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(54) **Shock absorber**

Stoßdämpfer

Amortisseur de chocs

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EP 2 732 716 B1

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Description

TECHNICAL FIELD

[0001] The invention relates to a shock absorber for use in a heel section of an insole of a shoe.

BACKGROUND

[0002] In order to improve comfort of a shoe for a wearer, it is known in the art to provide a heel section of the shoe with a shock absorber for relieving the pressure on the wearer's feet.

[0003] Whether a person is running, walking or even just standing still, a substantive force acts on her feet, and in particular on her heels, where a major part of the body weight is balanced. This is even more evident in case the person stands on a hard surface, such as concrete, which is often the case in e.g. industrial environments. This can ultimately lead to back and knee injuries.

[0004] When comparing elasticity of the up to 2 cm thick fibrofatty body tissue located under the heel bone of a population of individuals, the degree of elasticity may vary up to 50% for two given individuals in the population. Further, the elasticity of an individual's heel tissue is not the same at an outer part of the heel as compared to a heel centre part. A problem with shock absorbers in the art is that they are not adapted to this varying elasticity in heel tissue.

[0005] GB 2 225 212 discloses a damping system comprising a hollow housing to be removably fitted into a cavity of an insole of a sport shoe. The damping system further comprises a damping element of flexible elastomeric material to be fitted within the hollow housing.

[0006] EP 1 714 571 discloses a shoe sole product, such as a sole, an insole or a midsole, being formed from elastomeric material of a predetermined hardness, and at the heel part has a central region formed from relatively softer material, the central region being surrounded by a ring of material whose hardness is intermediate the hardness of the sole product and the central region.

SUMMARY

[0007] An object of the present invention is to solve or at least mitigate this problem in the art and to provide an improved shock absorber.

[0008] This object is attained in a first aspect of the present invention by a shock absorber for use in a heel section of an insole of a shoe. The shock absorber comprises a first elastic member having a first elasticity and a second elastic member having a second elasticity, which second elastic member is arranged to be integrated with the first elastic member, wherein the second elastic member has a greater elasticity than the first member.

[0009] Thus, by providing the shock absorber according to the present invention, it is possible to advantageously adapt to different elasticity properties of the heel tissue

of an individual, and further to adapt to varying elasticity properties among a population of individuals.

[0010] In an embodiment of the present invention, the second elastic member is arranged at a center of the first elastic member. Thus, when in use, the second elastic member will be compressed to a higher degree than the first member due to its greater elasticity. By arranging the second elastic member at the center of the first elastic member, the shock absorber according to this embodiment will become bowl-shaped around the heel of the wearer of the shoe in which the shock absorber is arranged and thus advantageously improve the comfort of the wearer.

[0011] In an embodiment, the first elastic member has a Shore A value of approximately 20 and the second elastic member having a Shore A value of about 10. Thus, the hardness of the first elastic member is about twice that of the second elastic member. It should be noted that the respective hardness of the first and second elastic member may take on other Shore A values than these two. Generally, the shock absorber of the present invention is positioned between the relatively soft heel of a wearer of a shoe and the hard surface underneath the shoe. Thus, the second elastic member is slightly softer than the body tissue surrounding the heel while the first elastic member is slightly harder.

[0012] The shock absorber according to the present invention can be made of e.g. polyurethane plastics such as thermoplastic polyurethane (TPU) or thermoplastic rubbers (TR).

[0013] The second elastic member is arranged to be selectively removable from the first elastic member. Thus, since the wearer can insert and remove the second elastic member from the first elastic member, the elasticity of the shock absorber can be even further adapted to the individual wearer in that second elastic members having different measures of hardness may be inserted in the first elastic member at a choice of the individual wearer.

[0014] The object of the invention is further attained in a second aspect by an insole comprising the shock absorber of the first aspect.

[0015] The object of the invention is further attained in a third aspect by a shoe comprising the insole of the second aspect.

[0016] It is noted that the invention relates to all possible combinations of features recited in the claims. Further features of, and advantages with, the present invention will become apparent when studying the appended claims and the following description. Those skilled in the art realize that different features of the present invention can be combined to create embodiments other than those described in the following.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The invention is now described, by way of example, with reference to the accompanying drawings, in

which:

Figure 1 shows a perspective view of a prior art shock absorber 10 to be arranged in a heel section of a shoe;

Figures 2a-d show the prior art shock absorber in a section taken along line A-A of Figure 1;

Figure 3 shows a perspective view of a shock absorber to be arranged in a heel section of a shoe according to an embodiment of the present invention;

Figure 4 shows a top view of a shock absorber according to embodiments of the present invention;

Figure 5a shows a sectional view of a shock absorber according to an embodiment of the invention arranged in the heel section of an insole;

Figure 5b shows a sectional view of the shock absorber of Figure 5a arranged in the heel section of an insole, which insole further is mounted in a shoe;

Figure 6 shows a top view of the insole of Figure 5, in which the shock absorber of the present invention is arranged;

Figure 7 shows yet another embodiment of the present invention where the second elastic member is arranged to be selectively removable from the first elastic member; and

Figures 8a-d show the shock absorber according to embodiments of the present invention in a section taken along line B-B shown in Figure 4.

DETAILED DESCRIPTION

[0018] The invention will now be described more fully hereinafter with reference to the accompanying drawings, in which certain embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided by way of example so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout the description.

[0019] Figure 1 shows a perspective view of a prior art shock absorber 10 to be arranged in a heel section of a shoe. As can be seen, the shock absorber comprises a waist part 11 around which an insole (not shown) will be tightly arranged in order to create a locking engagement with the shock absorber 10. Further, the shock absorber 10 comprises a top part 12 extending radially from the

waist part 11 and a bottom part 13 on which the shock absorber rests, which bottom part extends radially from the waist part. When arranged at the heel section of a shoe, an inlaysole (not shown) is placed on the top part 12. Further, the prior art shock absorber 10 comprises a plurality of cavities 14 extending from the top part 12 through the waist part 11 and in to the bottom part 13. The shock absorber is made of an elastic material, typically rubber.

[0020] Figures 2a-d show the shock absorber 10 in a section taken along line A-A of Figure 1 in different degrees of deformation. Figure 2a shows a cross section of the shock absorber when no force is applied to the top part 12. Figure 2b illustrates the elasticity of the shock absorber 10 when a force F is applied to the top part 12. In use, this force will be embodied by the weight of a wearer of the shoe. Figures 2c and 2d show deformation of the shock absorber as the force F applied by the wearer's heel to the top part 12 increases. The deformation is further facilitated by the cavities 14. The elasticity of the prior art shock absorber 10 greatly improves the comfort of the wearer of the shoe in which the shock absorber is arranged.

[0021] Figure 3 shows a perspective view of a shock absorber 20 to be arranged in a heel section of a shoe according to an embodiment of the present invention. According to the invention, the shock absorber 20 comprises a first elastic member 25 having a first elasticity and a second elastic member 26 having a second elasticity, which second elastic member is arranged to be integrated with the first elastic member, wherein the second elastic member has a greater elasticity than the first member. Thus, when a force F is applied to the shock absorber 20 of the present invention, as is discussed in connection to the prior art shock absorber 10 shown in Figures 2a-d, the shock absorber 20 of the present invention will be even more compressed at its centre, where the softer second elastic member 26 is arranged.

[0022] Figure 4 shows a top view of the shock absorber 20 according to embodiments of the present invention, illustrating that the second elastic member 26 is arranged at the centre of the first elastic member 25.

[0023] Again with reference to Figure 3, it can be seen that the shock absorber 20 according to an embodiment of the present invention comprises a waist part 21 around which an insole (not shown) will be tightly arranged in order to create a locking engagement with the shock absorber 20. Further, the shock absorber 20 comprises a top part 22 extending radially from the waist part 21 and a bottom part 23 on which the shock absorber rests, which bottom part extends radially from the waist part. When arranged at the heel section of a shoe, an inlaysole (not shown) is placed on the top part 22. In an embodiment, the top part 22 extends further in a radial direction than the bottom part 23, thus acting as a gasket against an upper side of the insole (not shown) in which the shock absorber is arranged.

[0024] Figure 5a shows a sectional view of the shock

absorber 20 according to an embodiment of the invention arranged in the heel section of an insole 30. As can be seen, the height of the waist part 21 is adapted to the thickness of the insole 30. Further, the bottom part 23 and the top part 22 are arranged to sandwich the insole 30 which encloses the waist part 21 in order to retain the shock absorber 20 in locking engagement with the insole. As can be seen, the second elastic member 26 is positioned in a cavity of the waist part 21.

[0025] Figure 5b shows a sectional view of the shock absorber 20 and the insole 30 of Figure 5a when mounted in a shoe 40 according to an embodiment of the present invention. As can be seen, a heel section 41 of the shoe 40 is arranged with an accommodation 42 for receiving and housing the bottom part 23 of the shock absorber 20.

[0026] Figure 6 shows a top view of the insole 30 of Figure 5, in which the shock absorber 20 of the present invention is arranged, which shock absorber comprises the first elastic part 25 and the second elastic part 26. As can be deduced from Figure 6, when a wearer of a shoe (not shown) in which the insole 30 is arranged places her heel on the shock absorber 20, the centre part of her heel will press the second elastic member 26 in a direction towards the surface on which the shoe rests, and the second elastic member 26 will be compressed to a higher degree than the first elastic member 25 due to its greater elasticity. Thus, the shock absorber 20 of the present invention will adapt to the elasticity of the body tissue located under the heel bone of the foot.

[0027] Figure 7 shows the second elastic member 26 is arranged to be selectively removable from the first elastic member 25. The shock absorber according to an embodiment of the invention has in its top part 22 an opening 27 through which the second elastic member 26 is inserted into the cavity 28 of the waist part. Thus, since the wearer can insert and remove the second elastic member 26 from the first elastic member 25, the elasticity of the shock absorber can be even further adapted to the individual wearer in that second elastic members having different measures of hardness may be inserted in the first elastic member at a choice of the individual wearer.

[0028] With further reference to Figure 7, in an embodiment of the present invention the top part 22 of the first member 25 comprises a flange 29 arranged at a circumference of the opening 27 through which the second elastic member 26 is inserted into the cavity 28 of the waist part. Advantageously, the flange 29 facilitates retention of the second member 26 in the cavity 28.

[0029] In yet another embodiment of the present invention, the cavity 28 in the waist part has a bottom section arranged with openings to a plurality of cavities 24 extending into the bottom part, where each cavity is separated from adjacent cavities by a corresponding wall member 30. As was described with reference to Figure 2, the cavities 24 will facilitate deformation of the shock absorber when acted upon by a compressing force.

[0030] Figures 8a-d shows the shock absorber 20 according to embodiments of the present invention in a sec-

tion taken along line B-B shown in Figure 4 in different degrees of deformation. Figure 8a shows a cross section of the shock absorber 20 when no force is applied to the top part 22. Figure 8b illustrates the elasticity of the shock absorber 20 when a force F is applied to the top part 22. In use, this force will be embodied by the weight of a wearer of the shoe. Figures 8c and 8d show deformation of the shock absorber 20 as the force F applied by the wearer's heel to the top part 22 steadily increases. The elasticity of the shock absorber 20 of the present invention greatly improves the comfort of the wearer of the shoe in which the shock absorber is arranged. Further, as compared to the prior art shock absorber 10 shown in Figures 1 and 2, due to the second elastic member 26 having a greater elasticity than the first elastic member 25, the shock absorber 20 of the present invention will be more compressed at its centre section where a majority of the force F is applied, thus creating a bowl-like support around the heel of the wearer.

[0031] Even though the invention has been described with reference to specific exemplifying embodiments thereof, many different alterations, modifications and the like will become apparent for those skilled in the art. The described embodiments are therefore not intended to limit the scope of the invention, as defined by the appended claims.

Claims

1. Shock absorber (20) for use in a heel section (41) of an insole of a shoe (40) comprising:
 - a first elastic member (25) having a first elasticity; and
 - a second elastic member (26) having a second elasticity, which second elastic member (26) is arranged to be integrated with the first elastic member (25); wherein
 - the second elastic member (26) has a greater elasticity than the first elastic member (25), the shock absorber being **characterized in that** the second elastic member (26) is arranged to be removable from the first elastic member (25).
2. The shock absorber (20) of claim 1, said second elastic member (26) being arranged at a centre of the first elastic member (25).
3. The shock absorber (20) of any one of claims 1-3, said first elastic member (25) having a Shore A value of 20; and said second elastic member (26) having a Shore A value of 10.
4. The shock absorber (20) of any one of the preceding claims, the first elastic member (25) comprising a waist part (21) comprising a cavity (28) in which

the second member (26) is arranged;
a top part (22) comprising an opening (27) through which the second elastic member (26) is inserted into the cavity (28) of the waist part (21), which top part (22) extends radially from the waist part (21); and a bottom part (23) on which the shock absorber (20) rests, which bottom part (23) extends radially from the waist part (21).

5. The shock absorber (20) of claim 4, the first elastic member (25) being arranged such that a height of the waist part (21) is adapted to a thickness of an insole (30) in which the shock absorber (20) is to be arranged; and the bottom part (23) and the top part (21) being arranged to sandwich the insole (30) enclosing the waist part (21) in order to retain the shock absorber (20) in locking engagement with the insole (30).

6. The shock absorber (20) of claims 4 or 5, said top part (22) of the first member (25) comprising:

a flange (29) arranged at a circumference of the opening (27) through which the second elastic member (26) is inserted into the cavity (28) of the waist part (21) for retaining the second member (26) in the cavity (28).

7. The shock absorber (20) of any one of the preceding claims, said cavity (28) in the waist part (21) having a bottom section arranged with openings to a plurality of cavities (24) extending into the bottom part (23), where each cavity is separated from adjacent cavities by a corresponding wall member (31).

8. An insole (30) comprising the shock absorber (20) according to any one of claims 1-7.

9. A shoe (40) comprising the insole (30) of claim 8.

Patentansprüche

1. Stossdämpfer (20) für den Gebrauch in einem Fersenbereich (41) einer Einlegesohle eines Schuhs (40) aufweisend:

ein erstes elastisches Element (25) mit einer ersten Elastizität; und
ein zweites elastisches Element (26) mit einer zweiten Elastizität, wobei das zweite elastische Element (26) so angeordnet ist, dass es im ersten elastischen Element (25) integriert werden kann; worin
das zweite elastische Element (26) eine grössere Elastizität aufweist als das erste elastische Element (25), der Stossdämpfer **dadurch gekennzeichnet, dass**

das zweite elastische Element (26) abnehmbar vom ersten elastischen Element (25) angeordnet ist.

2. Der Stossdämpfer (20) gemäss Anspruch 1, wobei das genannte zweite elastische Element (26) im Zentrum des ersten elastischen Elements (25) angeordnet ist.

3. Der Stossdämpfer gemäss einem der Ansprüche 1 - 3, wobei das genannte erste elastische Element (25) einen Shore A Wert von 20 aufweist; und das zweite elastische Element (26) einen Shore A Wert von 10 aufweist.

4. Der Stossdämpfer (20) gemäss einem der vorhergehenden Ansprüche, das erste elastische Element (25) aufweisend:

einen Tallienteil (21) aufweisend einen Hohlraum (28) in welchem das zweite elastische Element (26) angeordnet ist;

einen Oberteil (22) aufweisend eine Öffnung (27) durch welche das zweite elastische Element (26) in den Hohlraum (28) des Tallienteils (21) eingesetzt ist, wobei der Oberteil (22) radial vom Tallienteil (21) absteht; und

einen Unterteil (23) auf welchem der Stossdämpfer (20) liegt, wobei der Unterteil (23) radial vom Tallienteil (21) absteht.

5. Der Stossdämpfer (20) gemäss Anspruch 4, wobei das erste elastische Element (25) angeordnet ist so dass

eine Höhe des Tallienteils (21) an eine Dicke einer Einlegesohle (30), in welcher der Stossdämpfer (20) angeordnet werden soll, angepasst ist; und der Unterteil (23) und der Oberteil (21) so angeordnet sind um die Einlegesohle (30) ins Sandwich zu nehmen und dabei den Tallienteil (21) zu Umschliessen um den Stossdämpfer (20) im verriegelndem Eingriff mit der Einlegesohle (30) zu halten.

6. Der Stossdämpfer (20) gemäss den Ansprüchen 4 oder 5, wobei der genannte Oberteil (22) des ersten elastischen Elements (25) einen Flansch (29), der an einem Umfang der Öffnung (27) durch welche das zweite elastische Element (26) in den Hohlraum (28) des Tallienteils (21) eingesetzt ist um das zweite Element (26) im Hohlraum (28) zu halten, aufweist.

7. Der Stossdämpfer (20) gemäss einem der vorangehenden Ansprüche, wobei der genannte Hohlraum (28) im Tallienteil (21) einen unteren Bereich mit Öffnungen die zu einer Vielzahl von Hohlräumen (24) die sich in den Unterteil (23) erstrecken, aufweist, wobei jeder Hohlraum von angrenzenden Hohlräumen durch ein entsprechendes Wandelement ge-

trennt ist.

8. Eine Einlegesohle (30) aufweisend den Stossdämpfer (20) gemäss einem der Ansprüche 1 bis 7.

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9. Ein Schuh (40) aufweisend die Einlegesohle (30) gemäss Anspruch 8.

Revendications

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1. Un amortisseur (20) pour une partie de talon (41) d'une semelle d'une chaussure (40) comprenant :

un premier élément élastique (25) ayant une première élasticité ; et

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un deuxième élément élastique (26) ayant une deuxième élasticité, lequel deuxième élément élastique (26) est disposé pour être intégré dans le premier élément élastique (23); dans lequel le deuxième élément élastique (26) a une élasticité qui est supérieure au premier élément élastique (25), l'amortisseur étant **caractérisé en ce que**

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le deuxième élément élastique (26) est disposé pour être amovible du premier élément élastique (25).

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2. L'amortisseur (20) selon la revendication 1, ledit deuxième élément élastique (26) étant disposé au centre du premier élément élastique (25).

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3. L'amortisseur (20) selon l'une des revendications 1 à 3, ledit premier élément élastique (25) ayant un Shore A valeur de 20 ; et ledit deuxième élément élastique (26) ayant un Shore A valeur de 10.

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4. L'amortisseur (20) selon l'une des revendications précédentes, le premier élément élastique (25) comprenant :

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une partie de taille (21) comprenant une cavité (28) dans laquelle le deuxième élément élastique (26) est disposé ;

une partie supérieure (22) comprenant une ouverture (27) à travers laquelle le deuxième élément élastique (26) est inséré dans la cavité (28) de la partie de taille (21) ; et

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une partie inférieure (23) sur laquelle l'amortisseur (20) s'appuie, laquelle partie inférieure (23) s'étend radialement de la partie de taille (21).

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5. L'amortisseur (20) selon la revendication 4, le premier élément élastique (25) étant disposé de telle sorte qu'

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un hauteur de la partie de taille (21) est adapté à une épaisseur d'une semelle (30) dans laquelle l'amortisseur (20) doit être disposé ; et

la partie inférieure (23) et la partie supérieure (21) étant disposée pour prendre en sandwich la semelle (30) en entourant la partie de taille (21) afin de retenir l'amortisseur (20) en prise de verrouillage avec la semelle (30).

6. L'amortisseur (20) selon les revendications 4 ou 5, ladite partie supérieure (22) du premier élément (25) comprenant :

un collet (29) disposé à une circonférence de l'ouverture (27) à travers laquelle le deuxième élément élastique (26) est inséré dans la cavité (28) de la partie de taille (21) pour retenir le deuxième élément (26) dans la cavité (28).

7. L'amortisseur (20) selon l'une des revendications précédentes, ladite cavité (28) dans la partie de taille (21) ayant une zone inférieure disposée avec des ouvertures à une pluralité de cavités (24) s'étendant dans la partie inférieure (23), ou chaque cavité est séparée des cavités adjacentes par un élément de paroi (31) correspondant.

8. Une semelle (30) comprenant l'amortisseur (20) selon l'une des revendications 1 à 7.

9. Une chaussure (40) comprenant une semelle (30) selon la revendication 8.

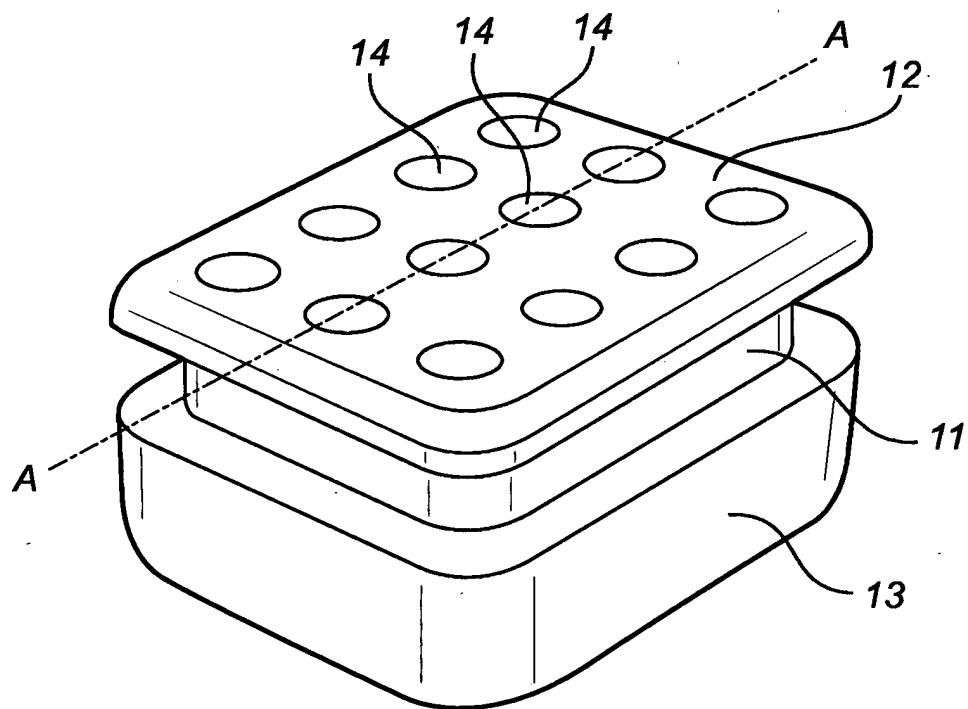


Fig. 1

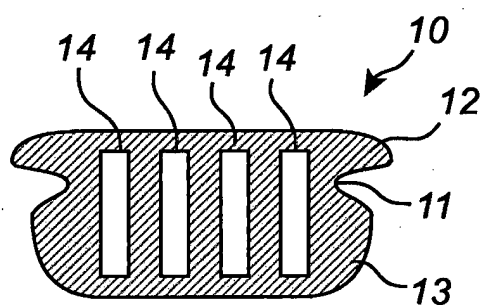


Fig. 2a

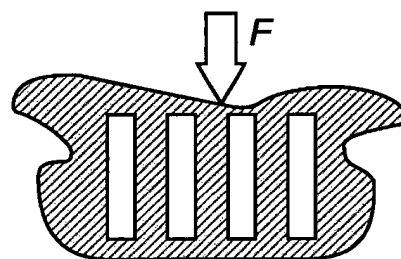


Fig. 2b

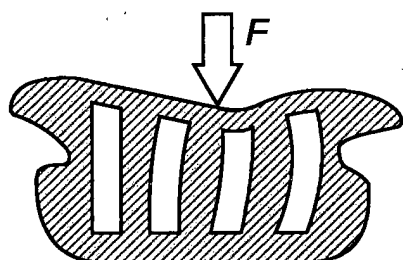


Fig. 2c

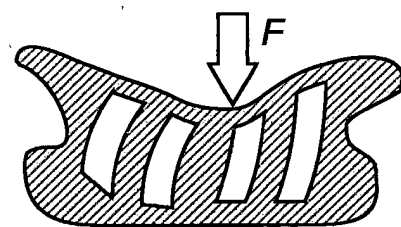


Fig. 2d

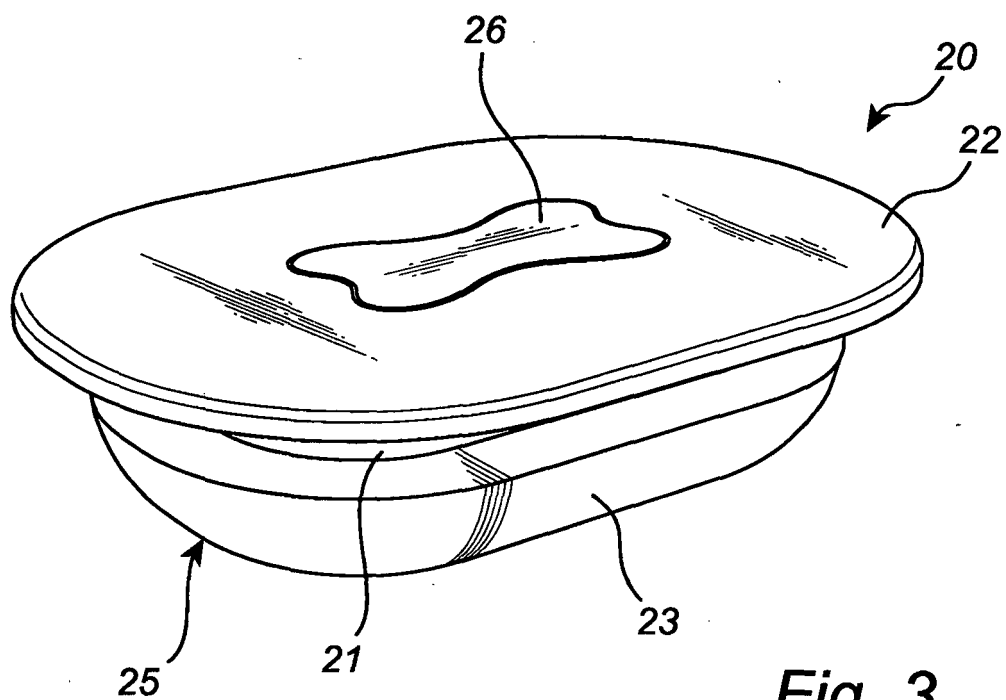


Fig. 3

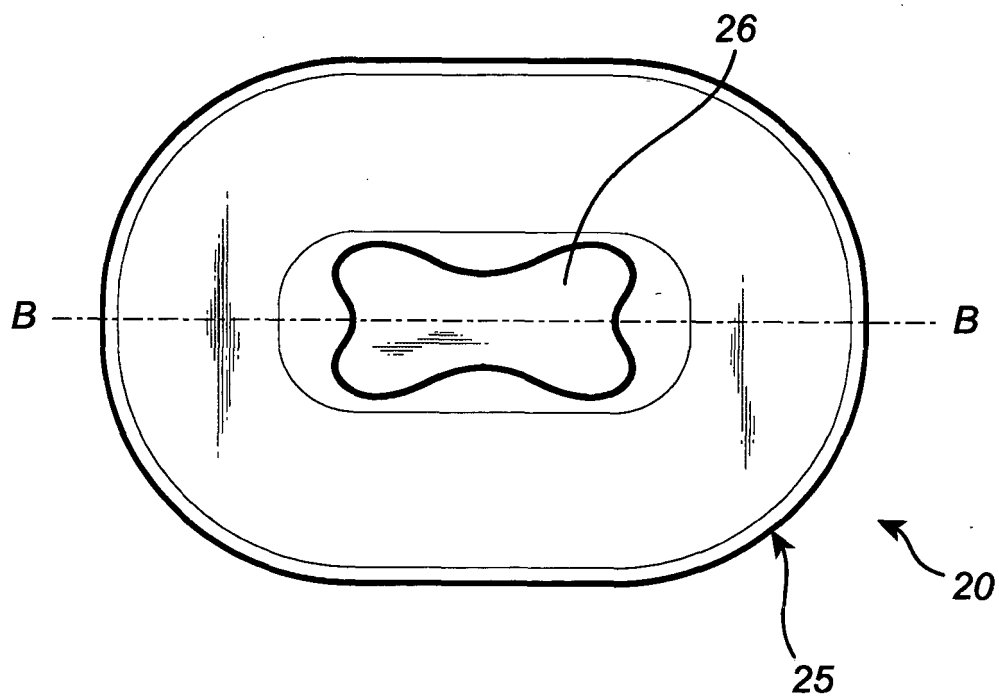
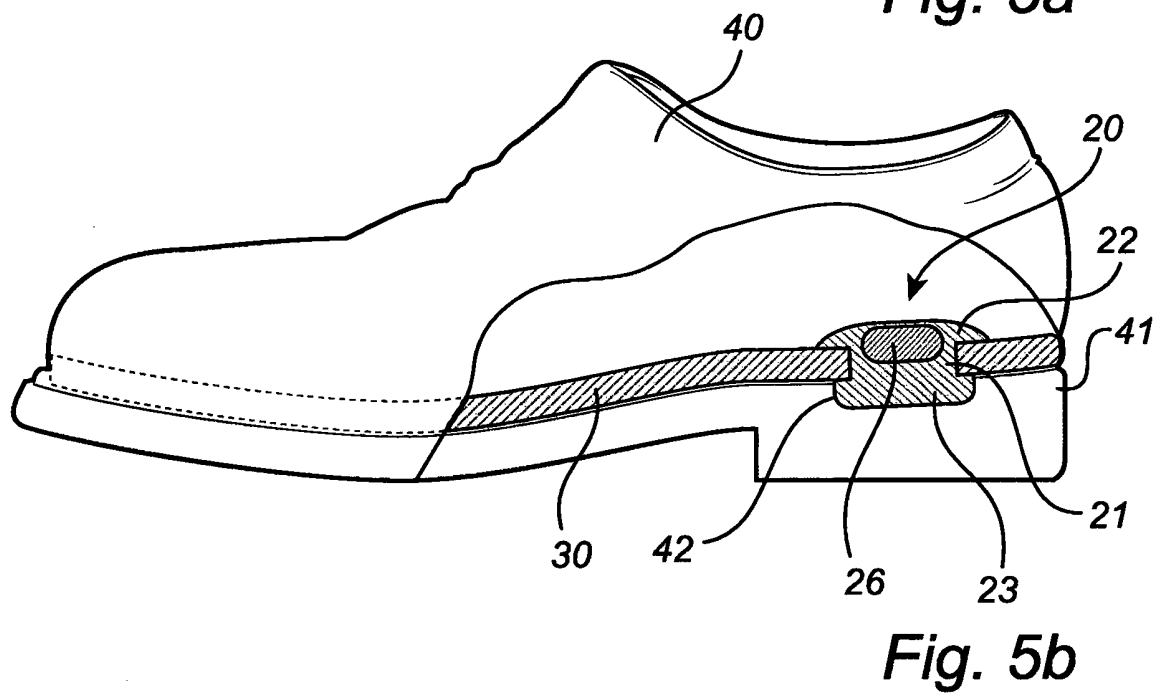
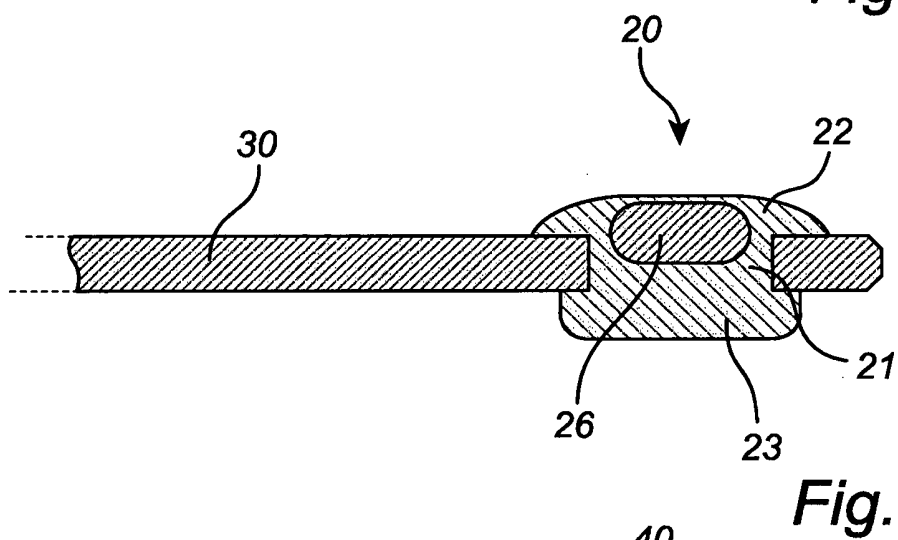
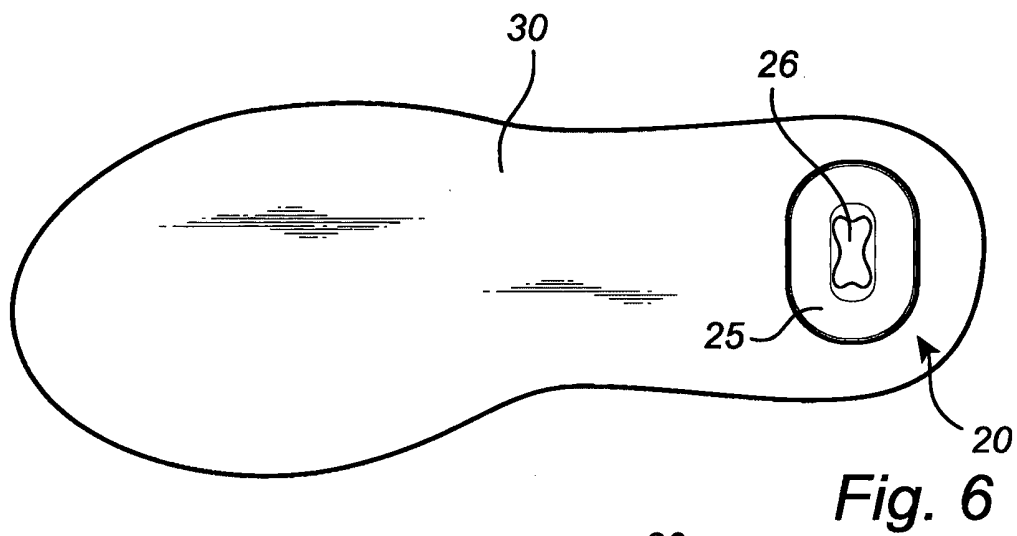


Fig. 4



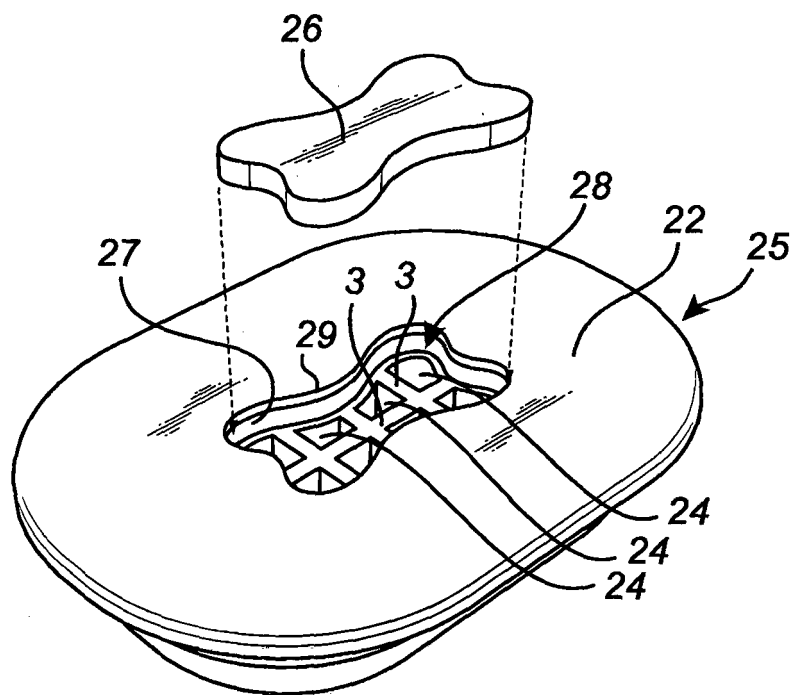
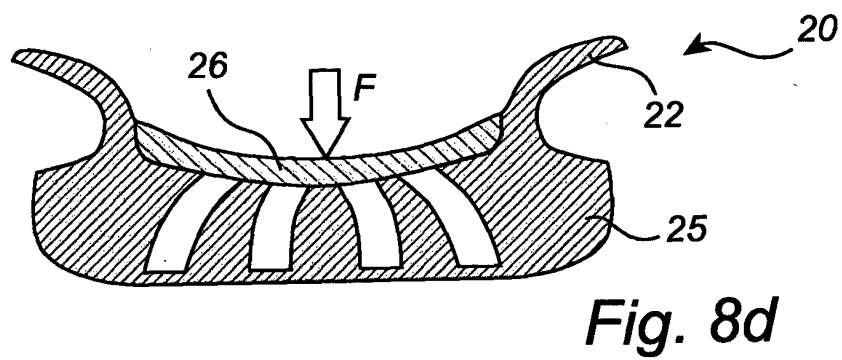
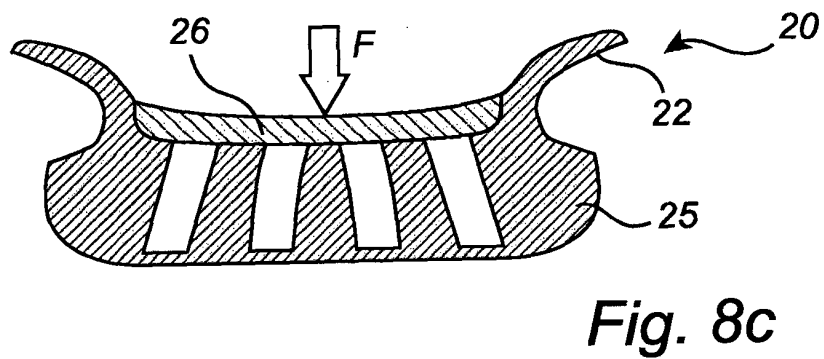
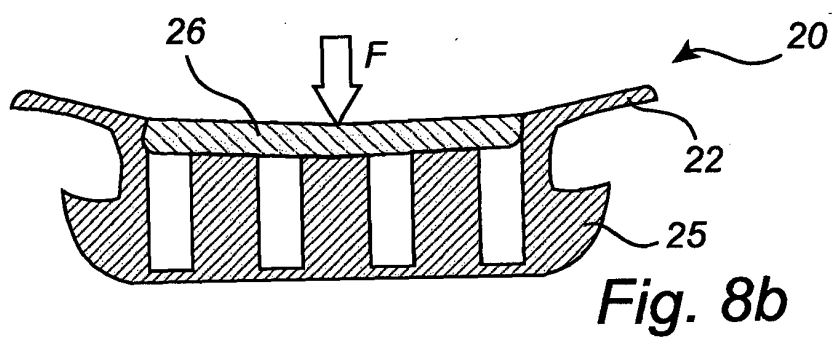
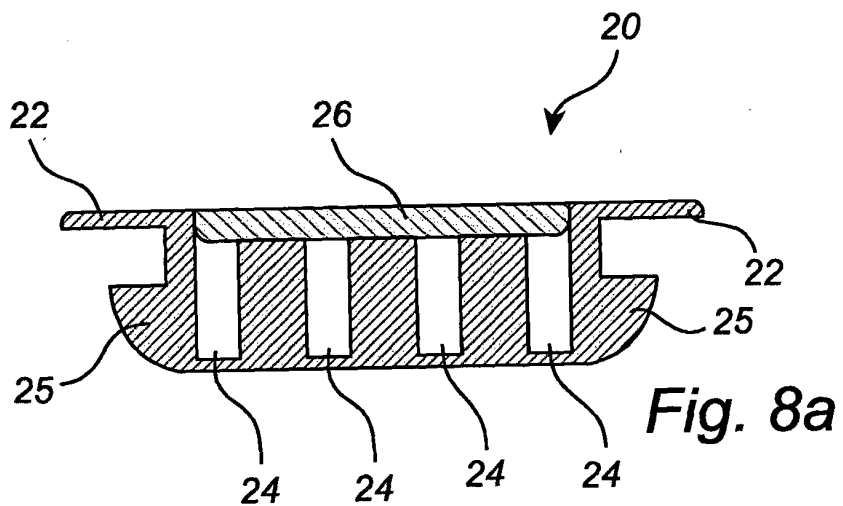


Fig. 7



REFERENCES CITED IN THE DESCRIPTION

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