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(54) **SPORTING AND EXERCISING DEVICE HAVING A FOOT RECEIVING PORTION AND AN
ANTICOLLAPSE SPRING PORTION**

SPORT- UND TRIMMGERÄT MIT FUSSTEIL UND NICHT-ZUSAMMENFALTENDEM FEDERTEIL
DISPOSITIF D'ENTRAÎNEMENT ET DE MUSCULATION AYANT UNE PARTIE POUR RECEVOIR
LE PIED ET UNE PARTIE ANTI-AFFAISSEMENT FAISANT RESSORT

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Description**BACKGROUND OF THE INVENTION****1. Field of the invention:**

[0001] The present invention relates to a sporting and exercising device comprising an upper foot receiving portion and a lower spring portion and as disclosed in the preamble of claim 1.

2. Brief description of the prior art:

[0002] US patent N° 5,205,798 granted to Gregory Lekhtman on April 27, 1993 describes a sporting and exercising device comprising a foot receiving portion and a spring portion detachably attached to the bottom face of the foot receiving portion. The spring portion comprises an upper spring layer arched upwardly, a lower spring layer arched downwardly, and an intermediate, substantially elastic plastic strap. A first end of the plastic strap is connected to both a first end of the upper spring layer and a first end of the lower spring layer. Similarly, a second end of the plastic strap is connected to both a second end of the upper spring layer and a second end of the lower spring layer.

[0003] A major drawback of the sporting and exercising device of US patent N° 5,205,798 is that the spring portion collapses after about 7 centimeters (cm) (out of about 13 cm) of deformation by compression, that is it lacks smooth, growing elasticity. This reduces the ability to absorb increasing higher pressures, reduces the available bouncing power and makes the sporting and exercising device noisy.

[0004] A similar drawback exists with the sporting and exercising device of US-A-4,492,374, which corresponds to the preamble of claim 1.

OBJECTS OF THE INVENTION

[0005] The main object of the present invention is therefore to eliminate the above described drawback of the prior art.

SUMMARY OF THE INVENTION

[0006] More particularly, in accordance with the present invention, there is provided a sporting and exercising device as claimed in claim 1.

[0007] Preferred embodiments are disclosed in claims 2 - 8.

[0008] The objects, advantages and other features of the present invention will become more apparent upon reading of the following non restrictive description of preferred embodiments thereof, given by way of example only with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] In the appended drawings:

Figure 1 is a perspective, exploded view of a sporting and exercising device in accordance with the present invention, comprising a foot-receiving portion and a spring portion;

Figure 2, which is labelled as prior art, is a graph illustrating the evolution of the resistance (force in Newtons) of the spring portion to compression as a function of the deformation (cm) by compression of a sporting and exercising device as described in US patent N° 5,205,798;

Figure 3 is a perspective, enlarged view of a generally elastic plastic strap of the spring portion of the device of Figure 1, comprising resilient shock absorbing bodies;

Figure 4 is a schematic diagram illustrating a first method of mounting the resilient shock absorbing bodies onto the plastic strap of Figure 3;

Figure 5 is a perspective, partial view of the plastic strap of Figure 3, with a resilient shock absorbing body mounted thereon in accordance with the first method;

Figure 6 illustrates a transversal series of holes made in the plastic strap for mounting the shock absorbing bodies in accordance with a second method (overmolding);

Figure 7 is a perspective, partial view of the plastic strap with shock absorbing bodies mounted thereon in accordance with the second method;

Figure 8 is an elevational transversal cross sectional view of the plastic strap with shock absorbing bodies mounted thereon in accordance with the second method; and

Figure 9 is a graph illustrating the evolution of the resistance (force in Newtons) of the spring portion to compression as a function of the deformation (cm) by compression of a sporting and exercising device in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] Figure 1 is a perspective, exploded view of a sporting and exercising device in accordance with the present invention. In Figure 1, the sporting and exercising device is generally identified by the reference 1.

[0011] The device 1 comprises two major parts: an up-

per foot receiving portion 2 and a lower spring portion 3.

[0012] Preferably, the foot receiving portion 2 is formed of a boot 4. The boot 4 comprises a lower shell 5 with a bottom 6, and an upper shell 7 hingedly connected to the lower shell 5 through a pair of fasteners of which one 8 is shown. The lower 5 and upper 7 shells are made of molded plastic material. The boot 4 further includes a padded inner boot 90 inserted in the hingedly interconnected shells 5 and 7. This type of boot, currently used in the fabrication of ice skates, is well known to those of ordinary skill in the art and accordingly will not be further described.

[0013] It should be kept in mind that it is within the scope of the present invention to use in the sporting and exercising device foot receiving portions having a structure different from that of Figure 1.

[0014] The spring portion 3 comprises an upper spring layer 9, a lower spring layer 10, and an intermediate spring rate and weight adjusting elongate plastic strap 11.

[0015] The upper spring layer 9 is arched upwardly and the lower spring layer 10 is arched downwardly as illustrated in Figure 1. Both the upper and lower spring layers 9 and 10 are made of a sturdy, generally flexible plastic material.

[0016] The strap 11 is made of a substantially elastic plastic material and is interposed between the upper and lower spring layers 9 and 10. To increase the spring resistance and/or to support a greater weight, the cross sectional area of the plastic strap 11 is increased. Alternatively, to reduce the spring resistance and/or to support a smaller weight, the cross sectional area of the plastic strap 11 is reduced.

[0017] The plastic strap 11 has a first end provided with a generally arrow-shaped integral connecting member 12, and a second end opposite to the first end and provided with a generally arrow-shaped integral connecting member 13. The arrow-shaped connecting member 12 is formed with transversal rear grooves 14 and 15 situated on the opposite top and bottom faces of the plastic strap 11, respectively. Similarly, the arrow-shaped connecting member 13 is formed with transversal rear grooves 16 and 17 situated on the opposite top and bottom faces of the plastic strap 11.

[0018] To assemble the upper spring layer 9, the lower spring layer 10, and the intermediate plastic strap 11 together and thereby form the spring portion 3, the upper spring layer 9 is bent to insert its two opposite ends 18 and 19 into the grooves 14 and 16, respectively, and the lower spring layer 10 is also bent to insert its two opposite ends 20 and 21 into the grooves 15 and 17, respectively. The plastic strap 11 is then tensioned and stretched by the spring action produced by the resiliency of the arched upper and lower spring layers 9 and 10.

[0019] The end 18 of the upper spring layer 9 comprises an indent 91 fitted into a corresponding indent 22 of the groove 14. In the same manner, the end 19 of the upper spring layer 9 comprises an indent 23 fitted into

a corresponding indent 24 of the groove 16. The end 20 of the lower spring layer 10 also comprises an indent 24 fitted into a corresponding indent (not shown) of the groove 15. Finally, the end 21 of the lower spring layer 10 comprises an indent 25 fitted into a corresponding indent (not shown) of the groove 17. When the spring portion 3 is assembled as described hereinabove, the arrow-shaped connecting member 12 connects one end of the plastic strap 11 with the ends 18 and 20 of the upper and lower spring layers 9 and 10, while the arrow-shaped connecting member 13 connects the other end of the plastic strap 11 with the ends 19 and 21 of the upper and lower spring layers 9 and 10.

[0020] The mutually mating indents will of course prevent lateral movement of the ends 18, 19, 20 and 21 in the grooves 14, 16, 15 and 17, respectively, to thereby hold the ends 18, 19, 20 and 21 in the grooves 14, 16, 15 and 17, respectively.

[0021] As described in US patent N° 5,205,798, nipples 26 and 27 may extend from the bottom face of the upper spring layer 9 at the end 18 thereof. Similarly, nipples 28 and 29 may extend from the bottom face of the upper spring layer 9 at the end 19 thereof, nipples 30 and 31 may extend from the top face of the lower spring layer 10 at the end 20 thereof, and nipples 32 and 33 may extend from the top face of the lower spring layer 10 at the end 21 thereof. When the spring portion 3 is assembled, the nipples 26-33 will abut respective edge surfaces such as 34 and 35 of the generally arrow-shaped connecting members 12 and 13 to help in holding the ends 18, 19, 20 and 21 in the grooves 14, 16, 15 and 17, respectively.

[0022] The spring portion 3 is mounted onto the boot 4 by detachably fastening the upper spring layer 9 to the bottom 6 of the lower shell 5 by means, for example, of appropriate screw fasteners (not shown) passing through openings 36 and 37 of the upper spring layer 9 and corresponding openings (not shown) in the bottom 6 of the lower shell 5 of the boot 4.

[0023] Finally, a sole 38 is screwed to the bottom face of the lower spring layer 10. The sole 38 has an anti-slip bottom tread to prevent accidents caused by slipping of the device 1 on the ground.

[0024] In operation, the nipples 26-33 will abut the respective edge surfaces such as 34 and 35 of the generally arrow-shaped connecting members 12 and 13 to prevent lateral movement of the ends 18, 19, 20 and 21 in the grooves 14, 16, 15 and 17, respectively, when a small lateral force is applied. When a strong lateral force is applied, this strong force will overcome the restraint of the nipples 26-33 and will withdraw the indents of the ends 18 and 19 of the upper spring layer 9 and the ends 20 and 21 of the lower spring layer 10 from the indents of the grooves 14, 16, 15 and 17, respectively, to automatically disassemble the spring portion 3 and prevent the user to fall, and to twist and/or sprain his ankles. Upon disassembly of the spring portion 3, the user will step onto the bottom face of the upper spring layer 9.

[0025] Figure 2 is a graph illustrating the evolution of the resistance (force in Newtons) of the spring portion 3 to compression as a function of the deformation (cm) by compression of a sporting and exercising device as described in US patent N° 5,205,798, having a plastic band 11 60 cm wide.

[0026] As can be seen in Figure 2, the maximal resistance of the spring portion 3 is found at about 7 cm of deformation by compression. From this point, the resistance of the spring portion 3 gradually reduces as the deformation by compression increases.

[0027] As the spring portion 3 collapses at 7 cm (out of about 13 cm) of deformation by compression, the spring portion 3 lacks smooth, growing elasticity. This reduces the ability of the sporting and exercising device to absorb increasing higher pressures. This also reduces the available bouncing power and makes the sporting and exercising device noisy.

[0028] To overcome the above drawback of the sporting and exercising device of US patent N° 5,205,798, the spring portion 3 of the present invention is provided with shock absorbing means 50-53.

[0029] Preferably, these shock absorbing means 50-53 comprise four bodies of resilient material such as rubber material and resilient foam material. As illustrated in Figures 1 and 3:

- the shock absorbing means 50 comprises a first elongate transversal resilient shock absorbing body 39 mounted on the top face of the plastic strap 11 proximate a first end thereof and the end 18 of the upper spring layer 9;
- the shock absorbing means 51 comprises a second elongate transversal resilient shock absorbing body 40 mounted on the top face of the plastic strap 11 proximate a second end thereof and the end 19 of the upper spring layer 9;
- the shock absorbing means 52 comprises a third elongate transversal resilient shock absorbing body 41 mounted on the bottom face of the plastic strap 11 opposite to the body 39, i.e. proximate the first end of the plastic strap 11 and the end 20 of the lower spring layer; and
- the shock absorbing means 53 comprises a fourth elongate transversal resilient shock absorbing body 42 mounted on the bottom face of the plastic strap 11 opposite to the body 40, i.e. proximate the second end of the plastic strap 11 and the end 21 of the lower spring layer 10.

[0030] As illustrated in Figures 1 and 3, the shock absorbing bodies 39 and 40 are mounted longitudinally remote from each other between the upper spring layer 9 and the plastic strap 11. Similarly, the shock absorbing bodies 41 and 42 are mounted longitudinally remote

from each other between the lower spring layer 10 and the plastic strap 11. The bodies 39-42 are generally semi-elliptical in cross section and have rounded ends. They can be made of resilient rubber material or resilient foam material such as polyurethane or other plastics.

[0031] Figures 4 and 5 illustrate a first method of mounting the resilient bodies 39-42 onto the plastic strap 11. According to this first method; each body 39-42 comprises two opposite and generally coplanar extensions 43 and 44 having respective free edge 45 and 46 formed with notches 60 and 61 therein. The plastic strap 11 comprises four pairs of spaced apart, generally angular integral tabs such as 62 and 63 for mounting the bodies 39-42, respectively, onto the top and bottom faces of the plastic strap 11.

[0032] Each tab 62,63 has a first section 64,65 extending generally perpendicular from the top or bottom face 66 of the plastic strap 11 and a second section 67,68 generally parallel to but spaced apart from the top or bottom face 66 of the plastic strap 11, and extending toward the other tab 63,62 of the same pair.

[0033] The first sections 62 and 63 of the tabs 63 and 62 have a width corresponding to a width of the notches 60 and 61 whereby, in operation, the extension 43 of each body 39-42 is inserted between the second section 67 of the tab 62 of a corresponding pair and the top or bottom face 66 of the plastic strap 11, while the extension 44 of the body 39-42 is inserted between the second section 68 of the other tab 63 of said corresponding pair and the top or bottom face 66 of the plastic strap 11, until the first sections 64 and 65 of the tabs 62 and 63 fit into the notches 60 and 61 of the extensions 43 and 44 of the body 39-42.

[0034] It should be noted that the bodies 39-42 may be formed with a bottom longitudinal groove such as 69 (Figures 4 and 5) to increase, or more generally adjust their flexibility.

[0035] In accordance with another method as illustrated in Figures 5, 6 and 7, a transversal series of three holes 47, 48 and 49 are made through the plastic strap 11 (Figure 5) and the pair of opposite resilient bodies 39 and 41 are simultaneously overmolded on the opposite top and bottom faces of the strap 11 (Figure 7). Resilient material of the bodies 39 and 41 fill the holes 47-49 (Figure 8) to interconnect the bodies 39 and 41 and retain the latter bodies on the corresponding top and bottom faces of the strap 11. Those of ordinary skill in the art will appreciate that the insertion of the first sections 64 and 65 of the tabs 62 and 63 in the notches 60 and 61 prevents the extensions 43 and 44 to slide out of the tabs 62 and 63.

[0036] The same method is used to produce and simultaneously install the resilient bodies 41 and 42.

[0037] In the embodiment of Figures 6-8, the bodies 39-42 are generally semicylindrical with rounded ends.

[0038] When the deformation by compression of the spring portion 3 reaches 7 cm, the bottom face of the upper spring layer 9 is applied to the shock absorbing

bodies 39 and 40 while the top face of the lower spring layer 10 is applied to the shock absorbing bodies 41 and 42. At this moment:

(a) the resilient shock absorbing bodies 39-42 progressively absorb compression forces and corresponding energy is accumulated and stored in the resilient bodies 39-42 and is subsequently released to increase the bouncing power of the sporting and exercising device;

(b) each shock absorbing body (for example shock absorbing body 39) create a progressively increasing lever force on the end section of the corresponding spring layer (for example spring layer 9) between the shock absorbing body (for example shock absorbing body 39) and the corresponding connecting member (for example arrow-shaped connecting member 12) whereby the flexibility of this end section contributes to increase the resistance to compression of the spring portion 3; and

(c) starting from a certain degree of compression of the shock absorbing bodies 39-42, the span of the two spring layers 9 and 10 is reduced to the distance separating the two shock absorbing bodies 39 and 40; 41 and 42, respectively, whereby the rigidity of the spring layers increases to increase the resistance to compression of these spring layers.

[0039] The above described structure including the shock absorbing bodies 39-42 presents, amongst others, the following advantages:

- increased bouncing power of the device;
- improved comfort for the user;
- increased flexibility of the sporting and exercising device (wider range of resistance to compression);
- improved protection of the user's joints by a better absorption of the impacts and by an increased impact time;
- the sporting and exercising device is more quiet whereby it can also be used indoors, for example in fitness classes; and
- more personalized weight and stiffness/softness adjustments of the sporting and exercising device are enabled for each user by changing the dimensions and hardness of the resilient shock absorbing bodies 39-42.

[0040] Finally, Figure 9 shows that the resistance (force in Newtons) of the spring portion 3 to compression continues to increase after the threshold of 7 cm of de-

formation by compression has been reached. Generally speaking, the present invention therefore eliminates the major drawback of a spring portion that collapses as soon as a deformation by compression of about 7 cm has been reached.

[0041] Although the present invention has been described hereinabove with reference to preferred embodiments thereof, these embodiments can be modified at will, within the scope of the appended claims, without departing from the spirit and nature of the subject invention.

Claims

1. A sporting and exercising device comprising:

- an upper foot receiving portion (1) and
- a lower spring portion (3) fastened to the foot receiving portion, said spring portion comprising :
 - an upper spring layer (9) arched upwardly and comprising a bottom face and first and second opposite ends;
 - a lower spring layer (10) arched downwardly and comprising a top face and first and second opposite ends;
 - an intermediate substantially elastic elongate member (11) having a top and a bottom face and first and second opposite ends;
 - first means (12) for connecting the first ends of the upper spring layer, the lower spring layer and the intermediate member;
 - second means (13) for connecting the second ends of the upper spring layer, the lower spring layer and the intermediate member; and
 - shock absorbing means (50-53) mounted between said upper and lower spring layers,

characterized in that the shock absorbing means comprise :

first (50) and second (51) shock absorbing means which are mounted :

- remote from each other,
- on one of the bottom face of the upper spring layer and the top face of the intermediate member, and
- spaced apart from the other of said bottom face of the upper spring layer and the top face of the intermediate member; and

third (52) and fourth (53) shock absorbing means which are mounted :

- remote from each other,
 - on one of the bottom face of the intermediate member and the top face of the lower spring layer, and
 - spaced apart from the other of said bottom face of the intermediate member and the top face of the lower spring layer.
2. A sporting and exercising device as recited in claim 1, in which the first shock absorbing means (50) is situated proximate the first ends of the upper spring layer (9) and the intermediate member (11), the second shock absorbing means (51) is situated proximate the second ends of the upper spring layer and the intermediate member, the third shock absorbing means (52) is situated proximate the first ends of the lower spring layer (10) and the intermediate member, and the fourth shock absorbing means (53) is situated proximate the second ends of the lower spring layer and the intermediate member.
3. A sporting and exercising device as recited in claim 1, in which the intermediate, substantially elastic elongate member (11) comprises a plastic strap having a top face and a bottom face.
4. A sporting and exercising device as recited in claim 3, in which:
- the first shock absorbing means (50) comprises a first body (39) made of resilient material and mounted on the top face of the plastic strap (11);
 - the second shock absorbing means (51) comprises a second body (40) made of resilient material and mounted on the top face of the plastic strap;
 - the third shock absorbing means (52) comprises a third body (41) made of resilient material and mounted on the bottom face of the plastic strap and
 - the fourth shock absorbing means (53) comprises a fourth body (42) made of resilient material and mounted on the bottom face of the plastic strap.
5. A sporting and exercising device as recited in claim 4, in which the first, second, third and fourth bodies (39 - 42) are generally elongate, transversal bodies.
6. A sporting and exercising device as recited in claim 1, wherein:
- the lower spring layer (10) is made of a sturdy, generally flexible plastic material and comprises a bottom face; and
 - the sporting and exercising device further comprises a sole (38) mounted to the bottom face of the lower spring layer and formed with an anti-slip bottom tread.
7. A sporting and exercising device as recited in claim 1, wherein:
- the first shock absorbing means (50) is spaced apart from the first ends of the upper spring layer (9) and the intermediate member (11);
 - the second shock absorbing means (51) is spaced apart from the second ends of the upper spring layer (9) and the intermediate member (11);
 - the third shock absorbing means (52) is spaced apart from the first ends of the lower spring layer (10) and the intermediate member (11); and
 - the fourth shock absorbing means (53) is spaced apart from the second ends of the lower spring layer (10) and the intermediate member (11).
8. A sporting and exercising device as recited in claim 1, wherein:
- the first shock absorbing means (50) is mounted on the top face of the intermediate member (11)
 - the second shock absorbing means (51) is mounted on the top face of the intermediate member
 - the third shock absorbing means (52) is mounted on the bottom face of the intermediate member; and
 - the fourth shock absorbing means (53) is mounted on the bottom face of the intermediate member.

Patentansprüche

1. Sport- und Trimmgerät mit:

einem oberen Fußaufnahmeabschnitt (1) und einem unteren Federabschnitt (3), der an dem Fußaufnahmeabschnitt befestigt ist, wobei der Federabschnitt aufweist:

- eine obere Federschicht (9), die nach oben gebogen ist und eine Unterseite und ein erstes und zweites Ende aufweist, die sich gegenüberliegen;
- eine untere Federschicht (10), die nach unten gebogen ist und eine Oberseite und ein erstes und zweites Ende aufweist, die sich gegenüberliegen;
- ein im wesentlichen elastisches, längliches Zwischenteil (11) mit einer Ober- und einer Unterseite und einem ersten und zweiten Ende, die sich gegenüberliegen;

eine erste Einrichtung (12) für eine Verbindung der ersten Enden der oberen Federschicht, der unteren Federschicht und des Zwischenteils; eine zweite Einrichtung (13) für eine Verbindung der zweiten Enden der oberen Federschicht, der unteren Federschicht und des Zwischenteils; und eine Stoßdämpfervorrichtung (50-53), die zwischen der oberen und der unteren Federschicht montiert ist,

dadurch gekennzeichnet, daß

die Stoßdämpfervorrichtung aufweist:
eine erste Stoßdämpfeinrichtung (50) und eine zweite Stoßdämpfeinrichtung (51), die entfernt voneinander, entweder auf der Unterseite der oberen Federschicht oder auf der Oberseite des Zwischenteils und beabstandet von jeweils der anderen Seite, entweder von der Unterseite der oberen Federschicht oder der Oberseite des Zwischenteils montiert sind; und eine dritte Stoßdämpfeinrichtung (52) und eine vierte Stoßdämpfeinrichtung (53), die entfernt voneinander, entweder auf der Unterseite des Zwischenteils oder auf der Oberseite der unteren Federschicht, und beabstandet von jeweils der anderen Seite, entweder von der Unterseite des Zwischenteils oder von der Oberseite der unteren Federschicht, montiert sind.

2. Sport und Trimmgerät nach Anspruch 1, dadurch gekennzeichnet, daß die erste Stoßdämpfeinrichtung (50) in der Nähe der ersten Enden der oberen Federschicht (9) und des Zwischenteils (11), die zweite Stoßdämpfeinrichtung (51) in der Nähe der zweiten Enden der oberen Federschicht und des Zwischenteils, die dritte Stoßdämpfeinrichtung (52) in der Nähe der ersten Enden der unteren Federschicht (10) und des Zwischenteils und die vierte Stoßdämpfeinrichtung (53) in der Nähe der zweiten Enden der unteren Federschicht und des Zwischenteils angeordnet ist.

3. Sport- und Trimmgerät nach Anspruch 1, dadurch gekennzeichnet, daß das im wesentlichen elastische, längliche Zwischenteil (11) einen Plastikriemen mit einer Ober- und einer Unterseite aufweist.

4. Sport- und Trimmgerät nach Anspruch 3, dadurch gekennzeichnet, daß

die erste Stoßdämpfeinrichtung (50) einen ersten Körper (39) aufweist, der aus einem federnden Material hergestellt und auf der Oberseite des Plastikriemens (11) montiert ist; die zweite Stoßdämpfeinrichtung (51) einen

zweiten Körper (40) aufweist, der aus einem federnden Material hergestellt und auf der Oberseite des Plastikriemens montiert ist; die dritte Stoßdämpfeinrichtung (52) einen dritten Körper (41) aufweist, der aus einem federnden Material hergestellt und auf der Unterseite des Plastikriemens montiert ist; und daß die vierte Stoßdämpfeinrichtung (53) einen vierten Körper (42) aufweist, der aus einem federnden Material hergestellt und auf der Unterseite des Plastikriemens montiert ist.

5. Sport- und Trimmgerät nach Anspruch 4, dadurch gekennzeichnet, daß der erste, zweite, dritte und vierte Körper (39-42) üblicherweise als längliche, transversale Körper ausgebildet sind.

6. Sport- und Trimmgerät nach Anspruch 1, dadurch gekennzeichnet, daß

die untere Federschicht (10) aus einem robusten, im allgemeinen verformbaren Plastikmaterial hergestellt ist und eine Unterseite aufweist; und daß

das Sport- und Trimmgerät außerdem eine Sohle (38) besitzt, die auf der Unterseite der unteren Federschicht montiert und mit einem Antirutsch-Unterprofil ausgebildet ist.

7. Sport- und Trimmgerät nach Anspruch 1, dadurch gekennzeichnet, daß

die erste Stoßdämpfeinrichtung (50) von den ersten Enden der oberen Federschicht (9) und des Zwischenteils (11) beabstandet ist; die zweite Stoßdämpfeinrichtung (51) von den zweiten Enden der oberen Federschicht (9) und des Zwischenteils (11) beabstandet ist; die dritte Stoßdämpfeinrichtung (52) von den ersten Enden der unteren Federschicht (10) und des Zwischenteils (11) beabstandet ist; und daß

die vierte Stoßdämpfeinrichtung (53) von den zweiten Enden der unteren Federschicht (10) und des Zwischenteils (11) beabstandet ist.

8. Sport- und Trimmgerät nach Anspruch 1, dadurch gekennzeichnet, daß

die erste Stoßdämpfeinrichtung (50) auf der Oberseite des Zwischenteils (11) montiert ist; die zweite Stoßdämpfeinrichtung (51) auf der Oberseite des Zwischenteils montiert ist; die dritte Stoßdämpfeinrichtung (52) auf der Unterseite des Zwischenteils montiert ist; und daß

die vierte Stoßdämpfeinrichtung (53) auf der Unterseite des Zwischenteils montiert ist.

Revendications

1. Dispositif d'entraînement sportif et de musculation comprenant:

- une partie supérieure (1) de réception du pied; et
- une partie inférieure formant ressort (3) fixée à la partie de réception du pied, ladite partie formant ressort comprenant:
 - une couche supérieure formant ressort (9) cintrée vers le haut et comprenant une face inférieure et des première et seconde extrémités opposées;
 - une couche inférieure formant ressort (10) cintrée vers le bas et comprenant une face supérieure et des première et seconde extrémités opposées;
 - un élément allongé intermédiaire essentiellement élastique (11) possédant une face supérieure et une face inférieure et des première et seconde extrémités opposées;
 - des premiers moyens (12) pour raccorder les premières extrémités de la couche supérieure formant ressort, de la couche inférieure formant ressort et de l'élément intermédiaire;
 - des seconds moyens (13) pour raccorder les secondes extrémités de la couche supérieure formant ressort, de la couche inférieure formant ressort et de l'élément intermédiaire; et
 - des moyens (50-53) d'absorption des chocs, montés entre lesdites couches supérieure et inférieure formant ressorts,

caractérisé en ce que les moyens d'absorption de chocs comprennent:

des premiers moyens (50) et des seconds moyens (51) d'absorption de chocs, qui sont montés:

- à distance les uns des autres,
- sur l'une de la face inférieure de la couche supérieure formant ressort et de la face supérieure de l'élément intermédiaire,
- en étant distants de l'autre de ladite face inférieure de la couche supérieure formant ressort et de la face supérieure de l'élément intermédiaire; et

des troisièmes moyens (52) et des quatrièmes moyens (53) d'absorption de chocs, qui sont montés:

- à distance les uns des autres;
- sur l'une de la face inférieure de l'élément intermédiaire et de la face supérieure de la couche inférieure formant ressort, et
- en étant distants de l'autre de ladite face inférieure

rieure de l'élément intermédiaire et de la face supérieure de la couche inférieure formant ressort.

- 5 2. Dispositif d'entraînement sportif et de musculation selon la revendication 1, dans lequel les premiers moyens (50) d'absorption de chocs sont situés à proximité des premières extrémités de la couche supérieure formant ressort (9) et de l'élément intermédiaire (11), les seconds moyens (51) d'absorption de chocs sont situés à proximité des secondes extrémités de la couche supérieure formant ressort et de l'élément intermédiaire, les troisièmes moyens (52) d'absorption de chocs sont situés à proximité des premières extrémités de la couche inférieure formant ressort (10) et de l'élément intermédiaire et les quatrièmes moyens (53) d'absorption de chocs sont situés à proximité des secondes extrémités de la couche inférieure formant ressort et de l'élément intermédiaire.

3. Dispositif d'entraînement sportif et de musculation selon la revendication 1, dans lequel l'élément intermédiaire allongé essentiellement élastique (11) comprend une bande en matière plastique possédant une face supérieure et une face inférieure.

4. Dispositif d'entraînement sportif et de musculation selon la revendication 3, dans lequel:

les premiers moyens (50) d'absorption de chocs comprennent un premier corps (39) formé d'un matériau résilient et monté sur la face supérieure de la bande de matière plastique (11);

les seconds moyens (51) d'absorption de chocs comprennent un second corps (40) formé d'un matériau résilient et monté sur la face supérieure de la bande de matière plastique;

les troisièmes moyens (52) d'absorption de chocs comprennent un troisième corps (41) formé d'un matériau résilient et monté sur la face inférieure de la bande de matière plastique; et

les quatrièmes moyens (53) d'absorption de chocs comprennent un quatrième corps (42) formé d'un matériau résilient et monté sur la face inférieure de la bande de matière plastique.

5. Dispositif d'entraînement sportif et de musculation selon la revendication 4, dans lequel les premier, second, troisième et quatrième corps (39-42) sont des corps transversaux de forme générale allongée.

6. Dispositif d'entraînement sportif et de musculation selon la revendication 1, dans lequel:

la couche inférieure formant ressort (10) est

réalisée en une matière plastique robuste qui d'une manière générale est flexible, et comprend une face inférieure; et le dispositif d'entraînement sportif et de musculation comporte en outre une semelle (38) montée sur la face inférieure de la couche inférieure formant ressort et constituée par une bande inférieure antidérapante.

7. Dispositif d'entraînement sportif et de musculation selon la revendication 1, dans lequel:

les premiers moyens (50) d'absorption de chocs sont distants des premières extrémités de la couche supérieure formant ressort (9) et de l'élément intermédiaire (11);
 les seconds moyens (51) d'absorption de chocs sont distants des secondes extrémités de la couche supérieure formant ressort (9) et de l'élément intermédiaire (11);
 les troisièmes moyens (52) d'absorption de chocs sont distants des premières extrémités de la couche inférieure formant ressort (10) et de l'élément intermédiaire (11); et
 les quatrièmes moyens (53) d'absorption de chocs sont distants des secondes extrémités de la couche formant ressort (10) et de l'élément intermédiaire (11).

8. Dispositif d'entraînement sportif et de musculation selon la revendication 1;

dans lequel les premiers moyens (50) d'absorption de chocs sont montés sur la face supérieure de l'élément intermédiaire (11);
 les seconds moyens (51) d'absorption de chocs sont montés sur la face supérieure de l'élément intermédiaire;
 les troisièmes moyens (52) d'absorption de chocs sont montés sur la face inférieure de l'élément intermédiaire; et
 les quatrièmes moyens (53) d'absorption de chocs sont montés sur la face inférieure de l'élément intermédiaire.

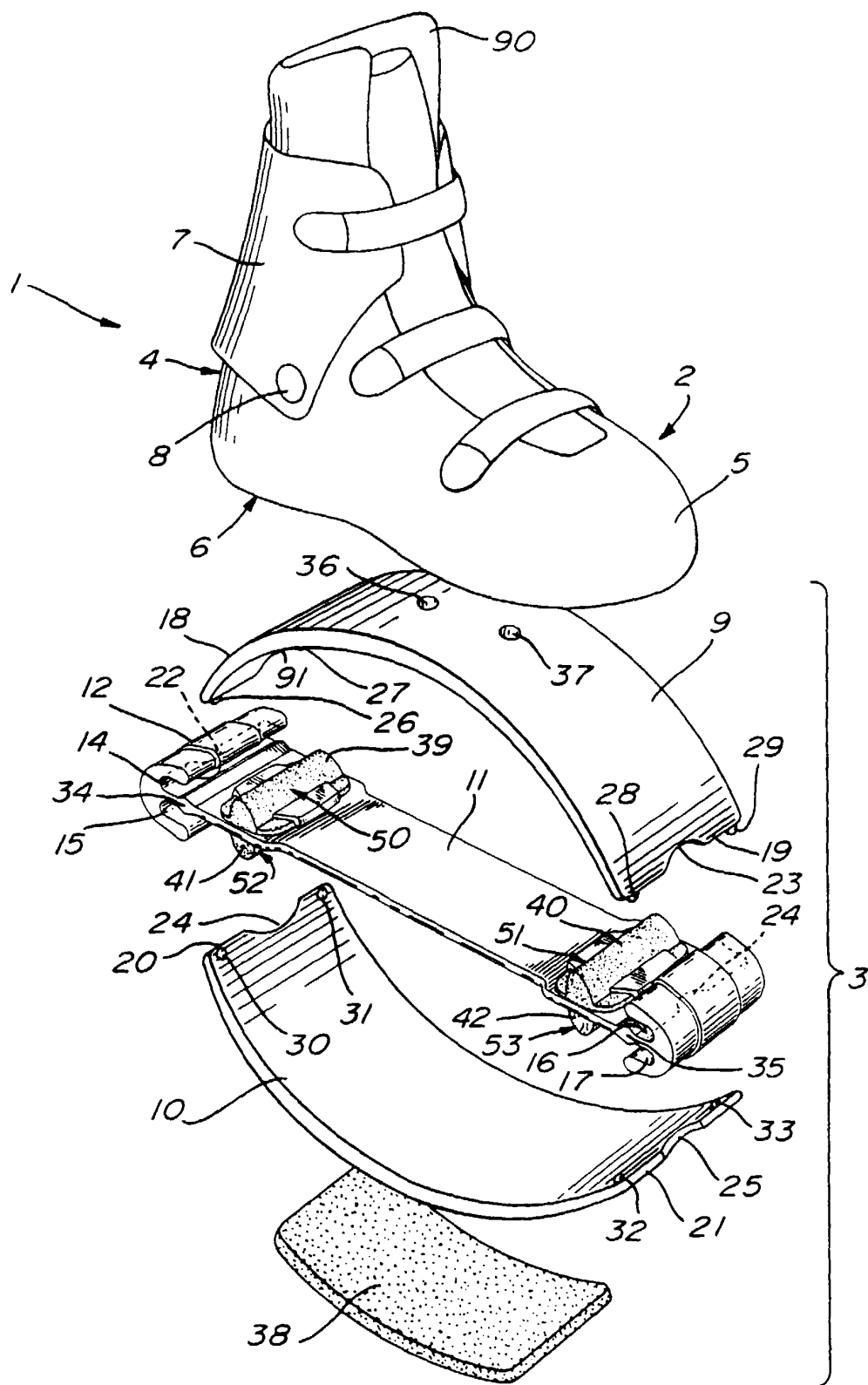


FIG. 1

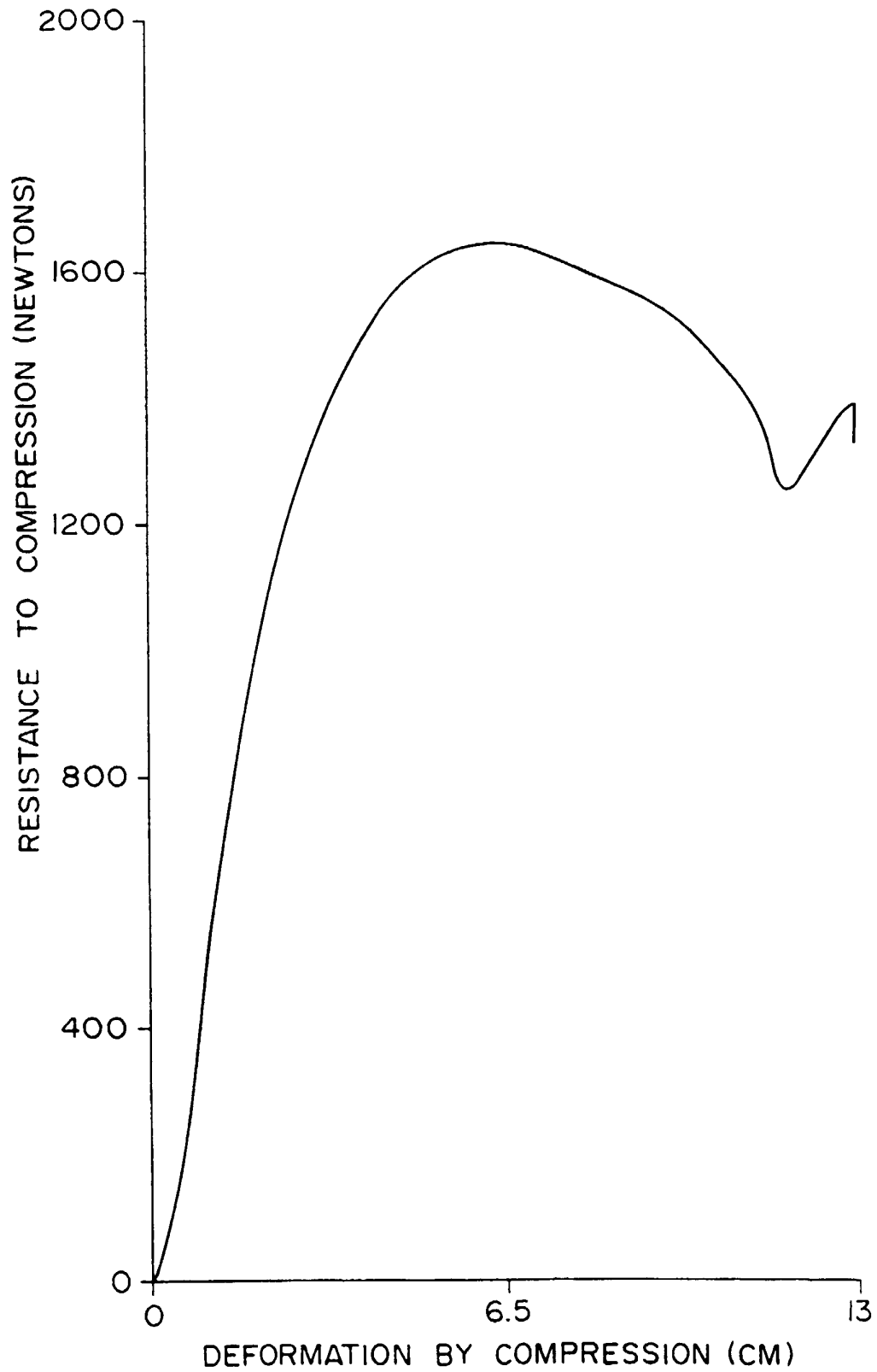


FIG. 2 (PRIOR ART)

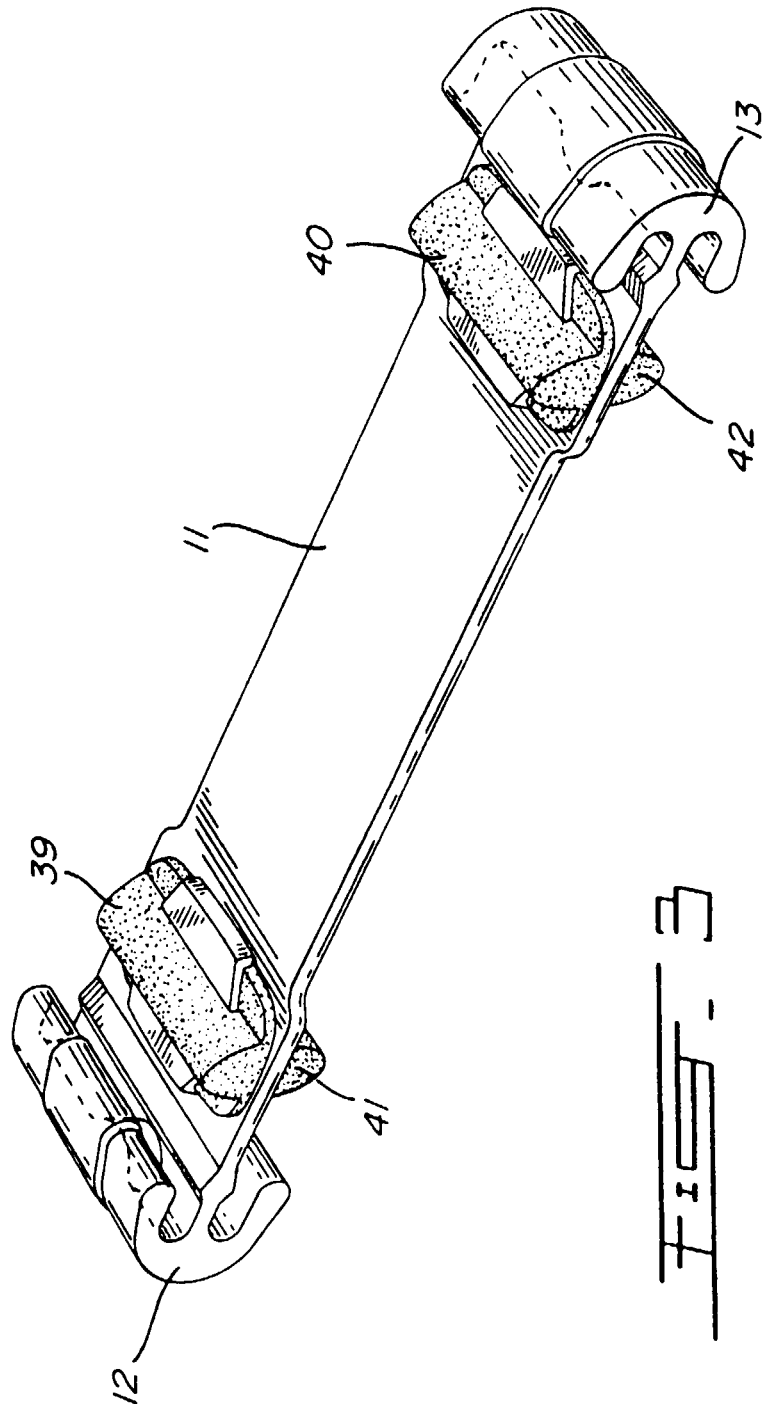
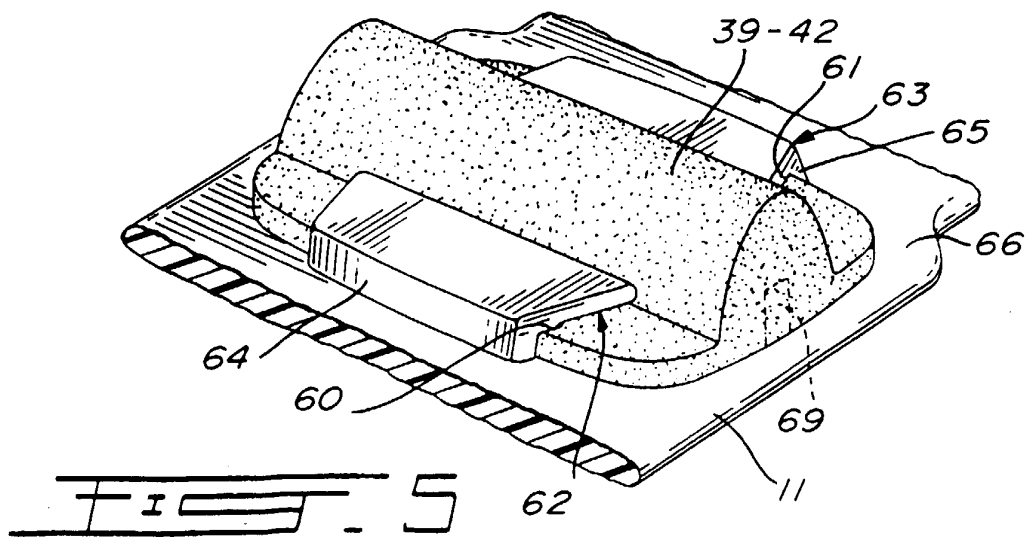
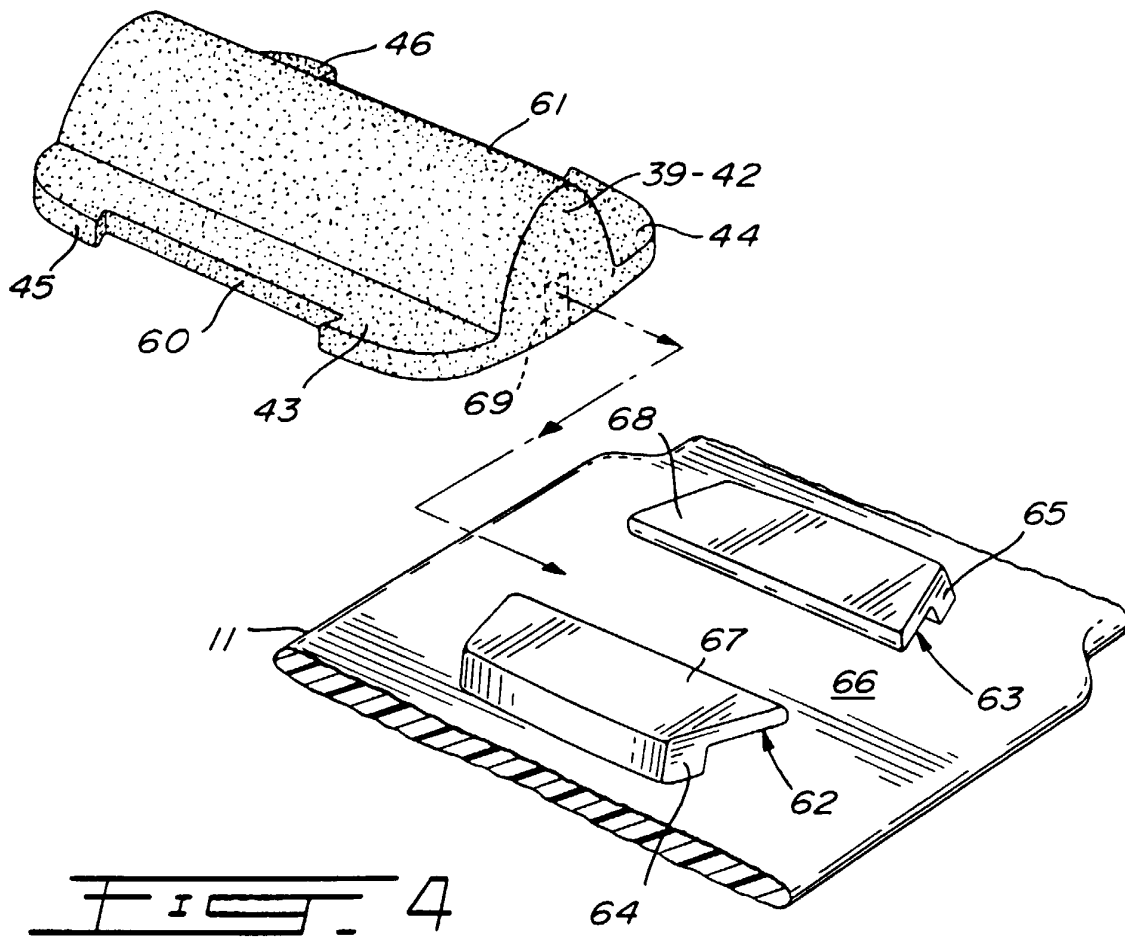
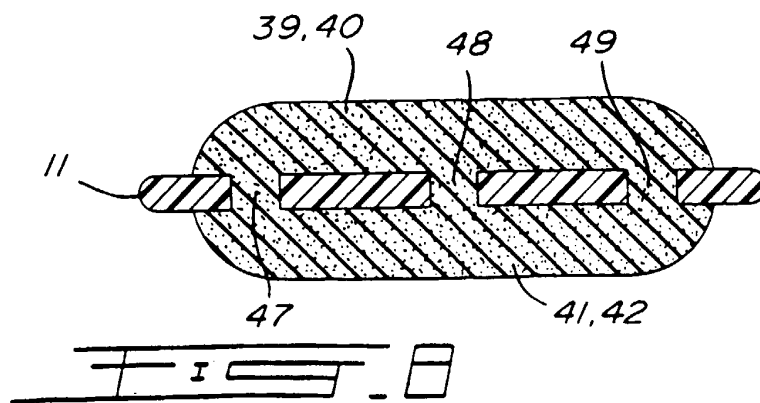
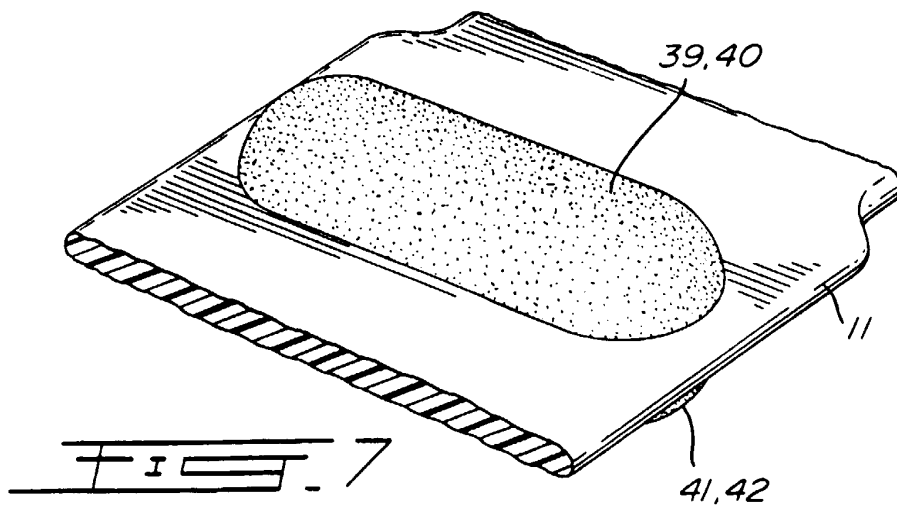
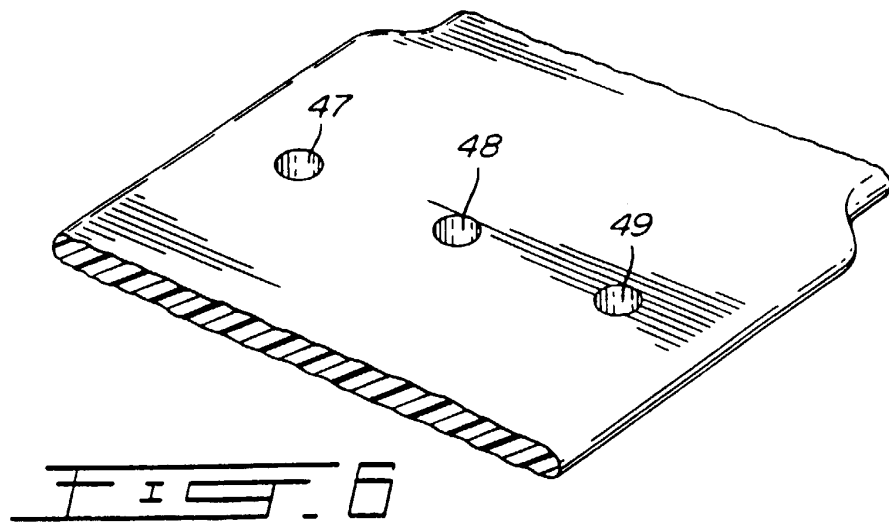


Fig. 3





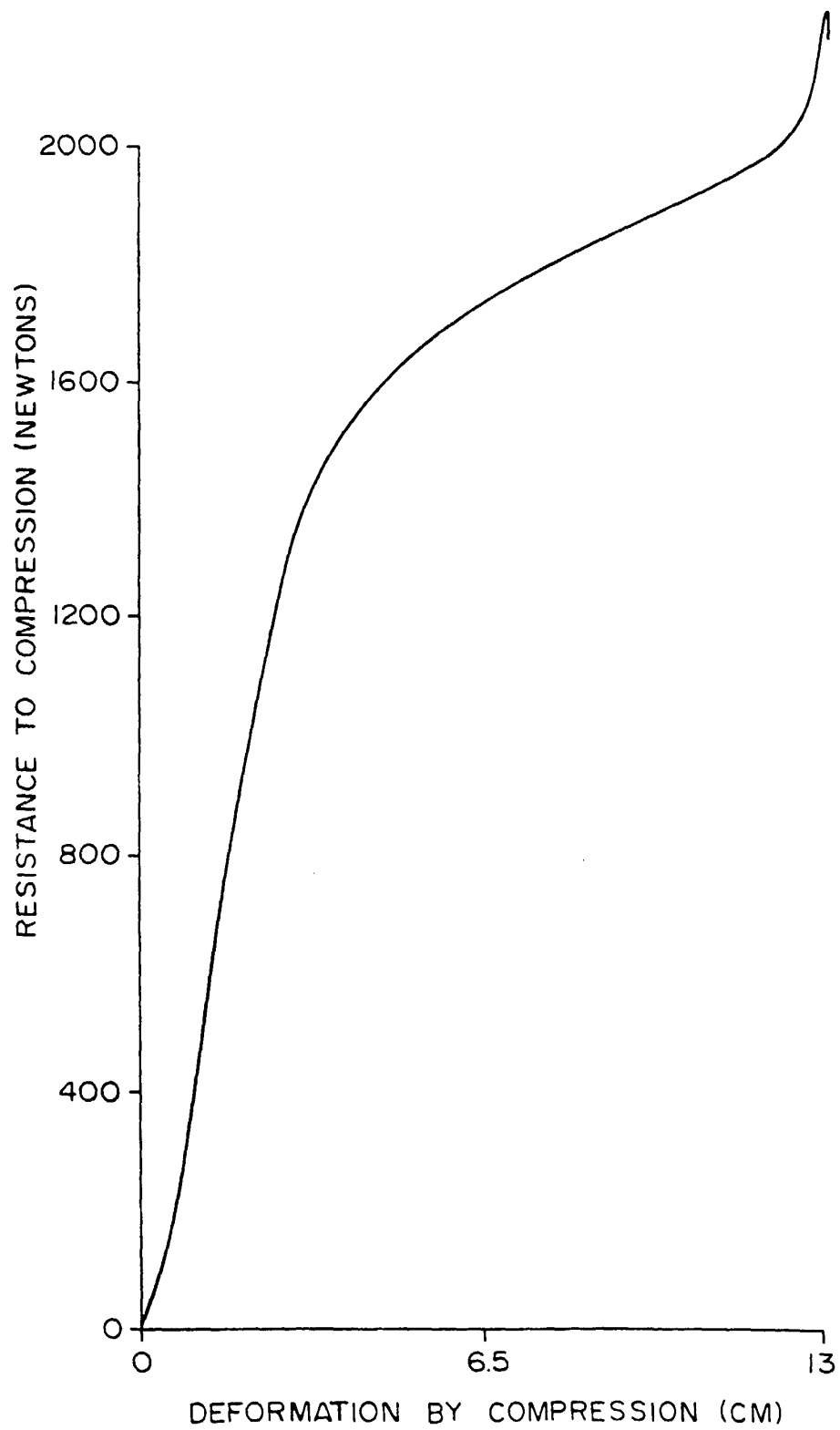


FIG. 9