said guide means (7) are defined by at least a buttonhole (8) longitudinally obtained in said second upper portion (6), said first upper portion (5) running through said buttonhole (8) transversely to said second upper portion (6) in said operating condition.
8. Helmet according to any one of the preceding claims, **characterized in that** said first and/or said second upper portion (5, 6) are firmly engaged at said basic portion (4) transversely thereto.
9. Helmet according to any one of the preceding claims, **characterized in that** the structure (2) of said helmet (1) is carried out in a single piece.
10. Helmet according to any one of the preceding claims, **characterized in that** said basic portion (4) includes a superimposable and associable protection portion (4c) to said basic portion (4) for constituting a double-layer zone (4d) destined for covering the frontal bone of the baby (1a).
11. Helmet according to any one of the preceding claims, **characterized in that** it further includes a submandibular lacing element (9) for the engagement of said helmet (1) to the cranium (1b) of the baby (1a), said lacing element (9) having a fixed end (9a) integral with said basic portion (4) and a free end (9b) opposite to the fixed end (9a) and which can be movably engaged to the structure (2), for tensile yielding over a predetermined maximum safe load.
12. Helmet according to any one of the preceding claims, **characterized in that** said fixing means (10) include:

a first hooking means (10a) operably interposed between one of said ends (4b) of said basic portion (4) for keeping these latter engaged according to an overlapped configuration when said structure 2 is in the operating condition;

a second hooking means (10b) operably interposed between said free end (5a) of said first upper portion (5) and one of said ends (4b) of said basic portion (4) for keeping these latter

engaged according to an overlapped configuration when said structure (2) is in the operating condition; and

a third hooking means (10c) operably interposed between the free end (6a) of said second upper portion (6) and said basic portion (4) for holding these latter engaged according to an overlapped configuration when said structure is in the operating condition.

13. Helmet according to claim 12, **characterized in that** said fixing means (10) further include a fourth hooking means (10d) operably interposed between said free end (9b) of said lacing element (9) and said structure (2) of said helmet (1), for holding said structure (2) and said lacing element (9) joined according to an overlapped configuration.
14. Helmet according to claim 13, **characterized in that** said fixing means (10) include a fifth hooking means operably interposed between said basic portion (4) and said protection portion (4c) for keeping these latter engaged and overlapped.

Amended claims in accordance with Rule 86(2) EPC.

1. Babies safety helmet having a structure (2) including:

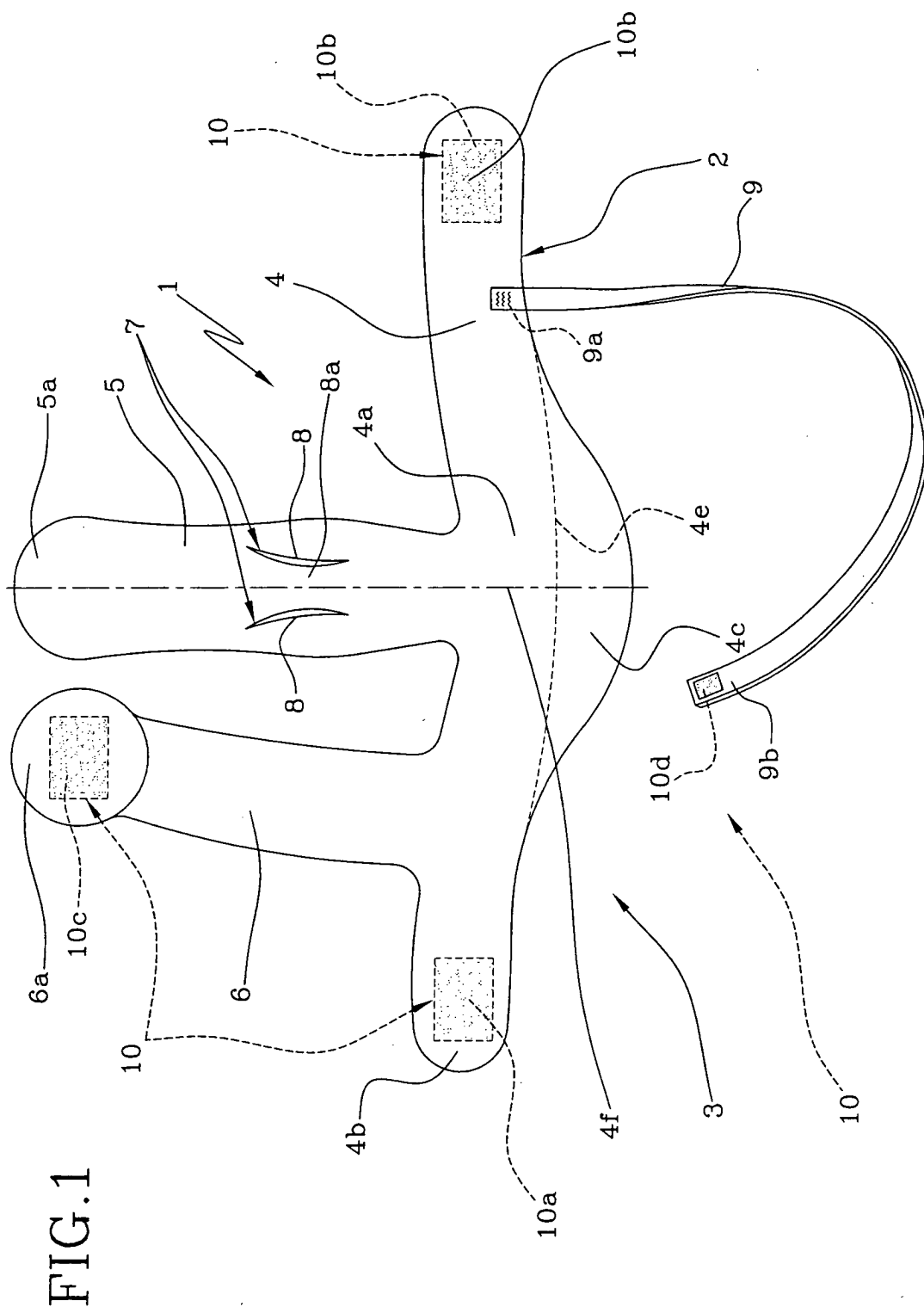
at least a basic portion (4) associable to a cranial circumference (1c) of a baby (1a);

a first upper portion (5) transversely associated with said basic portion (4) and associable in correspondence with a forehead/nape arch (1d) of the cranium (1b) of the baby (1a) ;

a second upper portion (6) associable in correspondence with an ear/ear arch (1e) of the cranium (1b) of the baby (1a) and developing transversely, in an operating condition, with respect to said first upper portion (5), said second upper portion (6) being movably associable to said basic portion (4) in a plurality of operating positions, for varying the length of said ear/ear arch (1e);

fixing means (7) for holding said structure (2) of said helmet (1) in the operating condition,

characterized in that said structure (2) is substantially flexible between a non operating condition, wherein it presents a substantially plane development (3), and said operating condition, wherein it presents a curved development (3) suitable for the ovoidal shape of a cranium (1b) of a baby (1a).



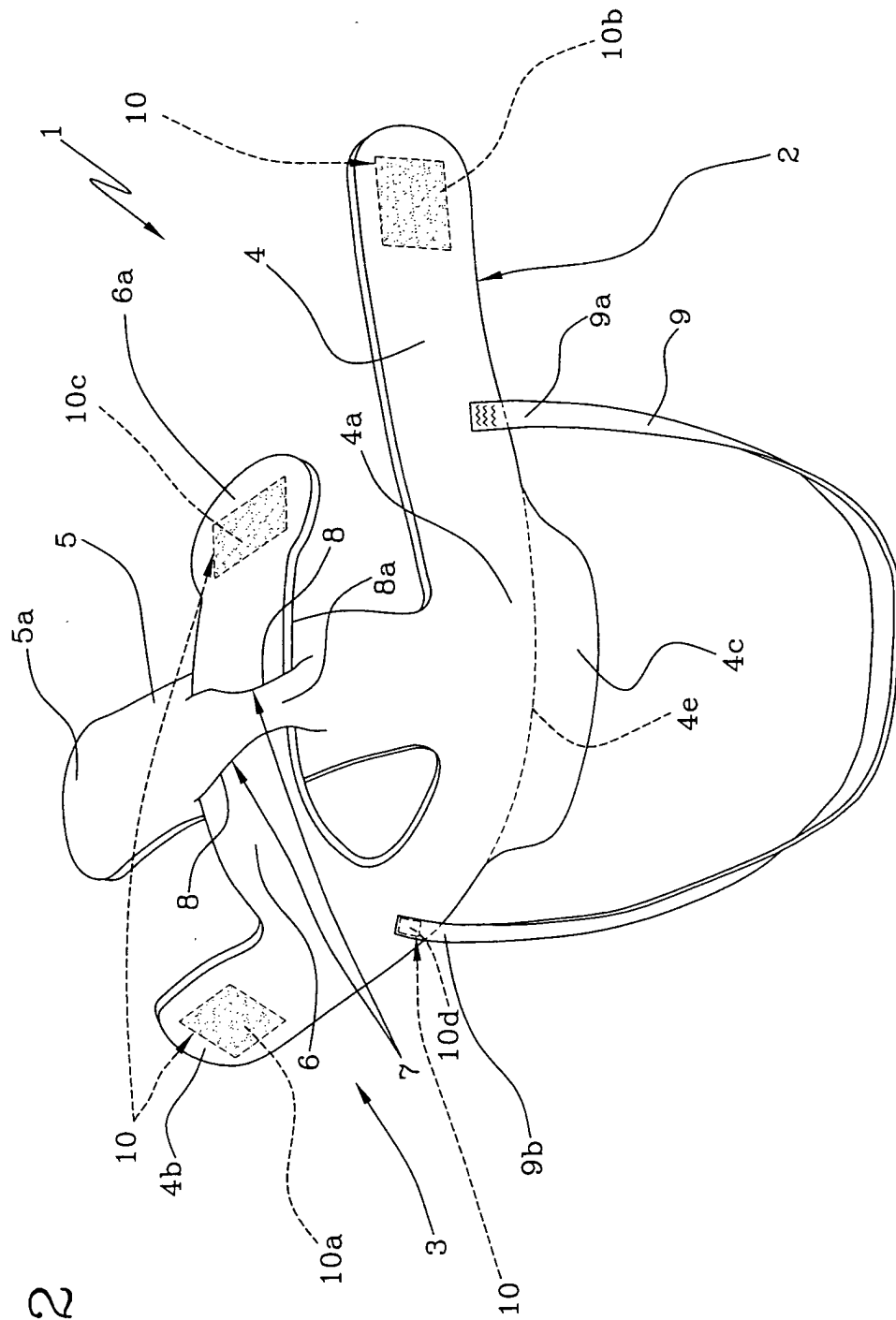


FIG. 2

FIG.3

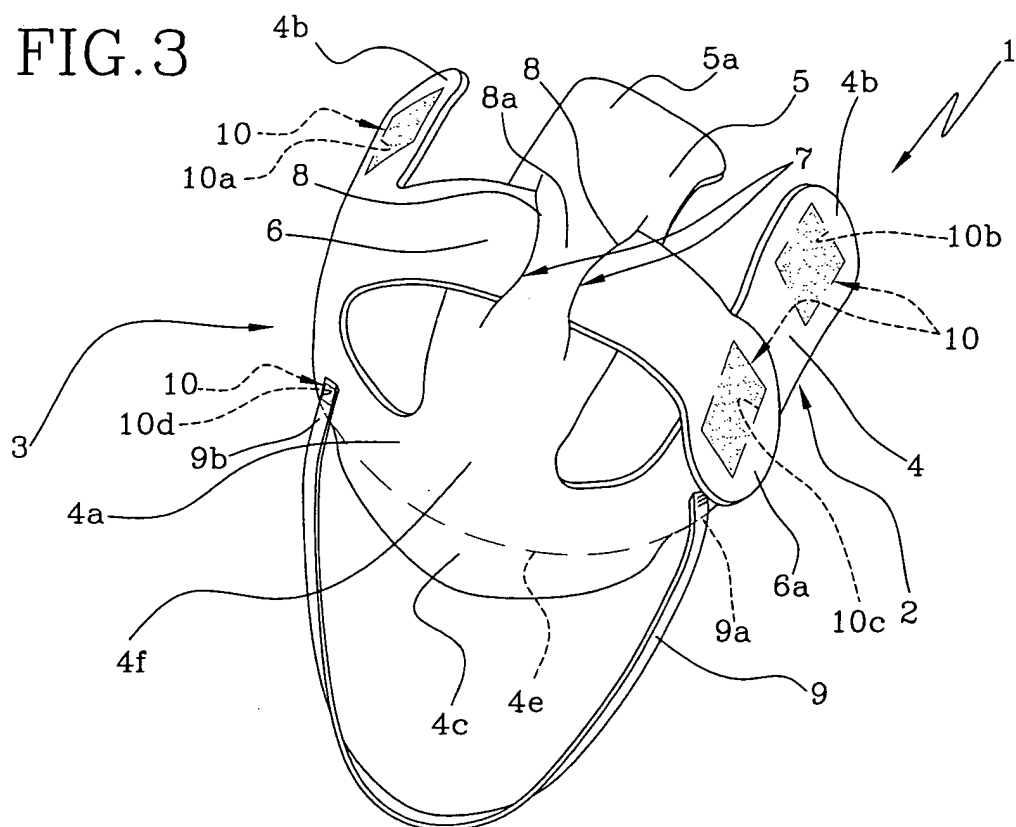


FIG.4

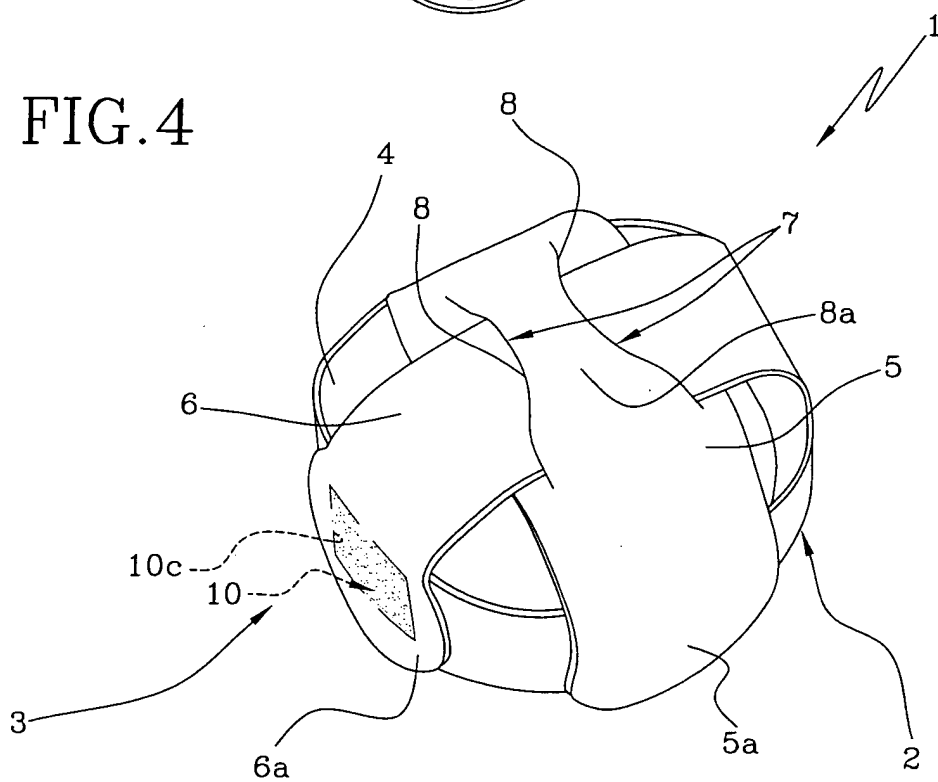
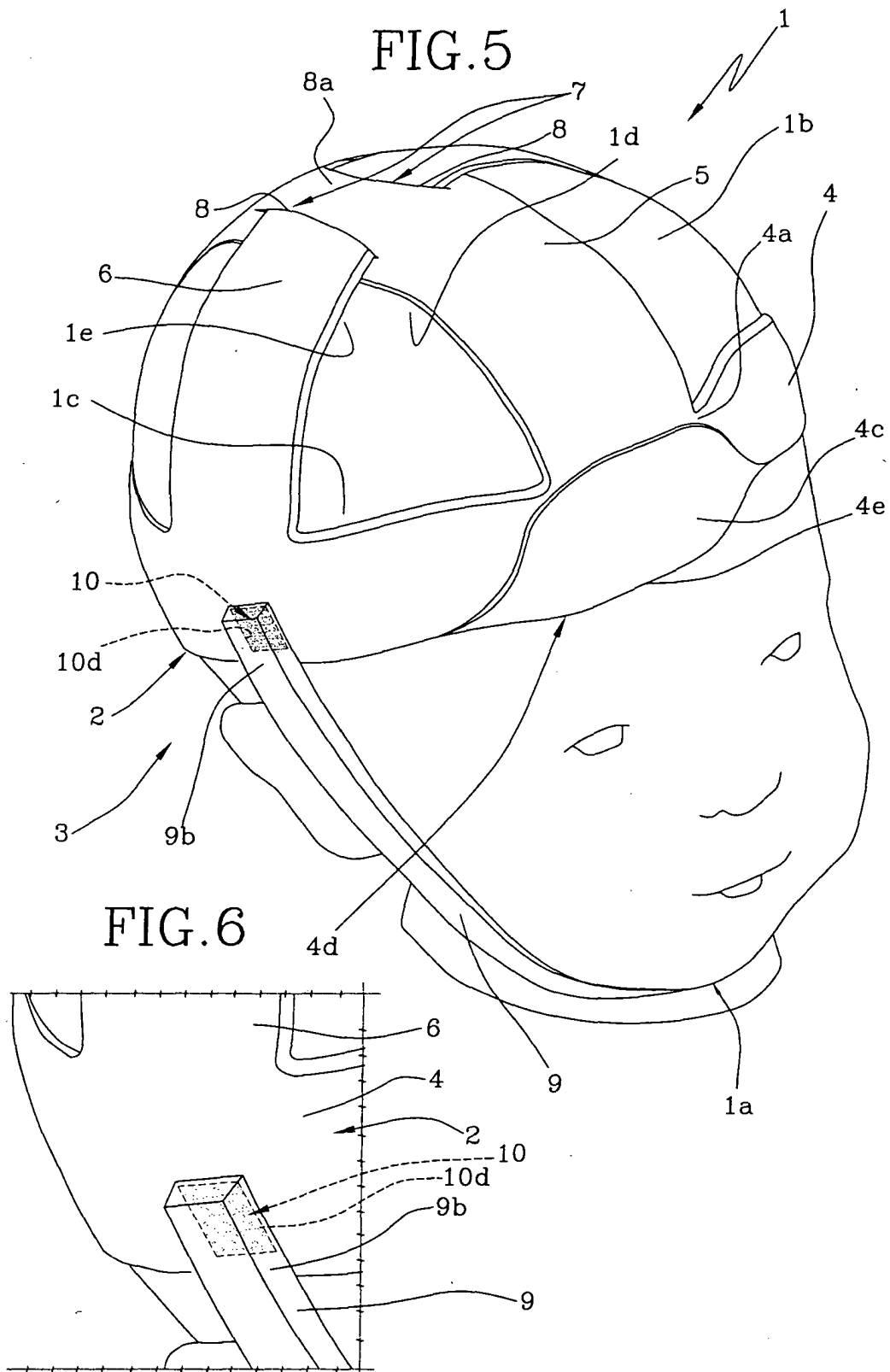
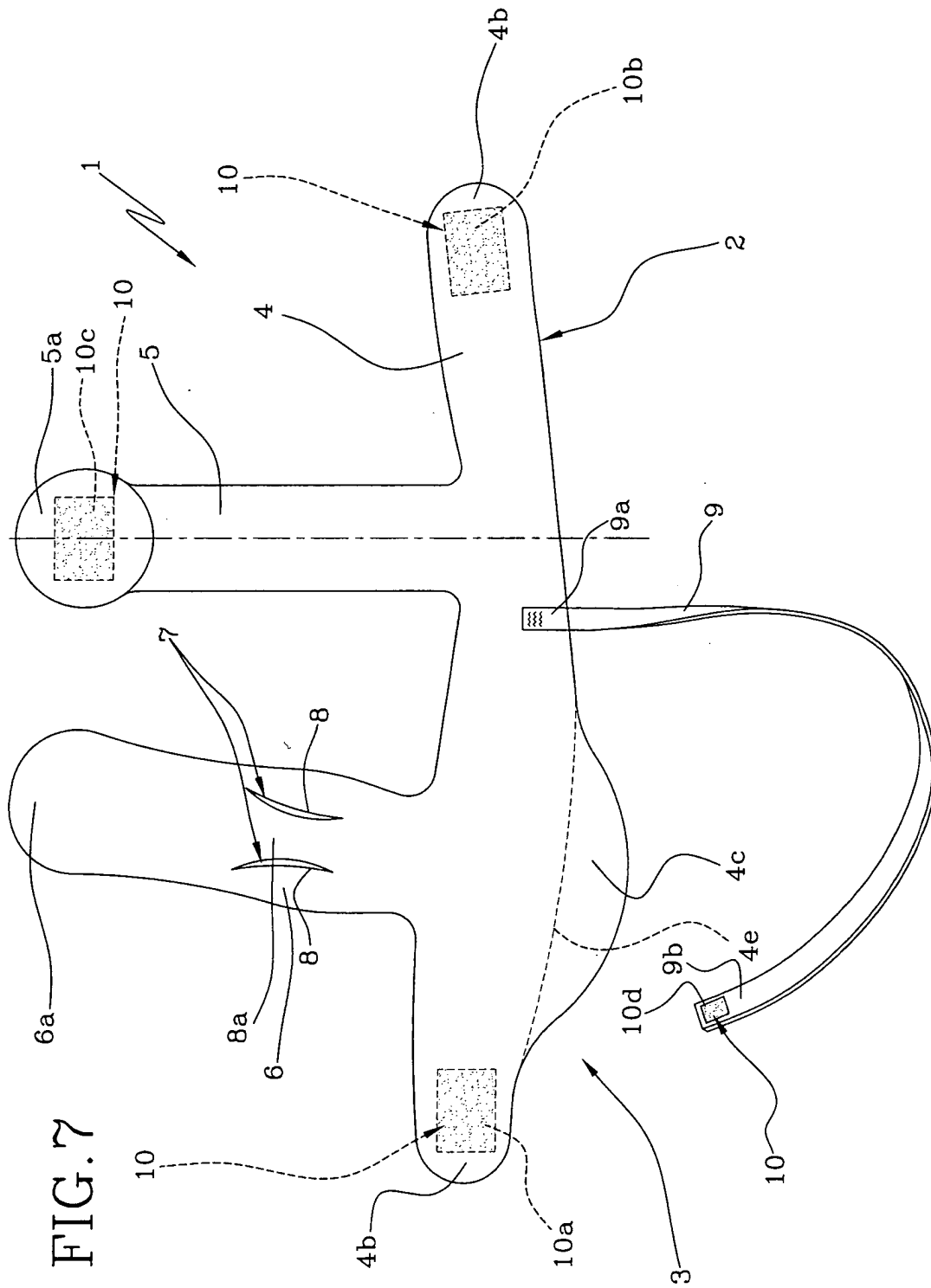
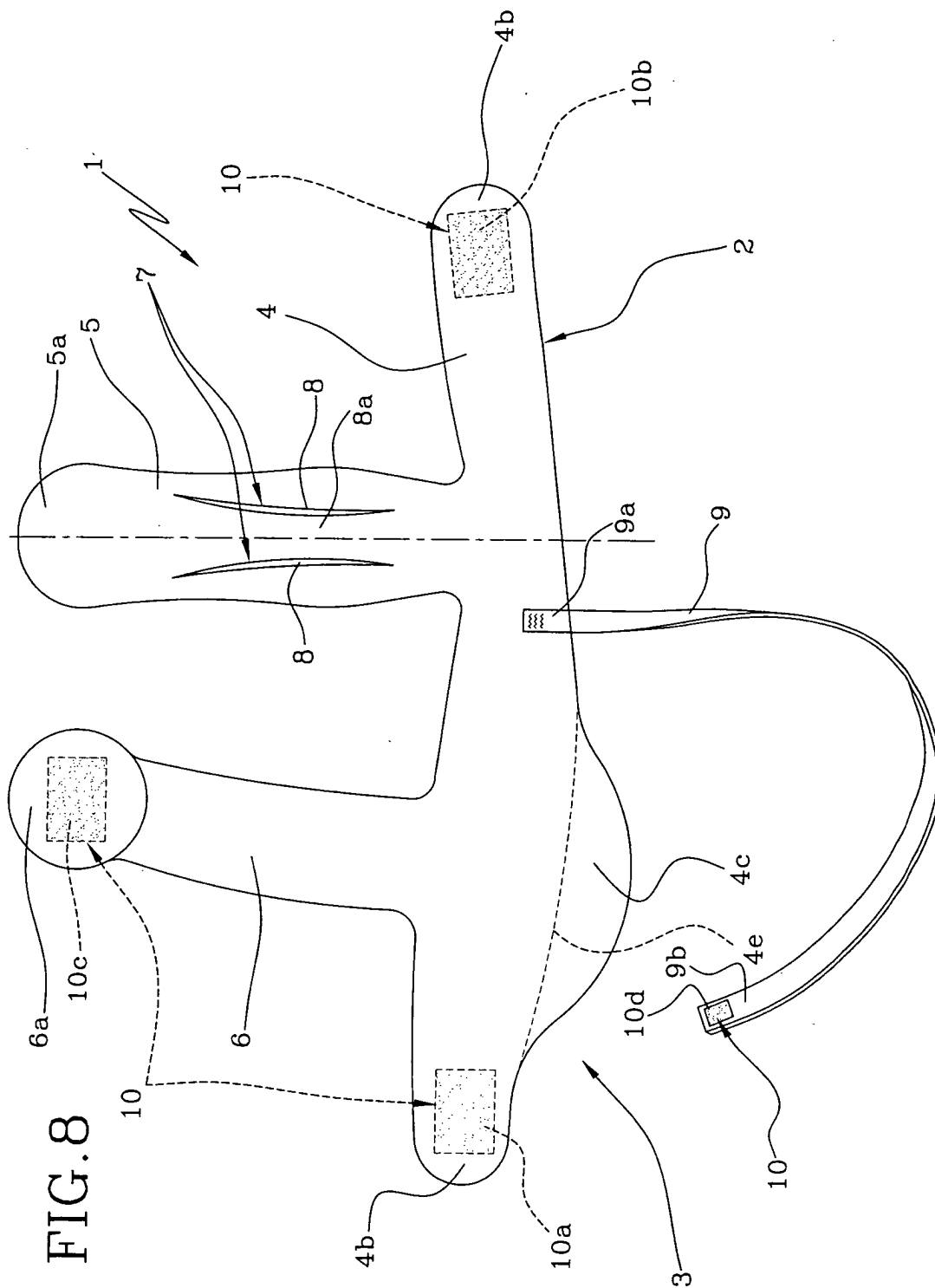


FIG.5









European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5367

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)
A	GB 350 142 A (ETHEL PEATE; JOHN PEATE) 11 June 1931 (1931-06-11) * claims 1,2,4; figure 2 *	1-3,8, 10,11,13	A42B3/00
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A42B A63B
Place of search		Date of completion of the search	Examiner
The Hague		18 October 2004	D'Souza, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 42 5367

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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18-10-2004

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