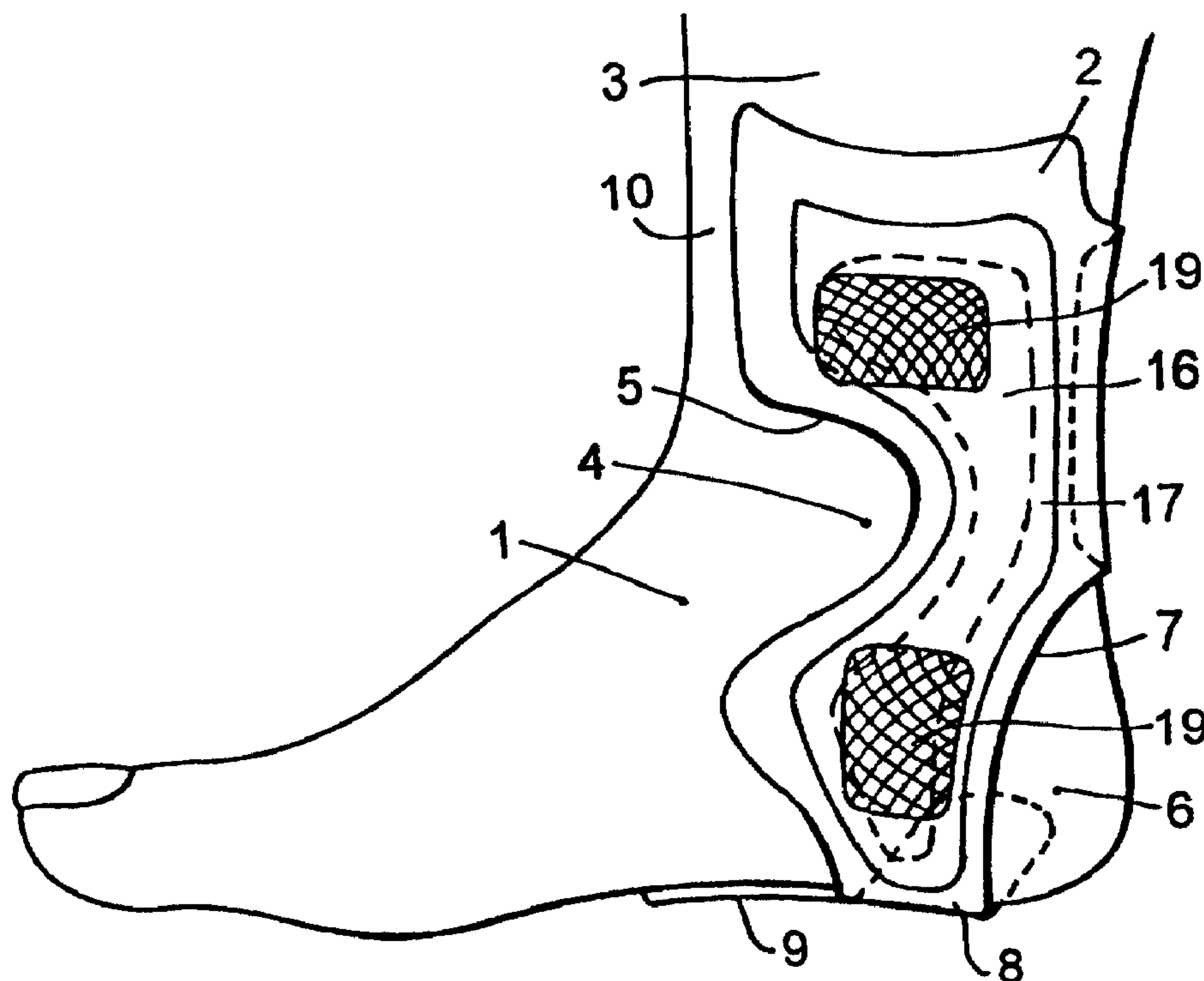




(86) Date de dépôt PCT/PCT Filing Date: 1998/01/05
(87) Date publication PCT/PCT Publication Date: 1998/07/09
(45) Date de délivrance/Issue Date: 2005/04/05
(85) Entrée phase nationale/National Entry: 1999/06/29
(86) N° demande PCT/PCT Application No.: NL 1998/000002
(87) N° publication PCT/PCT Publication No.: 1998/029060
(30) Priorité/Priority: 1997/01/05 (1004931) NL

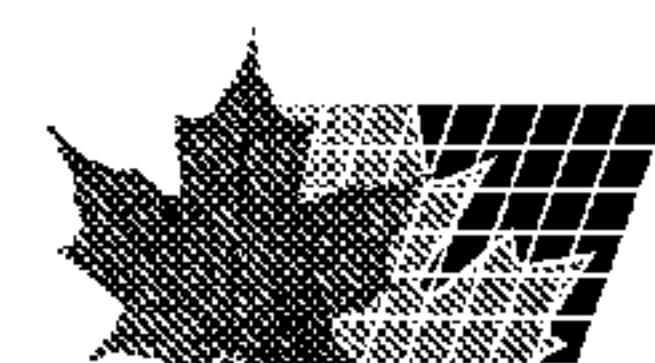
(51) Cl.Int.⁶/Int.Cl.⁶ A61F 5/01
(72) Inventeur/Inventor:
SCHRIJVER, FLOOR, NL
(73) Propriétaire/Owner:
NEA INTERNATIONAL B.V., NL
(74) Agent: MCFADDEN, FINCHAM

(54) Titre : SYSTÈME DE RENFORT DE LA CHEVILLE POUR USAGE INTENSIF MOYEN
(54) Title: MEDIUM HEAVY DUTY ANKLE BRACE



(57) **Abrégé/Abstract:**

The invention relates to a medium heavy duty ankle brace which comprises at least at the medial side (innerside of the foot) at least a flexible bracing element, which is anatomically adapted to the lower leg, the ankle and the foot shape, in which the bracing element shows a recess at the location of the medial ankle joint and has a substantially flat sole part below the foot. According to the invention the ankle brace is built up from different asymmetrical shell parts, a somewhat flexible medial part (2), with one or more different local stiffening elements, and a much more elastic lateral part (11) having possibly one or more different local stiffening elements.



**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A61F 5/01	A1	(11) International Publication Number: WO 98/29060 (43) International Publication Date: 9 July 1998 (09.07.98)
(21) International Application Number: PCT/NL98/00002 (22) International Filing Date: 5 January 1998 (05.01.98) (30) Priority Data: 1004931 5 January 1997 (05.01.97) NL (71) Applicant (for all designated States except US): NEA INTERNATIONAL B.V. [NL/NL]; P.O. Box 1568, NL-6201 BN Maastricht (NL). (72) Inventor; and (75) Inventor/Applicant (for US only): SCHRIJVER, Floor [NL/NL]; Oegondreef 5-7, NL-3565 BE Utrecht (NL). (74) Agent: VAN ASSEN, Jan, Willem, Bernard; P.O. Box 1029, NL-2240 BA Wassenaar (NL).		(81) Designated States: AU, BY, CA, CN, CZ, EE, IL, JP, KR, LT, LV, NO, PL, RO, RU, SI, TR, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <i>In English translation (filed in Dutch).</i>
(54) Title: MEDIUM HEAVY DUTY ANKLE BRACE (57) Abstract The invention relates to a medium heavy duty ankle brace which comprises at least at the medial side (innerside of the foot) at least a flexible bracing element, which is anatomically adapted to the lower leg, the ankle and the foot shape, in which the bracing element shows a recess at the location of the medial ankle joint and has a substantially flat sole part below the foot. According to the invention the ankle brace is built up from different asymmetrical shell parts, a somewhat flexible medial part (2), with one or more different local stiffening elements, and a much more elastic lateral part (11) having possibly one or more different local stiffening elements.		

PCT/NL98/00002

1

Medium heavy duty ankle brace

The invention relates to a medium heavy duty ankle brace, which comprises at least at the medial side at least a flexible support element that is

5 anatomically adapted to the lower leg, the ankle and the footshape, in which the bracing element shows a recess at the location adapted to leave the medial ankle joint uncovered and has a substantially flat sole part below the foot, such as known from EP 0 372 452.

In certain cases, such as when the foot has a natural tendency to sprain

10 inwards and/or during sports that give a heavy strain on the ankle, the stability and the protection against spraining inwards of the foot is insufficient. Thereby it is then possible, that the foot sprains inwards, by which so-called inversion traumas can occur in the ankle. These inversion traumas can only heal after an elaborate and long medical and/or physiotherapeutical

15 treatment.

Ankle braces can be divided into light duty, medium heavy duty and heavy duty ankle braces.

At light duty ankle braces, which frequently have the shape of a stocking that has been reinforced with balleens, the stabilisation effect to be

20 expected is practically nil.

Medium heavy duty ankle braces, which allow some freedom of movement to the ankle, are an intermediate shape between light duty and heavy duty ankle braces.

Heavy duty ankle braces, which are mostly provided with a stiff plastic

25 or metal frame, which indeed have a great stabilisation effect, have the objection of a too large limitation of movement because of the stiffness of the material, among others during sport and play. With these heavy duty and stiff ankle braces problems of irritation of the foot and lower leg frequently occur.

30 There is therefore the need of a medium duty ankle brace, which at the one hand gives enough stability, when the foot has the tendency of spraining

PCT/NL98/00002

2

inwards. Next to this sufficient stability it is at the other hand of importance, that most normal movements of the foot and leg can take place without irritation.

At the medium heavy duty ankle bracing according to EP 0 372 452
5 firstly the objection is present, that the stirrup shaped, somewhat flexible ankle brace gives insufficient freedom of movement to the lateral side. Secondly the fastening band cuts over the frontside of the uncovered forefoot, by which damages of the skin can occur.

Thirdly the substantially flat support part has a fixed width, by which no
10 setting for the adaptation of the several foot widths of several users is possible, so that the supplier must keep a larger number of several sizes in stock.

The object of the invention is removing these objections and providing an ankle brace with firstly such a stability, that when a foot has the natural
15 tendency of spraining inwards and also at heavy ankle strains, the danger of spraining inwards of the foot is removed. Secondly so much freedom of movement must remain, that most normal movements of foot and leg can take place without irritation.

Thirdly it should also be possible to adapt as much as possible to the
20 several foot widths of several users.

This object is reached according to the invention, in that the ankle brace is built up from two different asymmetrical shell parts, a substantially flexible medial part with one or more different, local stiffening elements and a lateral part being substantially more elastic than the medial part.

25 By the application of the invention the substantially flexible medial part gives the necessary differentiated brace to the ankle against spraining inwards, whereas the lateral part, which is substantially more elastic, at the one hand encounters an outward spraining and cooperates with the proper fixation of the ankle brace, but at the other hand allows sufficient freedom of
30 movement and thirdly gives a greater freedom to the adaptation to different foot sizes.

PCT/NL98/00002

3

According to a preferential embodiment of the invention the medial part is shaped as a shell, which extends from substantially the middle of the backside of the lower leg to the front side of the lower leg and leaves the front side of the lower leg free, whereas a heel recess extends from the level
5 of the inner ankle joint to the sole, but the sole part extends substantially below the complete heel and below at least a part of the middle foot.

According to another preferential embodiment the lateral part has the shape of a shell of elastic material, which is closely connected to the medial part below the heel and has a heel recess at the backside at the medial side
10 of the heel, whereas the front side is adapted the cover at least a part of the middle foot by means of a projecting rounded part.

The invention will now further be elucidated referring to the accompanying drawing of a preferential embodiment.

Figure 1 shows a side view on the medial side of an ankle brace
15 according to the invention, which is applied on a left lower leg and foot.

Figure 2 is a back view with cross section of an ankle brace on a right foot.

Figure 3 shows a side view on the lateral side of an ankle brace according to the invention shown in figure 1.

20 Figure 1 shows the ankle brace according to the invention, which comprises, at least at the medial side (innerside) of the foot, generally indicated with 1, with a somewhat stiff, but yet flexible medial part or shell 2, which is anatomically adapted to the lower leg 3, the ankle 4 and the foot shape. Going from above to below: this shell 2 extends with the upperpart
25 around the innerside of the left lower leg 3, shows a recess 5 in the middle part at the location of the ankle joint 4, and has a heel recess 7 at the lower part at the backside at the occasion of the heel (generally indicated with 6), and below the heel 6 a substantially flat sole part 8, that has a tongue 9 which extends in a forward direction below the forefoot.

30 Furthermore the medial part 2 extends from substantially the middle of the backside of the lower leg 3 until a short distance from the middle of the

PCT/NL98/00002

4

frontside of the lower leg 3 and leaves an open space 10 free at the frontside of the lower leg.

The ankle brace is built up from two different asymmetrical parts, the above somewhat flexible medial part 2 and a more elastic lateral part 11.

5 The lateral part 11 (outside of the foot) also has the shape of a shell which comprises an elastic material, such as plastic, and extends closely to the solepart 8 of the medial part 2 below the heel 6. The lateral shell 11 has, just as the medial shell 2, a heel recess 12, whereas the frontside covers at least a part of the forefoot with a projecting rounded part 15.

10 In certain cases the lateral part 11 can comprise at the outside of the elastic shell a more narrow and stiffer stiffening element 13. This stiffening element 13 extends from the upper end of the lower leg part 3 downwards along the heel recess 12 of the lateral shell 11, has a substantially round outer ankle recess 14 and is connected with the medial side 2 below the heel
15 6, viz. figure 2.

According to a preferential embodiment the medial part 2 is built up from:

- a) a lower layer of elastic material, which extends against the lower leg 3 and the foot; and
- 20 b) a more narrow and stiffer stiffening element 16, that extends downwards from the lower leg part between the ankle recess 5 and the heel recess 7 and ends above the sole 8;
- c) a broader cover layer 17 that is mounted over the stiffening element 16 and is more flexible than the stiffening element 16, but stiffer than the lower
25 layer 2.

According to another (not shown) embodiment the medial part 2 comprises a second more narrow and stiffer, substantially vertically extending stiffening element on the first stiffening element 16.

30 According to yet another embodiment the medial part 2 and possibly also the lateral part 11 comprise on the outer cover layer 17, 13 at several

PCT/NL98/00002

5

locations (not shown) adhering pieces for the tag of burring band, with which the ankle brace 2, 11 can be fixed around the ankle and lower foot.

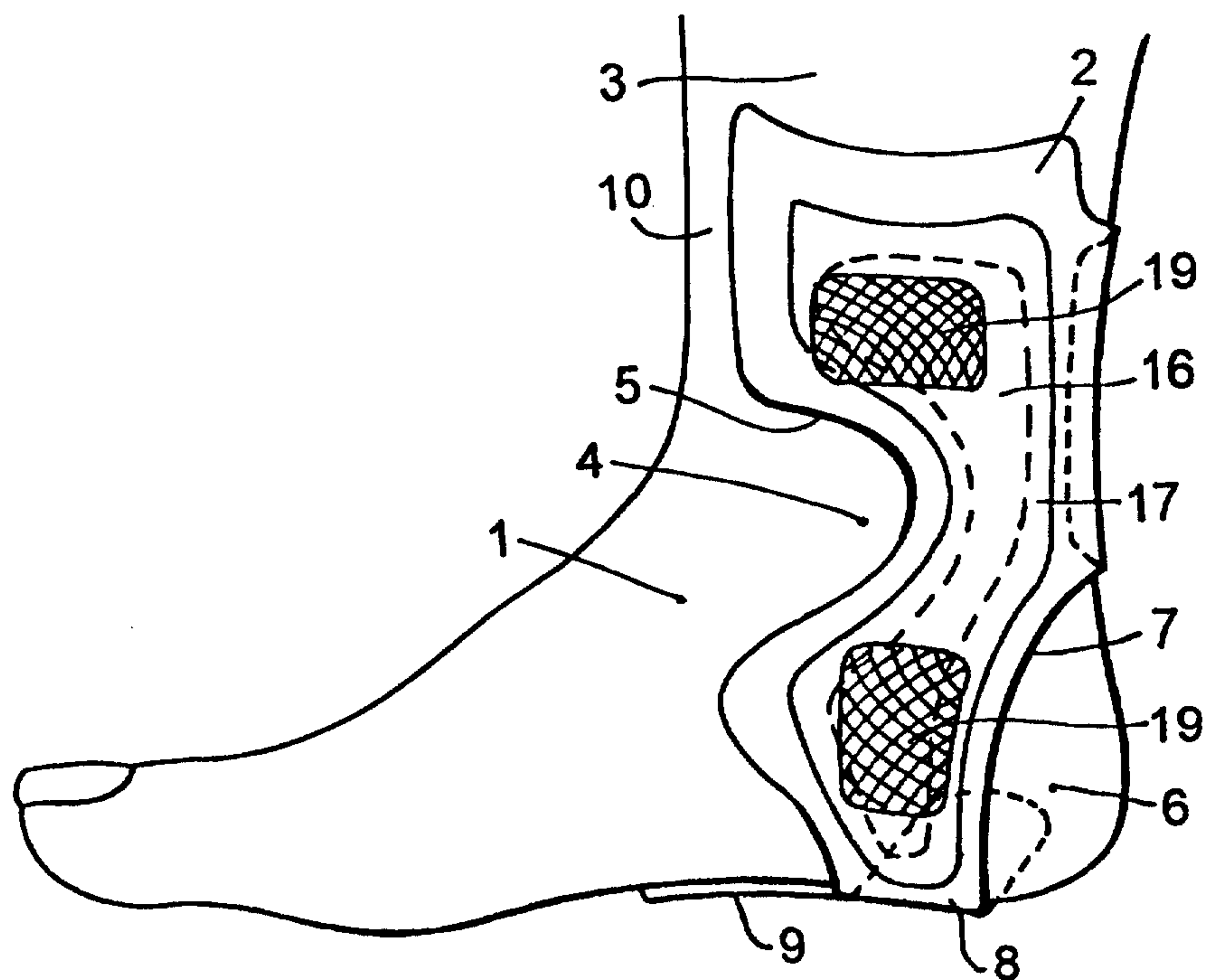
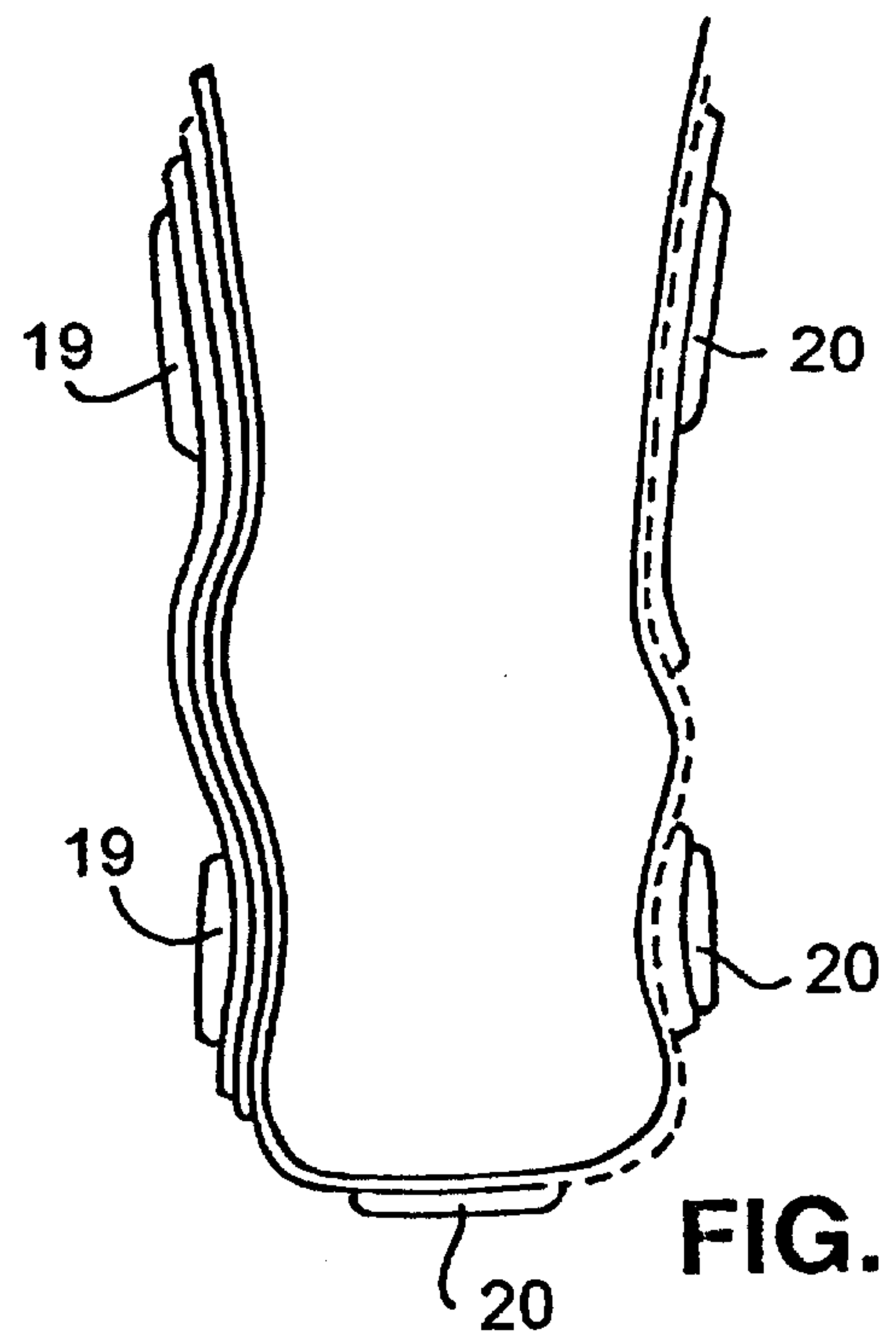
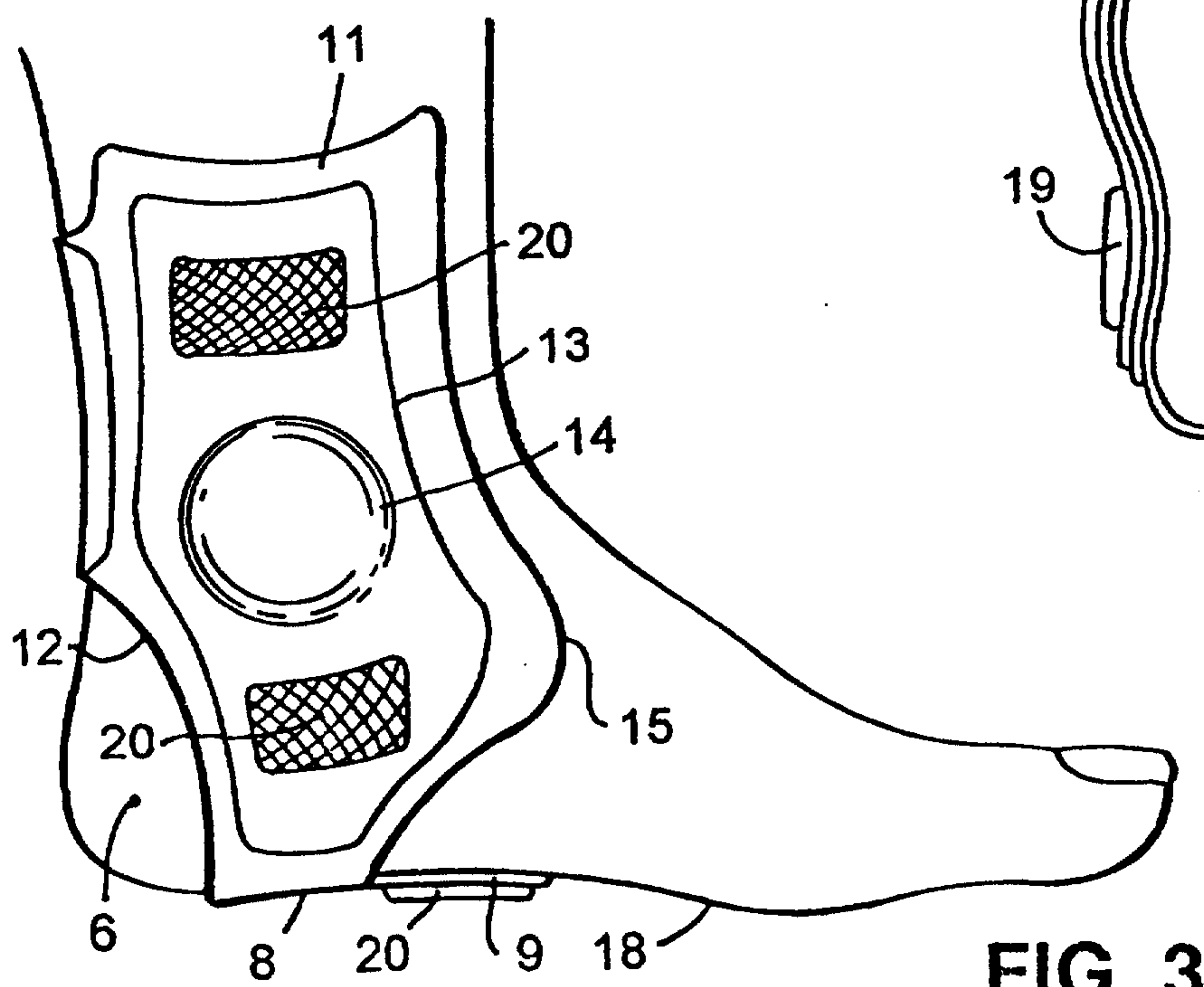
In a practical embodiment the medial part 2 and the lateral part 11 are formed with a same underlayer, which is integral. (not shown, known per se)

WHAT IS CLAIMED IS:

1. Ankle brace, having a medial side, which comprises at least at the medial side at least a flexible bracing element, which is anatomically adapted to the lower leg, the ankle and the foot shape, in which the bracing element shows a recess at a location adapted to leave the medial ankle joint uncovered, and has a substantially flat sole part below the foot, characterised in that, the ankle brace is built up from different asymmetrical shell parts, a substantially flexible medial part with one or more different, local stiffening elements, and a lateral part being substantially more elastic than the medial part.
2. Ankle brace according to claim 1, characterised in that, the medial part is shaped as a shell, which extends from substantially the middle of the back side of the lower leg to the front side of the lower leg and leaves the front part of the lower leg free, whereas a heel recess extends from the level of the inner ankle joint to the sole, but the sole part extends substantially below the complete heel and below at least a part of the middle foot.
3. Ankle brace according to claims 1 and 2, characterised in that, the lateral part has the shape of a shell of an elastic material, which is closely connected to the medial part below the heel and has a heel recess at the backside and at the medial side, whereas the front side is adapted to cover at least a part of the middle foot by means of a projecting rounded part.
4. Ankle support according to one or more of claims 1 to 3, characterised in that, the medial part is built up from:
 - a) a lower layer of elastic material, which is adapted to lie against the lower leg and the foot, and

- 5 b) in comparison to the lower layer, a more narrow and stiffer first stiffening element on the lower layer, which first stiffening element extends downwards from the upper end of the medial part between the ankle recess and the heel recess and ends above the sole;
- c) a cover layer, broader than the first stiffening element, that is mounted over the first stiffening element, which cover layer is more flexible than the first stiffening element, but stiffer than the lower layer.
- 10
5. Ankle brace according to one or more of claims 1 through 4, characterised in that, the medial part comprises a second, in comparison with the stiffening element more narrow and stiffer, substantially vertically extending stiffening element on top of the first
- 15 stiffening element and below the cover layer.
6. Ankle brace according to one or more of claims 1 through 5, characterised in that, the medial part comprises an outer cover layer on which adhering pieces are mounted on different locations for the
- 20 attachment of a burring band, with which the ankle brace can be fixed around the ankle and the lower foot.
7. Ankle brace according to one or more of claims 1 through 6, characterised in that the lateral part, which is substantially more elastic
- 25 than the medial part, is provided with one or more different more narrow and stiffer, local stiffening elements.
8. Ankle brace according to one or more of claims 1 through 7, characterised in that adhering pieces are fastened on several locations
- 30 of the lateral part for the attachment of a burring band, with which the ankle brace can be fixed around the ankle and the lower foot.

9. Ankle brace according to one or more of claims 1 through 8, characterised in that, the medial part and the lateral part have the same underlayer, which is integral.
- 5 10. Ankle brace according to one or more of claims 1 through 9, characterised in that, the lateral part comprises on the lower layer at the outer side a more narrow and stiffer than the lower layer stiffening element, which stiffening element extends downwards from the upper part of the brace between the heel recess of the lower layer and the
- 10 substantially round outer ankle recess and is connected with the medial part at the sole.

**FIG. 1****FIG. 2****FIG. 3**

