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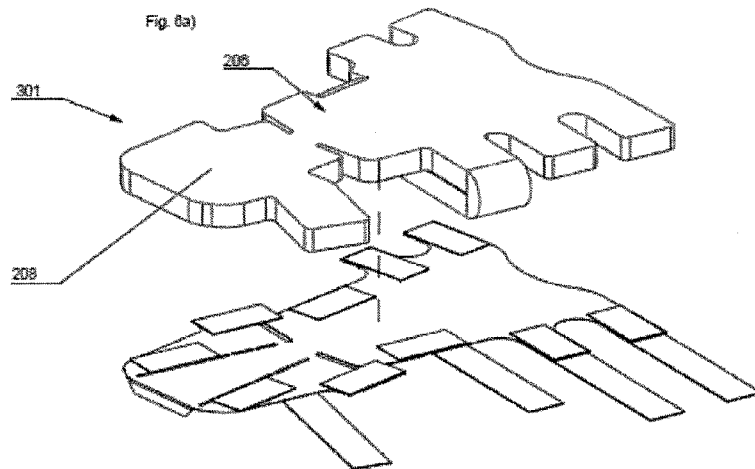
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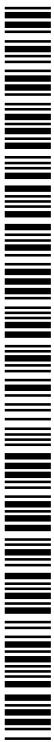
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(54) **Title:** SPLINT



(57) **Abstract:** A splint for supporting the bones on either side of a joint such as an ankle joint or elbow joint wherein said splint comprises a shell (2) and a liner (4) wherein the shell comprises a major body (3) and a minor body (33) wherein the major body (3) is joined to said minor body by an intermediate strip (55) and said major body has a substantially constant thickness t.



Splint

Field of the invention

- 5 The present invention relates to splints, especially splints intended to at least temporarily immobilise the bones on either side of an elbow or ankle joint or the like.

Background of the Invention

- 10 In the event of the fracture or dislocation of the bones in, or near to, an ankle or elbow joint it is necessary to hold the bones of the joint immobilised in order to prevent further injury and to allow the bones to heal correctly. Permanent casts made of plaster of Paris or the like are used to hold the bones in place once they have been correctly positioned but these are unsuitable for emergency treatment at an accident site or for temporary immobilisation of a
- 15 limb during treatment in a casualty department of a hospital where it may be necessary to inspect the injured area or X-ray it. Temporary splints for first aid use are known, for example from US2409195 which describes a splint made from pliant material scored to define various panels and flaps. Cuts can be made along the score lines in order to adapt the splint for use on different parts of the human body. A problem with this device is that it is difficult for the
- 20 unskilled user to determine which cuts should be made in order to adapt the device for a specific injury. A further problem is that because each of the multiplicity of unused score lines locally reduces the thickness of the pliant material then they each form a line of weakness which can reduce the stiffness of the splint and which can lead to it changing shape during use.

- 25 US4209011 describes a splint made from a flat piece of corrugated plastic material which is provided with longitudinal, parallel, scored fold lines which enable it to be folded to form an open quadratic cross-sectioned splint. A problem with this device is that it can only be folded easily along the score lines and thus is only suitable for splinting a limited size of limb.

- 30 Another problem with this device is that limbs rarely are of constant thickness and the use of parallel fold lines means that it is difficult to know in advance how much padding needs to be applied to fill the space between the limb being treated and the walls of the splint. This means that the padding has to be fitted by trial and error which is time-consuming and may lead to considerable patient discomfort.

Brief Description of the Invention

The present invention relates to a splint suitable for immobilising the bones on either side of an elbow or ankle joint. The splint comprises a shell and a liner. The splint has two parts
5 joined by a hinge as described in more detail below – a main body which is intended to immobilise the part of the limb above the joint, i.e. the upper arm or calf and a minor body which is intended to immobilise the part of the limb below the joint, i.e. the lower arm or foot. The shell is made of pliable material which lacks score lines in the major body and which is
10 of a thickness and stiffness which, while being pliable enough to be wrapped around a limb, is also rigid enough to provide adequate support to the limb. The shell is preferably in the form of a substantially flat piece of material, such as a polymer material, for example PET. Preferably the shell is made of a single piece of material. The liner may be releasably attachable to the shell or it may be permanently attached to the shell. Preferably it is in the
15 form of a comfort layer made of resilient material, such as expanded polymer foam which can grip the limb while avoiding exerting high point loads on the limb. The shell is in the form of an elongated main body provided with laterally projecting fastening tabs on one or more of its long sides which main body is pliant enough to surround a limb on one side of a joint, for example an upper arm or calf; and a second elongated part projecting from a short side of the main body, which minor body is provided with at least one laterally projecting tab, the
20 connection between the main body and the minor body being pliant enough so that it can act as a hinge so that the minor body can be bent out of the plane of the main body in order to surround a limb on the other side of the joint, for example a foot or lower arm. The main body of the shell has no score lines which it can be folded along – instead due to its inherent pliability it can be bent around the limb being treated.

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Brief Description of the Drawing

Figure 1a) shows a plan view of the interior surface of a splint 1 in accordance with an embodiment of the present invention, figure 1b) shows a lateral view of the splint and figure
30 1c) shows a plan view of the exterior surface of the splint.

Figure 2a) shows a plan view of the interior surface of a shell for a splint in accordance with an embodiment of the present invention and figure 2b) shows a lateral view of the shell.

Figure 3a) shows a perspective view of the interior of the splint of figure 1 and figure 3b) shows a perspective view of the exterior of the splint of figure 1.

Figure 4 a) shows a plan view of a shell according to a second embodiment of the invention and figure 4b) shows a lateral view of the shell.

Figures 5a) and 5b) show plan and lateral views of a liner in accordance with a second embodiment of the present invention. Figure 5c) shows a perspective view of the liner and figure 5d) shows a plan view corresponding to that of figure 5c).

Figure 6a) shows an exploded perspective view of a splint comprising shell and liner according to the second embodiment of the invention, figure 6b) shows a plan view of the interior surface of the splint, and figure 6c) shows a plan view of the exterior surface of the splint.

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Detailed Description of the Invention

As shown in figures 1a) to 3b), a first embodiment according to the present invention of a splint 1 comprises a shell 2 and a liner 4 attached to the inner surface 6 of the shell. Liner 4 can be attached to the shell by any suitable attaching means such by adhesive, by double-sided tape or mechanically. The attaching means may allow the liner to be removed, for example by being made of a hook and loop type fastener or non-setting adhesive, etc. or the attaching means may form a permanent attachment, for example by being made of a setting adhesive or non-releasable fittings such as rivets, bonding, laminating, etc. Shell 2 is formed from a pliable, shape-stable material. In this context the expression “shape-stable” means that the material can be bent or rolled by hand around a limb without being permanently deformed and which preferably is sufficiently elastic that it returns to its original shape when released. A suitable material for the shell is a polymer, preferably PET (polyethylene terephthalate), in the form of a substantially flat homogenous sheet with a constant thickness t of preferably 0.4 to 3 mm, more preferably 0.5 to 1.5 mm and most preferably 0.8 to 1.4 mm. Material in this range of thicknesses is sufficiently flexible to be rolled around a limb by hand but is sufficiently strong so that it does not stretch during this operation. The use of a homogenous sheet of material of constant thickness means that it can be bent evenly around a limb unlike scored material or material of varying thickness which bend along the score line or the interface between material of varying thickness and therefore may not fit the limb closely. Preferably the material has a tensile strength at yield of 40-60 MPa, elongation at break of greater than 30%, tensile modulus of elasticity of greater than 1.5 GPa (all measured using ISO 527), flexural strength of greater than 60 MPa (measured using ISP 178) and Charpy

notched impact strength of greater than 5 kJ/m² (measured using ISO 179). A suitable material is glycol-modified polyethylene terephthalate PET-G sheet.

Liner 4 is formed from a resilient, compressible foam material and is intended to provide comfortable support for a limb. The foam material must be sufficiently compressible so that it can be compressed to conform to the shape of a limb that it is in contact with without exerting an uncomfortable force on the limb, while at the same time being hard enough to prevent itself from being squashed flat under load which would lead to it undesirably directly transmitting transient forces from the shell to the limb. Examples of suitable foam materials are: high resilience foam, polyether foam and visco-elastic foam (which self-adjusts to the body's individual contours to reduce pressure on sensitive areas of the body). Preferably the foam has an indentation load deflection according to ISO 2439 B greater or equal to 80 N and less than or equal to 200 N. In order to improve patient comfort, the surface of the liner which is intended to face towards the patient and which may come into contact with bare skin is preferably provided with a comfort-enhancing means such as a surface treatment or coating which is suitable for skin contact and reduces the likelihood of patient discomfort or irritation. For example, such a coating could be a textile such as velour laminated to the foam material or a loop material glued to the foam material or another woven or non-woven textile, or a coating such as a silicone elastomer or other elastomer or a polymer. In one embodiment of the invention the liner is provided on one major surface with areas of loop material which form part of the attaching means which allow it to be attached to the shell while the opposite surface is provided with a textile comfort-enhancing means. In another embodiment of the invention the liner is provided on one major surface with areas of loop material which form part of the attaching means which allow it to be attached to the shell while the opposite surface is provided with an elastomer or polymer comfort-enhancing means.

Preferably liner 4 has a thickness T which is between 5 mm and 45 mm, more preferably between 10 and 40 mm and most preferably between 20 mm and 35 mm. In most cases it is preferable that the thickness T is substantially constant over the shell. The use of a constant thickness of liner material means that when the splint is bent around a limb it will tend to form a trough with a rounded cross-section which conforms well to the shape of the limb. However, as described below, it is also possible to provide extra liner material in predefined positions in order to provide extra support in areas where a limb has a narrow cross-section, for example just above the ankle or just above the wrist.

Figure 2a) shows a plan view of the inner surface 6 of the shell 2 according to the embodiment of the invention shown in figures 1a) to 1c) and figure 2b) shows a lateral view of the shell. Shell 2 comprises an elongated main body 3 joined by an intermediate strip 55 to a minor body 33. Main body 3 has a proximal end 5 and a distal end 7. These proximal and distal ends are separated by a first longitudinally-extending long side 9 and a second longitudinally-extending long side 11. The proximal end 13 of the first long side and the proximal end 15 of the second long side are separated by a transversely-extending proximal short side 17. The distal end 19 of the first long side and the distal end 21 of the second long side are separated by a transversely-extending distal short side 23.

10 The minor body 33 has a proximal end 35 and a distal end 37. The proximal and distal ends are separated by a first longitudinally-extending long side 39 and a second longitudinally-extending long side 41. The proximal end 43 of said first long side and the proximal end 45 of second long side are separated by a transversely-extending proximal short side 47. The distal end 49 of said first long side and the distal end 51 of second long side are separated by a

15 transversely-extending distal short side 53.

The transverse distal short side 23 of the main body 3 is connected to the transverse proximal short side 47 of the minor body by the intermediate strip 55 which has a width W_1 which is less than the width W_2 of the distal short side 23 of the main body 3 and also less than the

20 width W_3 of the proximal short side 47 of the minor body. Preferably W_1 is between 4 and 10 cm, W_2 is between 10 and 25 cm and W_3 is between 15 and 35 cm. Preferably the width W_4 of the proximal short side of main body 3 is greater than W_2 and is between 15 and 40 cm in order to accommodate the part of a limb held at the proximal end of the major body which usually would have a larger circumference than the part of the limb held in the distal end of

25 the major body. Preferably intermediate strip 55 is centralised on the longitudinal axis of the shell. Preferably intermediate strip 55 extends between 0.8 and 3 cm in the longitudinal direction, more preferably between 1.0 and 2.5 cm in the longitudinal direction and even more preferably between 1.1 and 1.5 cm in the longitudinal direction. As the intermediate strip has a width which is less than that of the short sides of the main body and minor body that it is

30 joined to, it acts as a hinge and makes it easier for a user to bend the minor body up out of the plane of the major body. This is necessary when, for example, the major body is used around the upper arm (or calf) or a patient and the minor body is used around the lower arm (or foot) of the patient. The intermediate strip then acts as a hinge between the major and minor bodies

and is intended to be positioned on the outside of the joint, for example, at, or near to, the point of the elbow (or heel).

5 Preferably the main body, minor body and intermediate strip are integrally formed from a single piece of material. This can be achieved by cutting or stamping or the like the shell from a sheet of material. This ensures that there are no joining seams which would harm a patient or collect contaminants and that the material properties of the shell are constant which makes it easier for the user of the splint to anticipate what forces are needed to be applied to bend the splint around a limb. Preferably the material is a sheet of polymer, especially transparent
10 polymer which may facilitate the detection of leaking body fluids inside the splint. Preferably the polymer is PET. The use of a sheet of polymer provides a smooth surface which is not only easy to clean but which also can be written on, for example by a doctor who wishes to write down patient notes or instructions.

15 In order to allow the splint to be maintained in place during X-ray examination of the splinted limb it is preferable that the materials used in the splint are X-ray transparent.

In order to allow the splint to be retained around a limb the main body of the shell is provided with fastening means which during use can hold the long sides of the main body in proximity
20 with each other. The minor body is similarly provided with releasable fastening means which during use can hold the long sides of the minor body in proximity with each other. Preferably, as illustrated in figs. 1a) and 1c), the fastening means comprises a plurality, preferably three, of pairs of opposed tabs (first pair tabs T1A, T1B; second pair of tabs T2A, T2B; third pair of tabs T3A, T3B) projecting laterally from the long side of the major body, which opposed tabs
25 can be brought into locking engagement with each other. Each tab may be integrally formed with the respective long side of the major body and provided with fastening means, or they may be in the form of straps or pieces of material attached to the long side of the major body – either directly or as extensions to tabs projecting from the long side – as can be seen in figure 3a) and figure 3b). The minor body is provided with at least one set of fastening means,
30 such as an area on a laterally extending tab t1B formed by a laterally-extending portion 57 of the liner and an opposed co-operating area t1A on the exterior surface of the minor body. In a preferred embodiment of the invention one of each pair of tabs, or one of each tab and its opposed cooperating area, is provided on its outer surface with an area of hook material (H1; H2; H3; h1) and the other tab or opposed area of the pair is provided on its inner surface with

an area of cooperating loop material (L1; L2; L3; 11). The tabs or opposed areas may be attached directly to the major body or minor body or the tabs may be attached to the liner. During use the major body and the minor body can be bent round a limb and the opposed tabs overlapped and fastened to each other, the hooks and loops or other fastening means cooperating to form a firm but also releasable join.

In order to retain the bent-up minor body in the desired angled relationship with the major body, releasable angle-maintaining fastening means are provided on suitable portions of the distal end of major body 3 and the proximal end of minor body 33. For example, if during use portions of the minor body overlap portions of the major body on the outside then, as shown in figures 1a) and 1c), at least part of the overlapped exterior surface of the major body is provided with hook (or loop) material (E1A, E1B) and at least part of the overlapping interior surface of the minor body is provided with cooperating loop (or hook) material (i1A; i1B), or vice versa.

When the major body and minor body lack score lines or other predetermined lines of weakness then when they are rolled around a limb they will naturally be inclined to form a trough with a rounded cross-sectional profile which corresponds well to the shape of an upper or lower arm or calf. This reduces the risk of areas of high pressure occurring on the limb inside the trough. However when a splint in accordance with the present invention is to be used on a foot, which has a less rounded underside than a lower arm, then the minor body 33 (which is intended to be fitted around the foot) may be provided with longitudinally extending lines of weakness such as the lines of perforations 59A, 59B shown in fig. 2a) in order to give distinct fold lines which will allow the centre portion of the minor body to have a squarer cross-section than would otherwise be possible. These perforated lines preferably extend from, or from the vicinity of, the outer edges of the intermediate strip 55 to the distal end 37 of the minor body. These perforated lines are preferably arranged symmetrically about the longitudinal axis of the minor body and preferably are arranged at an angle between 5° and 15° to the longitudinal axis so that they are closer together at the intermediate strip (corresponding to the intended position of the relatively narrow heel of a patient) than at the distal end of the minor body (corresponding to the intended proximity of the relatively broader toes of a patient). As an alternative, lines of perforations in the minor body can be replaced by score lines or a combination of score line(s) and perforated line(s) may be used.

In order to allow close conformity of the splint to the joint being splinted, major body 3 may be provided with longitudinally extending slits 61A, 61B which slits preferably extend from, or from the vicinity of, the outer edges of the intermediate strip 55 towards the proximal end of major body. These slits preferably should extend only a distance which the same as or less than $0.5 \times (W3 - W1)$. In order to prevent the slits tearing during use they can each finish in a respective stress-relieving round hole 63, 65.

As can be seen in figure 3b), except in the vicinity of the tabs, liner 4 preferably extends outside the area bounded by the long and short sides of major body 3 by at least 5 mm in order to provide patient comfort by ensuring that the relatively stiff major body 3 cannot come into direct contact with the limb being splinted.

Figure 4a) shows a plan view of the inner surface 106 of the shell 102 according to a second embodiment of the invention and figure 4b) shows a lateral view of the shell. This embodiment of a shell is similar in construction and material to the above-described shell except for any differences mentioned below. Shell 102 comprises an elongated main body 103 joined by an intermediate strip 155 to a minor body 133. The minor body 133 has a proximal end 135 and a distal end 137. The distal end 137 has a transversely-extending distal short side 153. Short side 153 is provided with a projecting stiffening surface 175 which extends longitudinally for a distance which is preferably between 0.5 cm and 1.5 cm and which extends transversely for a distance which is from 5 cm to 15 cm for a splint intended to support an ankle joint, and 3 cm to 12 cm for a splint intended to support an elbow joint. Preferably the two intersections of the periphery of the projecting surface with the short side 153 are each provided with a notch 177. During use stiffening surface 175 can be bent along a line connecting the two notches to an angle which is 90° or more out of the plane of the minor body in order to impart increased rigidity to the distal end of the minor body. Such a stiffening surface can be applied to any embodiment of a shell according to the present invention, including that shown in figures 1a) to 3b).

In this embodiment of the present invention, as is visible in figure 4c), the fastening means used to fasten the splint around the limb include two pairs of abbreviated laterally projecting tabs on the shell tabs a1A a1B, a2A, a2B to which flexible tab extensions TE1A, TE1B, TE2A, TE2B can be attached and additionally a pair of flexible tabs T3A and T3B which are attached directly to the shell without any intermediate laterally projecting tabs. The minor

body is provided with at least one set of fastening means, such as an area on a laterally extending tab t1B and an opposed co-operating area t1A on the exterior surface of the minor body. Such fastening means used to fasten the splint around the limb can be applied to any embodiment of a shell according to the present invention and can replace those described in connection with the embodiment of the invention described in figures 1a) to 3c).

In order to retain the bent-up minor body in the desired angled relationship with the major body, releasable angle-maintaining fastening means are provided on suitable portions of the distal end of the major body and the proximal end of the minor body. For example, if during use portions of the minor body overlap portions of the major body on the outside then, as shown in figures 4a) and 4c), at least part of the overlapped exterior surface of the major body is provided with hook (or loop) material (E1A, E1B) and at least part of the overlapping interior surface of the minor body is provided with cooperating loop (or hook) material (i1A; i1B), or vice versa. Flexible tabs and flexible tab extensions can be made of flexible material provided with mutually cooperating fastening material, for example straps provided with, or made of, suitably arranged loop and hook material, or straps provided with holes and buckles or the like.

Figures 5a) and 5b) show plan and lateral views of a foam liner 204 of thickness T in accordance with a second embodiment of the present invention. Liner 204 is preferably made of the same materials as described above for the first embodiment of a liner and preferably for ease of manufacture has a constant thickness T. Figure 5c) shows a perspective view of the liner with two folded tabs (described below) and figure 5d) shows a plan view corresponding to that of figure 5c). Liner 204 is intended to cover the inner surface 106 of the shell 102 (shown in figures 4a) and 4b)) which is intended to face the limb being immobilised and has a shape which corresponds mainly to that of the shell but which has some differences are described below. Furthermore liner 204 is wider and longer than shell 102 in order to ensure that during use the edges of relatively stiff shell 102 cannot come into direct contact with the limb being splinted. Preferably the patient-facing surface 206 of liner 204 is provided with a comfort-enhancing means such as a surface treatment or coating 208 which is suitable for skin contact and reduces the likelihood of patient discomfort or irritation.

When a splint is used on a lower leg to support an ankle joint, extra padding material is often needed in order to fill the space between the ankle, which is relatively thin compared to the

calf, and the splint. This can be achieved by providing loose extra padding material in the vicinity of the ankle. Alternatively, the extra padding material can be provided on the splint itself. Preferably it is formed in a single unit together with the liner. In the example of a liner shown in figures 5a) to 5d), extra padding material is provided in two positions, namely as
5 foam tab extension FT3A and FT3B, however it is conceivable to provide it at only one position. Using two opposing positions for the extra padding makes it easier to provide symmetrical padding of the limb. These are in the form of laterally projecting extensions on the main body of the liner each of which extends a distance which is at least 5 cm and less than 30 cm from side of the main body. Preferably the total extension of the two foam tab
10 extension FT3A and FT3B for an ankle joint splint is more than 20 cm and less than 40 cm. During use the foam tab extensions FT3A and FT3B can be folded back on themselves as shown in figures 5c) and 5d) to provide extra padding in the inside of the splint. If necessary, during use excess padding can be cut off the foam tab extension. Optionally the outer surface
15 210 of the liner, at least on the major surface of the foam tab extensions FT3A and FT3B which may be folded towards the patient, may be also be provided with a comfort-enhancing means such as a surface treatment or coating 208' which is suitable for skin contact and reduces the likelihood of patient discomfort or irritation.

Such extra padding may be provided in any embodiment of a splint according to the present
20 invention.

Figures 6a) to 6c) show a splint 301 formed by a shell 102 and liner 204 according to the second embodiment of the invention. Figure 6a) shows an exploded view of the splint, figure 6b) shows a plan view of the interior surface of the splint, and figure 6c) shows a plan view of
25 the exterior surface of the splint. In figure 6a) the foam tab extensions have been folded towards the shell so that in the case that the liner has been treated on only one side with comfort-enhancing material 208 then it is this material which contacts the patient.

While the invention has been illustrated by the use of hook and loop fasteners (which can be
30 of the type known as Velcro[®]) to join the opposite sides of the splint together, it is possible to use other types of fasteners. Preferably the fasteners are releasable and reusable, for example straps and buckles or clips, or tape, or safety pins and bandages. It is also possible to use single-use or fasteners such as adhesive tape.

A splint in accordance with the present invention can be used as follows:

The injured limb is placed on the flat splint with the base of the heel or the point of the elbow at the junction of the intermediate strip and the distal end of the main body. The long sides of the major body are folded up against the side of the calf or upper arm and the first and second
5 the major body are folded up against the side of the calf or upper arm and the first and second pairs of tabs are fastened around the limb. The minor body is folded up towards the foot or lower arm and retained against the major body at the desired angle by the angle maintaining fastening means. The third pair of tabs on the major body are then fastened into position over
10 the calf or upper arm before finally fastening the tabs on the minor body to each other around the foot or lower arm.

Naturally it is conceivable to fasten the tabs in a different order, for example to fasten all the tabs on the major body or on the minor body before fastening the other tabs and/or the angle
15 maintaining fastening means.

While the invention has been illustrated by examples of embodiments of splints, shells and liners, it will be understood by those skilled in the art that the invention is not limited by these
20 embodiments and various modifications can be made to the device while remaining within the scope of the claims.

Claims

1. A splint (1) for supporting the bones on either side of a joint such as an ankle joint or elbow joint wherein said splint comprises a shell (2) which comprises:
 - 5 an elongated main body (3) having a proximal end (5) and a distal short side (23); and, a minor body (33) having a proximal short side (47) and a distal end (37); characterised in that:
said distal short side (23) of the main body (3) is connected to the proximal short side (47) of the minor body by an intermediate strip (55) with a width W1 which is less than the width W2
10 of the distal short side (23) of the main body (3) and also less than the width W3 of the proximal short side (47) of the minor body; and,
said main body (3) is made of a piece of material that has a constant thickness (t) with no score lines.
- 15 2. Splint in accordance with claim 1 characterised in that said proximal and distal ends are separated by a first long side (9) and a second long side (11), the proximal end (13) of said first long side and the proximal end (15) of second long side being separated by a proximal short side (17), the distal end (19) of said first long side and the distal end (21) of second long side being separated by a distal short side (23) of width W2; and,
20 said minor body (33) has a proximal end (35) and a distal end (37), said proximal and distal ends being separated by a first long side (39) and a second long side (41), the proximal end (43) of said first long side and the proximal end (45) of said second long side being separated by a proximal short side (47) of width W3, the distal end (49) of said first long side and the distal end (51) of second long side being separated by a distal short side (53) wherein said
25 distal short side (23) of said main body is joined to the proximal short side (47) of the minor body by an intermediate strip (55) which has a width W1 which is less than width W2 and also less than width W3 .
3. Splint in accordance with claim 1 or claim 2 characterised in said shell (2) is made of
30 shape-stable pliable material.
4. Splint in accordance with any of the previous claims characterised in that said main body (3) is integrally formed with said minor body (33) and said intermediate strip (55).

5. Splint in accordance with any of the previous claims characterised in that the main body (3) is made of a sheet of polymer material.
6. Splint in accordance with the present invention characterised in that the splint is provided with releasable fastening means (i1A, E1B; i1B, E1A) for maintaining the major body (3) and minor body (33) at a desired angle to each other.
7. Splint in accordance with any of the previous claims characterised in that it comprises a liner (4) made of foamed material.
8. Splint in accordance with claim 7 characterised in that said foamed material has an indentation load deflection, according to ISO 2439 B, greater or equal to 80 N and less than or equal to 200 N.
9. Splint in accordance with any of claims 7-8 characterized in that at least one major surface of said foam is provided with a comfort-enhancing means such as a surface treatment or coating.
10. Splint in accordance with any of claims 7-9 characterized in that said liner is integrally-provided with extra padding material.
11. Splint in accordance with claim 10 characterized in that said extra padding material is in the form of at least one lateral foam tab extension (FT3A, FT3B).
13. Splint according to any of the previous claims wherein the distal end of said minor body is provided with a projecting stiffening surface.
14. Splint in accordance with any of the previous claims characterised in that said liner is releaseably attachable to said shell.

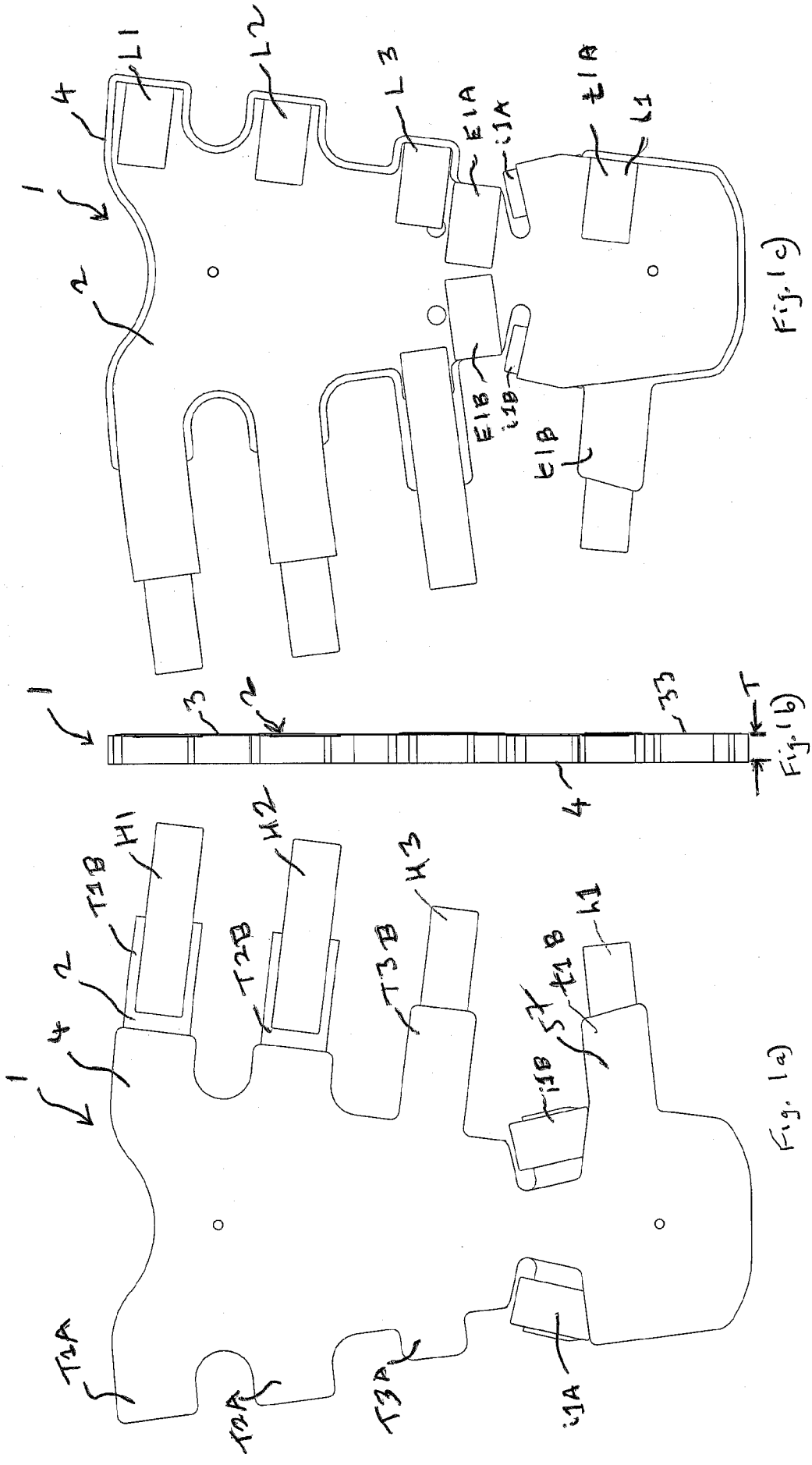
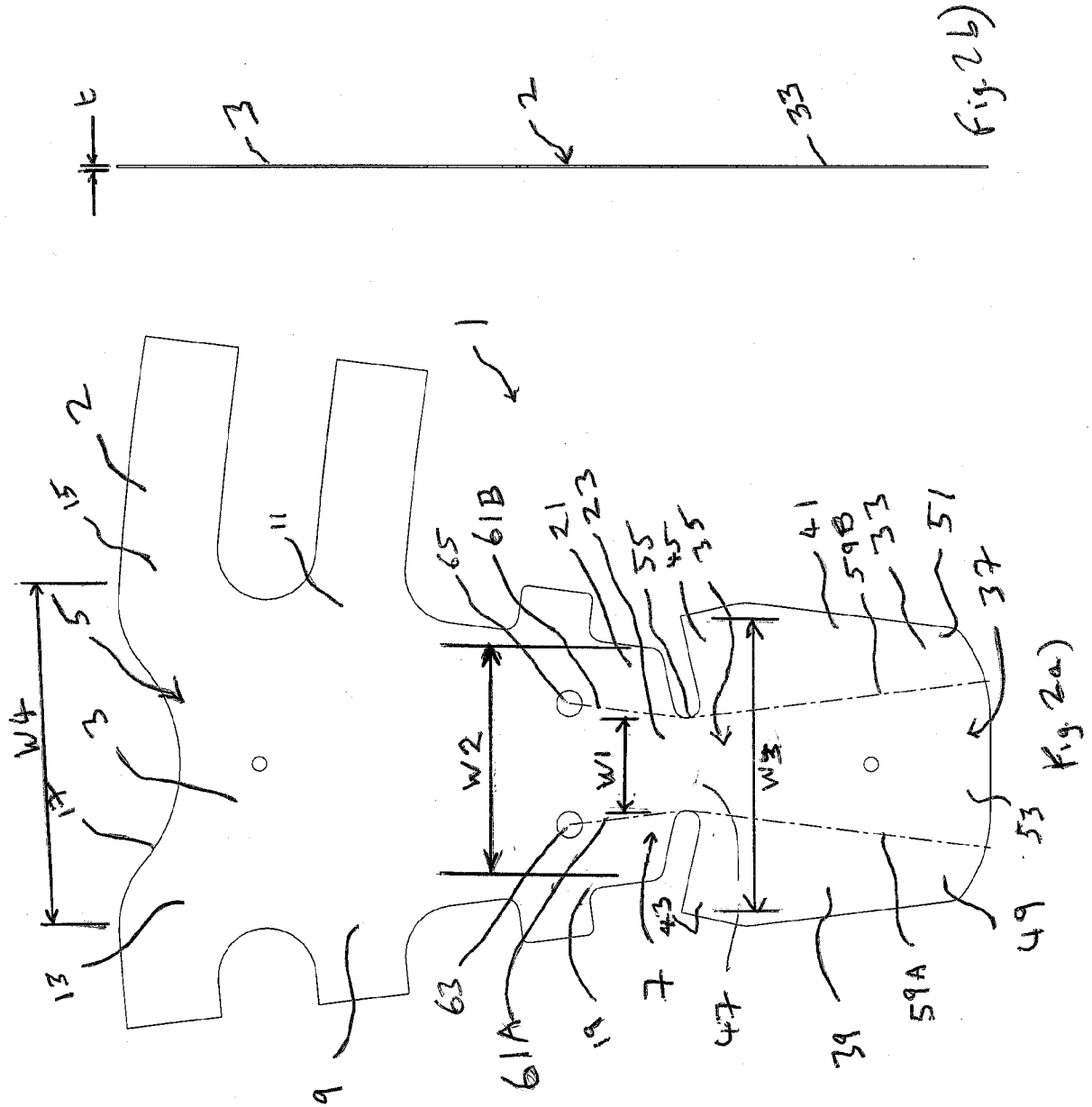


Fig. 1(c)

Fig. 1(b)

Fig. 1(a)



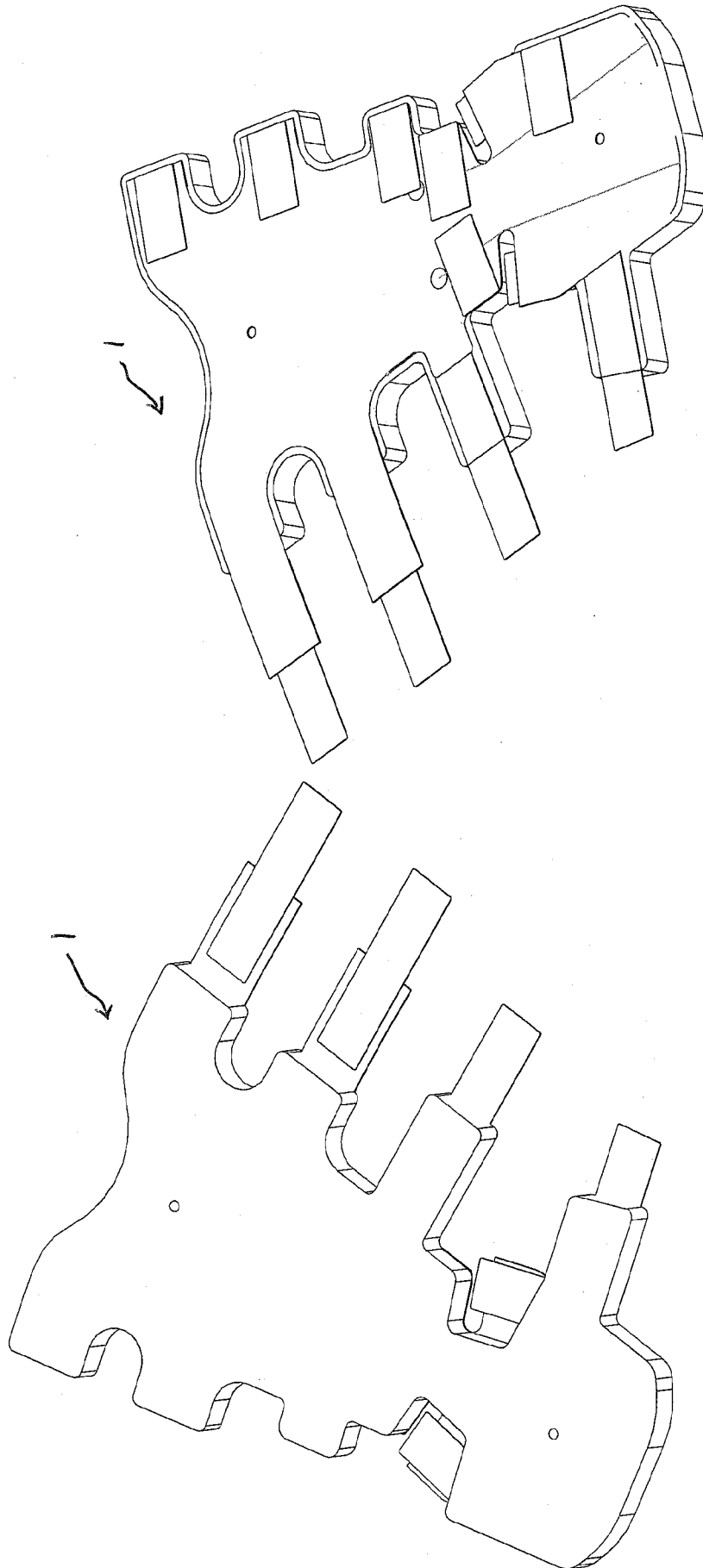
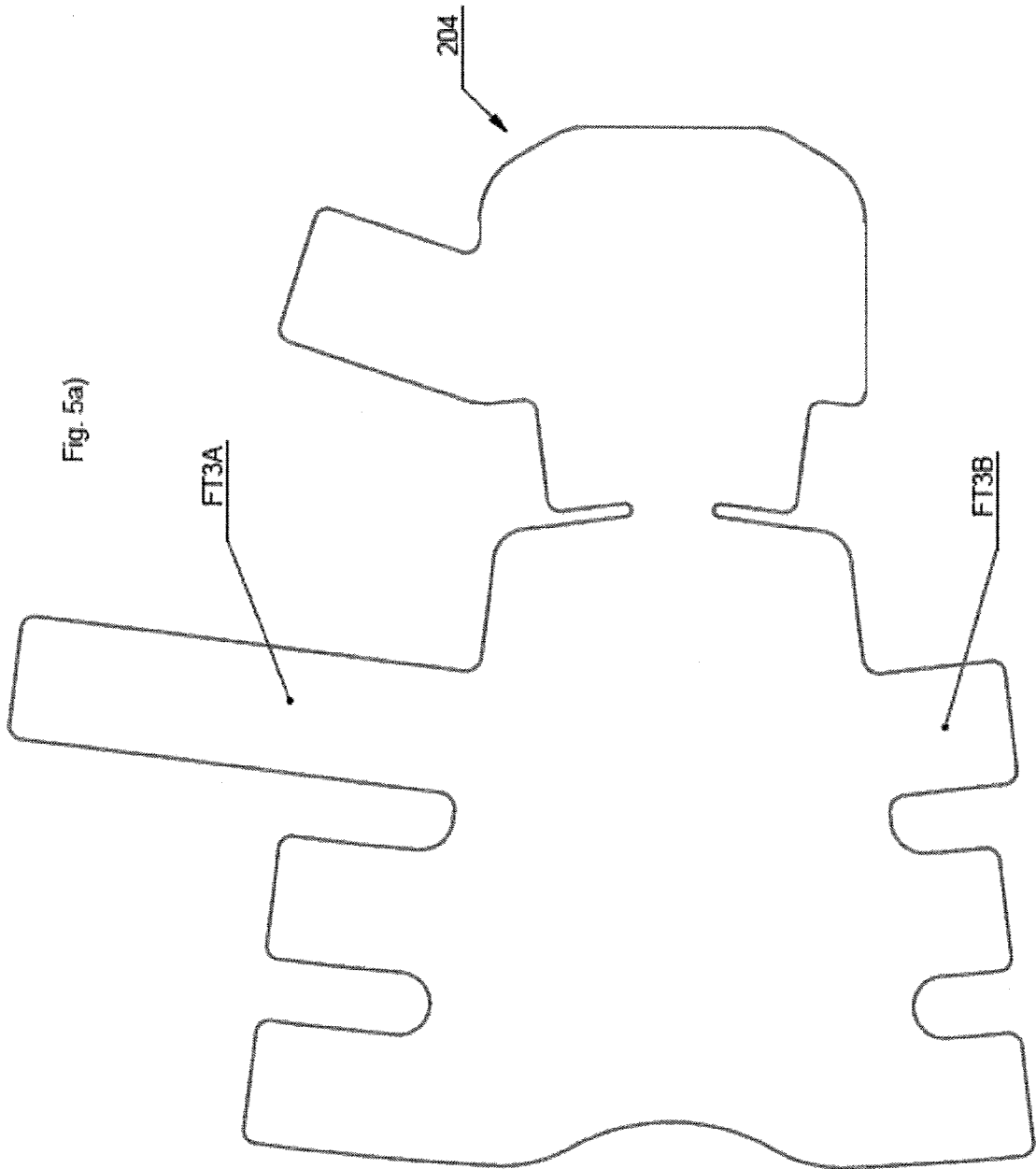
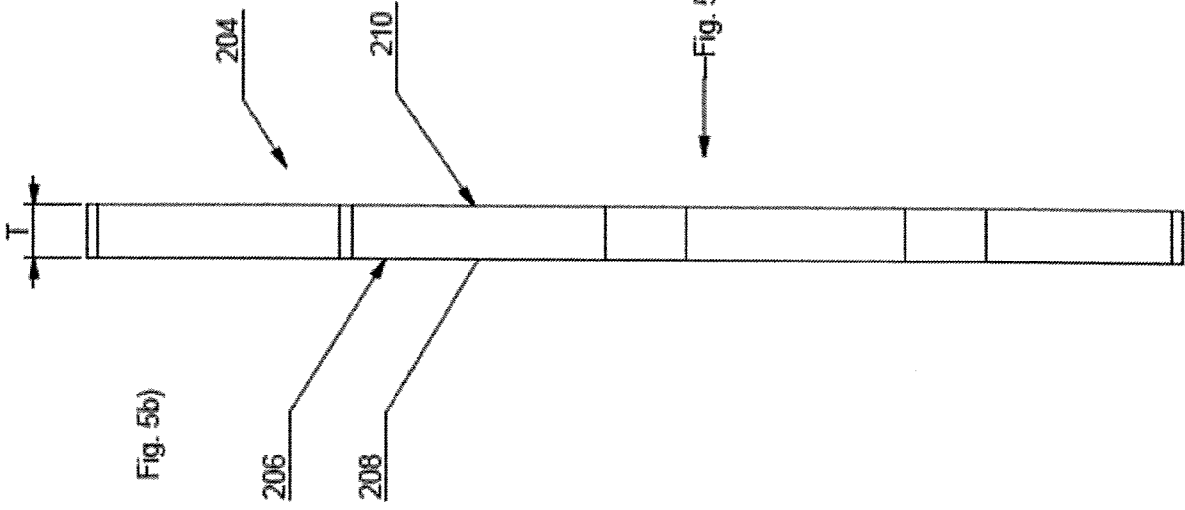
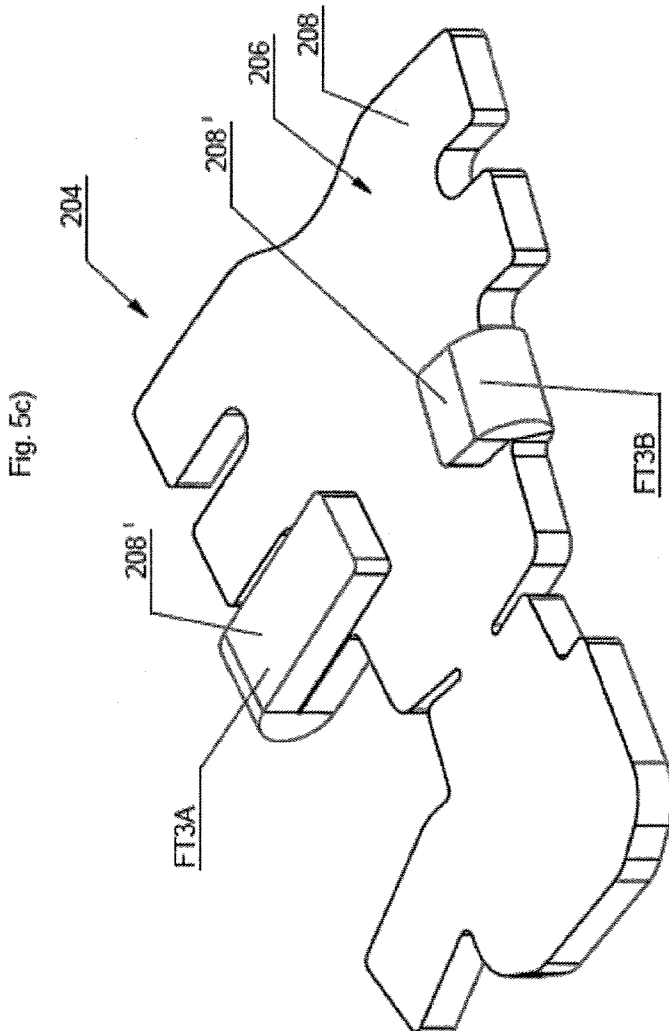
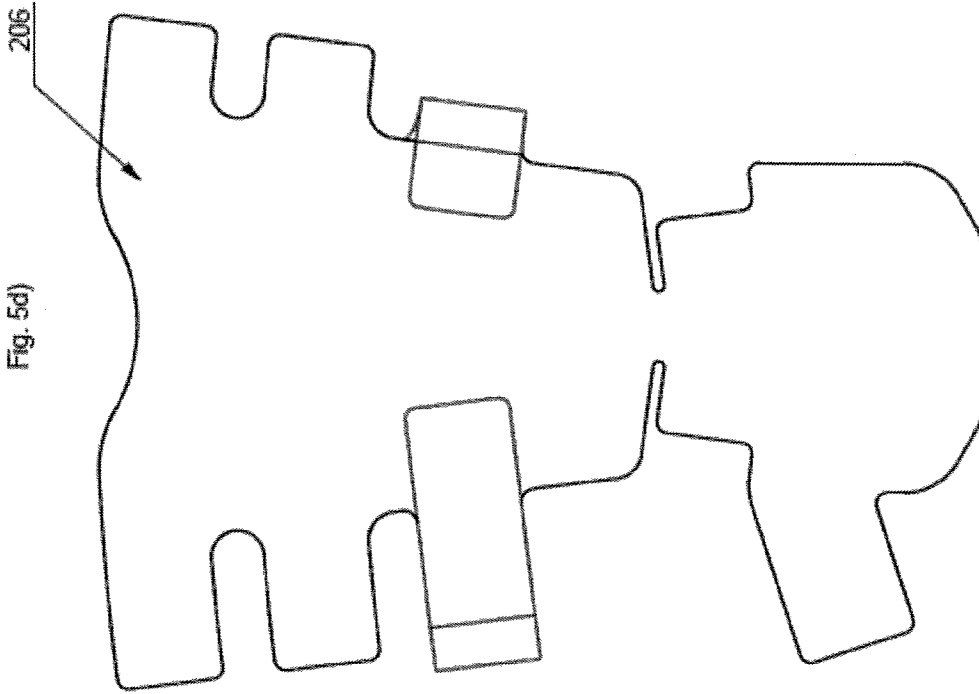
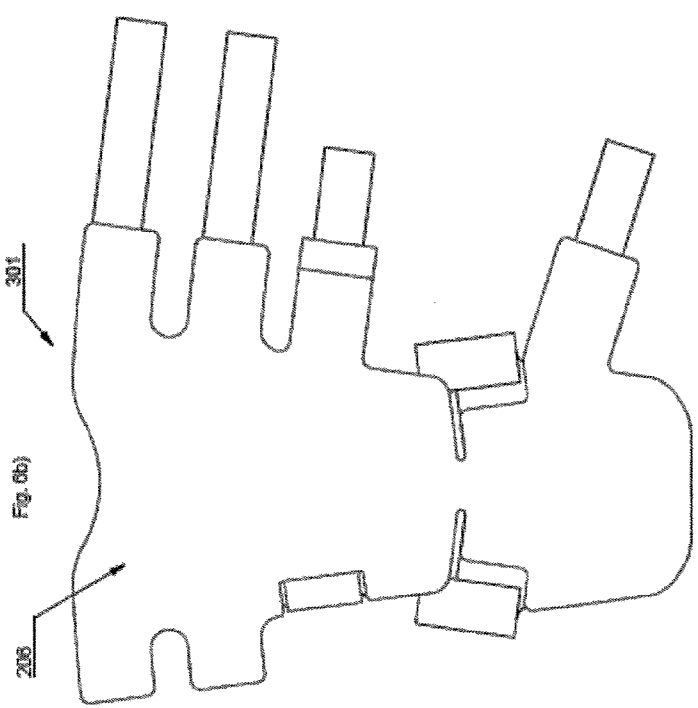
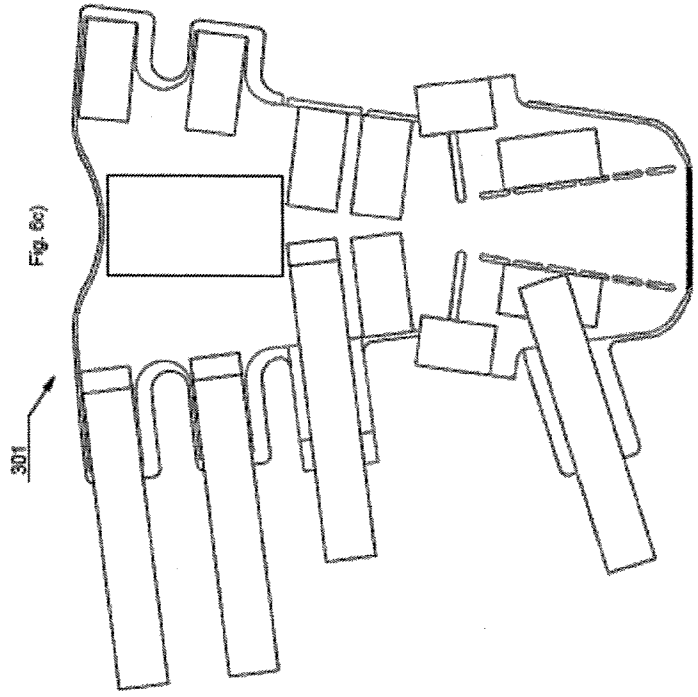
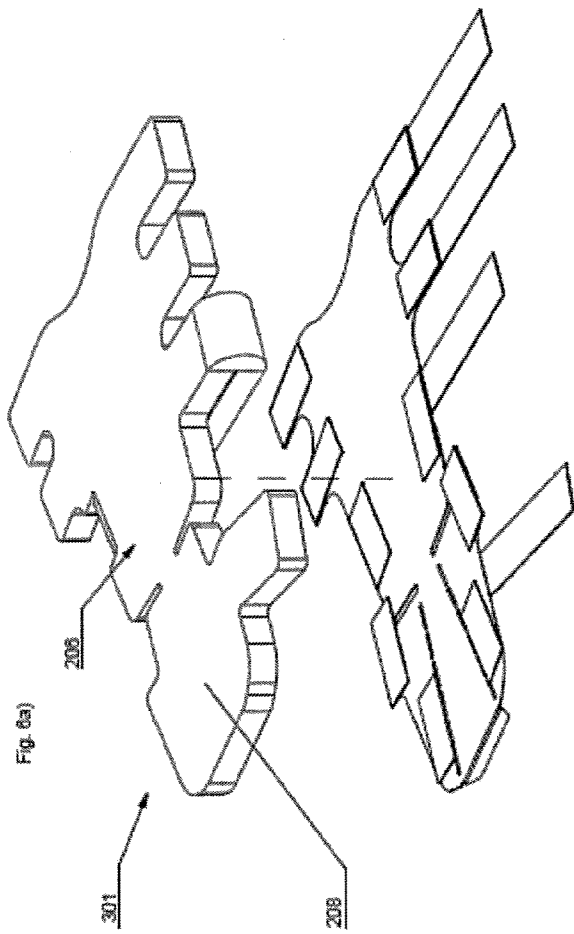


Fig. 3a)

Fig. 3b)







INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/050951

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F5/058 A61L15/14
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
A61F A61L
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/138597 A1 (VARN HAROLD T [US]) 15 July 2004 (2004-07-15) Figs. 1-8; [0019]-[0022]; claims 2 and 3 -----	1,2, 4-11,13, 14
X	WO 94/28830 A1 (ORTHOPEDIC TECHNOLOGY INC [US]) 22 December 1994 (1994-12-22) Figs. 1-3; page 2, lines 22-25; page 3, line 30 to page 4, line 10 -----	1-4, 7-11,13, 14
A	WO 2010/103186 A2 (ONBONE OY [FI]; PAERSSINEN ANTTI [FI]) 16 September 2010 (2010-09-16) Page 1, lines 7-11 ----- -/--	5

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search 5 April 2013	Date of mailing of the international search report 12/04/2013
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Foged, Søren

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/050951

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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International application No

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