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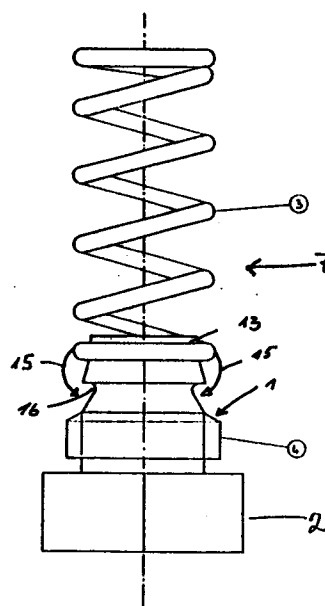
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54 **A cushion system for shoes.**

57 The cushioning assembly for the shoe is located in the rear part and comprises at least one spring (3) positioned between the outer sole (10) and the shoe upper (8), the shoe comprising an intersole (5) positioned between the outer sole and the upper. The outer sole has at least one internally threaded orifice (11) and at least one pin (1) is provided with an externally threaded portion, the externally threaded portion being engageable with the threaded orifice of the outer sole. The intersole has at least one threaded orifice of same size as the orifice of the outer sole, so that the spring rests on the threaded portion of the pin. The upper member has at least one tooth, the tooth entering the upper part of the spring, whereby the spring is held in place. Preferably a plurality of pins and springs and a plurality of teeth are provided and the springs may also be held in place between one tooth and the adjacent tooth.



This invention relates to shoes and more specifically to shoes which are provided with a cushioning assembly in the rear part. The cushioned shoe according to the present invention exerts a shock absorbing action when the wearer is in motion and also when he is standing. The cushioning system also helps to give the foot the correct position.

The present invention differs from other known devices which are mainly based on a different type of material being inserted between the shoe upper and the outer sole, or the presence of dampening inserts made of plastic material which are placed laterally or which pass through the rear part of the sole.

The crux of the present invention resides in the insertion of at least one, preferably a plurality of pins provided with springs in the rear portion of the shoe between the outer sole of the shoe which comes in contact with the ground and the upper. The invention is further illustrated by reference to the accompanying drawings of which:

Fig. 1 is an elevational view in cross section of the pin and spring;

Fig. 1a is a cross section of the pin;

Fig. 1b is a plan view in cross section of the spring;

Fig. 2 is a plan view of the intersole;

Fig. 3 is an elevational view of the intersole showing the pin to be inserted into an orifice of the intersole;

Fig. 4 is a plan view of the upper member of the cushioning assembly;

Fig. 5 is a side elevational view of the upper member of Fig. 4;

Fig. 6 illustrates the arrangement of the different parts of the cushioning assembly.

By reference to the drawings, Fig. 2, the inter-sole 5 is made of plastic or metal and is about 0.3-0.8 cm. It is provided with a plurality of threaded orifices in which the pins are introduced.

Numeral 10 in Fig. 6 illustrates the outer sole which is intended to come in contact with the ground. It is provided with a plurality of orifices 11a in locations corresponding to the orifices 11 in the intersole 5. Numeral 12 is the upper part of the upper sole 6 which comes in contact with the foot.

By reference to Fig. 1, the pin 1 comprises bottom portion 2 made of hard thermoplastic or rubber material and an upper portion 4 which is externally threaded. A spring 3 is placed firmly on the top portion 13. The pin serves three functions, namely it is a support for the spring, it is provided with a hard portion which comes in contact with the ground and is threaded to permit engagement with the intersole. The assembly of the pin and spring is designated by numeral 7. The final location of the lower end of the spring is indicated by the arrows 15, that means the spring is resting in the groove 16 on the top of the threaded portion 4.

As shown in Fig. 2, numeral 5 is the intersole provided with threaded orifices 11. This intersole is made of plastic material or metal. This intersole serves the function of housing the pin, imparting alignment to the spring, and imparting strength to the zone where the cushioning action is being exerted. Further it offsets any sliding of the cushioning assembly.

Figure 4 illustrates the upper sole 6 provided with a plurality of projections or teeth 14. The latter enter within the top part of the springs after the shoe is assembled so that the springs are firmly held in place. This upper sole 6 in addition to holding the springs and preventing the springs from hurting the foot of the wearer, impart strength to the cushioning zone and counterbalance the sliding of the cushioning assembly.

Numeral 10 in Fig. 6 is a conventional sole of a shoe provided with orifices 11a. These orifices are of size essentially equal to the base 2 of the pin.

Numeral 9 in Fig. 6 is another intersole which may optionally be inserted under the upper sole 6. This intersole is preferably made of foamed material, of low density so that it creates no resistance and contributes to create a shock absorbing action. It is provided with orifices 11b which must be of same size as the orifices 11 and 11a and are located in positions corresponding to orifices 11 and 11a. The spring 3 may be made of different material so that it will have different strength. The intersole 5 may be glued, sewn or may be attached to the outer sole by any suitable means. This intersole 5 gives the spring the correct direction and angle of inclination, reinforces the cushioning zone and through an appropriate angle of inclination inwardly, it balances the slight slipping or sliding outwardly of the assembly. This intersole may be made of metallic or plastic

material or may be rigid, may be made of one piece or composed of multiple parts.

Upper sole 6 provided with teeth may be glued, sewn, or fixed by any appropriate means to the shoe upper. It holds the upper ends of the springs, which may also be pressed against the toothed surface, thus avoiding skidding during use. It also reinforces the cushioning zone and counterbalances the skidding of the system by strengthening the material in the outer part of the foot, and provides a slight amount of inclination inwardly.

The diameter of the orifices may vary according to shoe size. It is not necessary to provide a specially designed system for the various sizes or half-sizes but lower pre-punched intersoles and toothed upper soles may be utilized for various sizes. The number of orifices as well as the dimensions and strength of the springs, are determined by the weight to be supported, or by the orthopedic defect to be corrected. The number of the orifices in the illustrated example is 13 which is suitable for average-sized shoes. Smaller sizes have less holes, while larger sizes have a greater number.

The total cushioning force resulting from the assembly according to the present invention is the sum of the number of springs multiplied by the elastic modulus of each spring and the elastic modulus of the outer sole. Fig. 6 shows how the different parts are arranged. The pins may be screwed in place by means of a suitable screwdriver. The

base of the pin may be circular or any other shape, for instance hexagonal. When the pins are worn out, they may be simply replaced in place.

One advantage of the shoe according to the present invention is that it may be used for sports footwear, such as training, jogging, tennis and foot-ball shoes, or any other shoe specifically used for running or marching. Due to its shock-absorbing effect, it minimizes the consequences of ailments such as tendonitis, periostitis, or any other temporary or chronic disease. Also the number of springs and the position of the springs may be varied according to individual needs. The cushioned shoe according to the invention reduces fatigue, reduces muscular strain and protects the bones of the foot.

Reference numerals

- 1 pin
- 2 bottom portion, base of the pin
- 3 spring
- 4 upper portion of the pin
- 5 intersole
- 6 upper sole
- 7 assembly of pin and spring
- 8 shoe upper
- 9 a further intersole
- 10 conventional sole or outer sole
- 11 threaded orifice
- 11a, orifice
- 11b
- 12 upper part of the upper sole
- 13 top portion of the pin
- 14 projections or teeth of the upper sole
- 15 arrows
- 16 groove of the pin

WHAT IS CLAIMED IS:

1. A shoe which has an outer sole (10), an upper (6) and a cushioning assembly (5,6,9) in the rear part thereof, said cushioning assembly comprising at least one spring (3) positioned between the outer sole (10) and the shoe upper (8), said shoe comprising an intersole (5) positioned between the outer sole and the upper.
2. The shoe according to Claim 1 wherein the outer sole (10) has at least one orifice (11a), the shoe comprising a pin (1) having a rigid base (2) and an externally threaded portion, said externally threaded portion passing through said orifice (11a) of the outer sole (10), said intersole (5) having at least one threaded orifice (11) of same size as the orifice of the outer sole, said threaded portion of said pin being engageable with said threaded orifice of said intersole, said spring resting on the threaded portion of said pin.
3. The shoe according to Claim 2 which comprises an upper sole (6), said upper sole having at least one tooth (14), said tooth entering the upper part of said spring, whereby the spring is held in place.
4. The shoe according to Claim 3 wherein said base (2) of the pin is a stud integral with said threaded portion of the pin.
5. The shoe according to Claim 3 which has a plurality of springs said outer sole (10) has a plurality of orifices (11a) and said upper sole has a plurality of teeth (14), each tooth entering the upper part of each of said springs and holding said spring in place.

6. The shoe according to Claim 2 which has a plurality of springs, said upper sole has a plurality of teeth and the upper part of said springs is held in place between two adjacent teeth.

7. The shoe according to Claim 2, wherein said intersole (5) comprises a rigid sheet of appropriate material, preferably plastic material.

8. The shoe according to Claim 7, wherein a further intersole (9) is placed between the intersole (5) and the uppersole (6), this intersole (9) being prepared preferably of foamed, elastically deformable material and being provided with orifices (11b) in alignment with the corresponding teeth of said upper sole (6) and orifices (11) of said intersole respectively.

9. The shoe according to any of the preceding claims, wherein the pin (1) has a top portion (13) entering the lower part of the spring (3).

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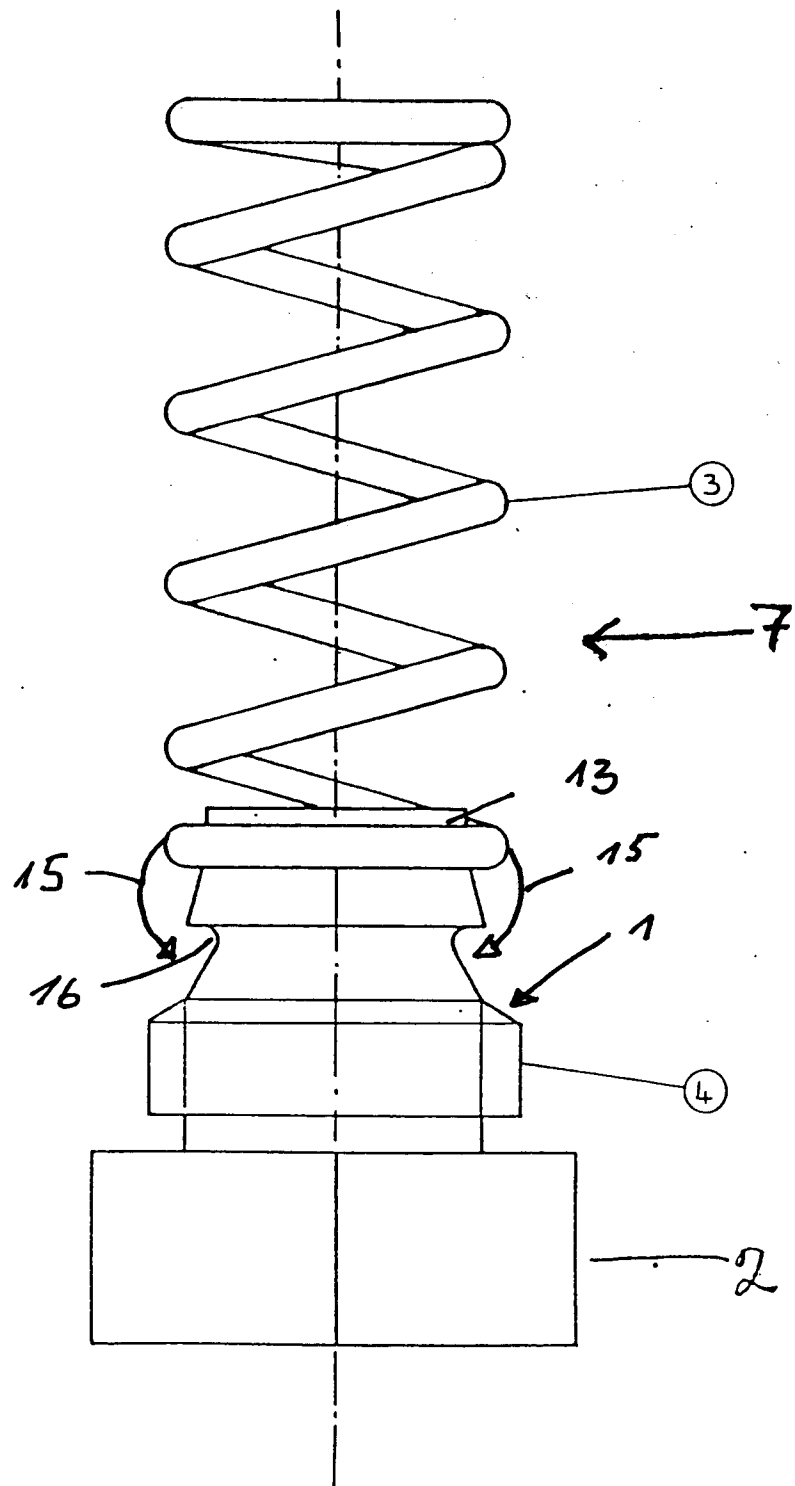


Fig 1

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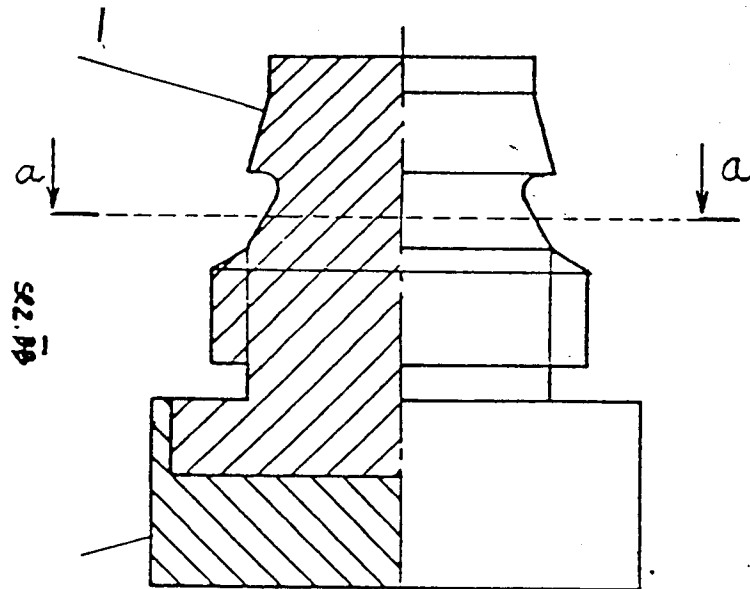
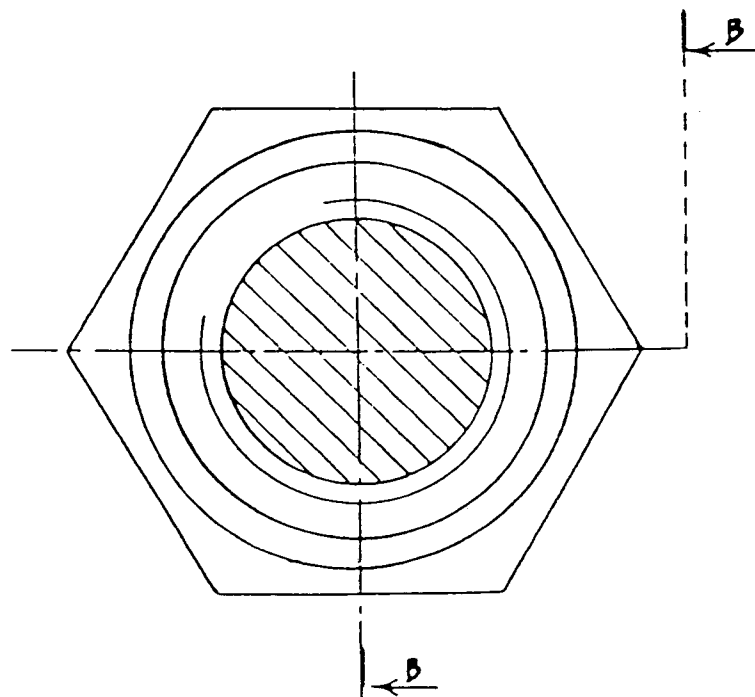


Fig 1a



sez. bb

Fig 1b

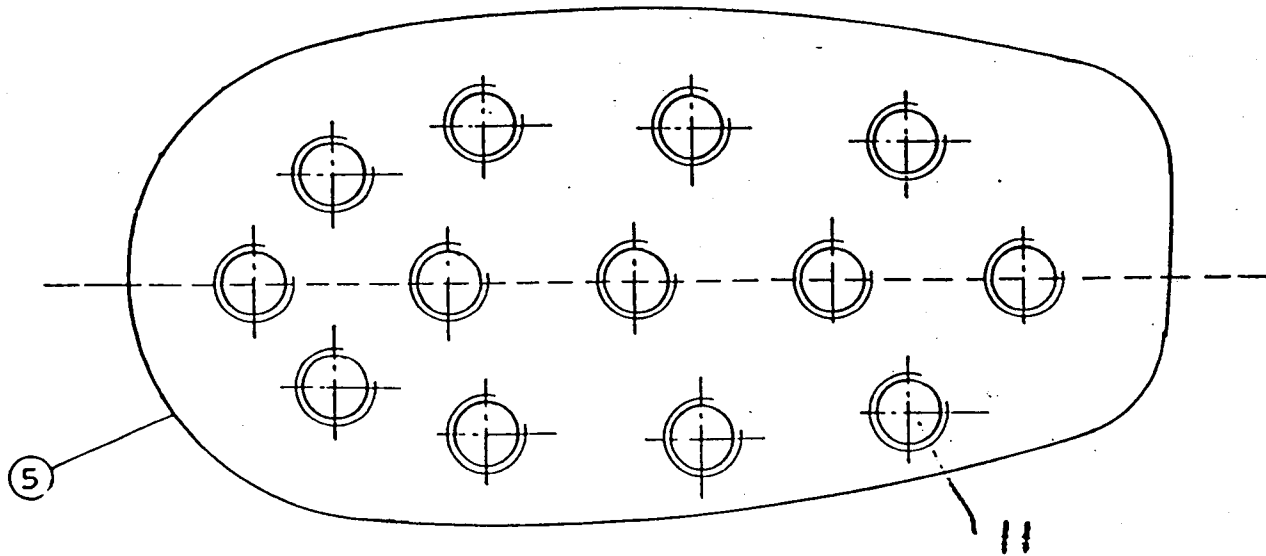


Fig 2

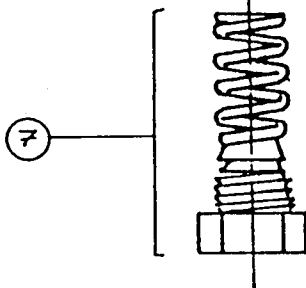
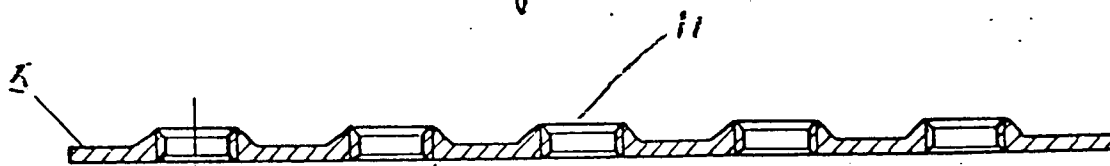


Fig 3

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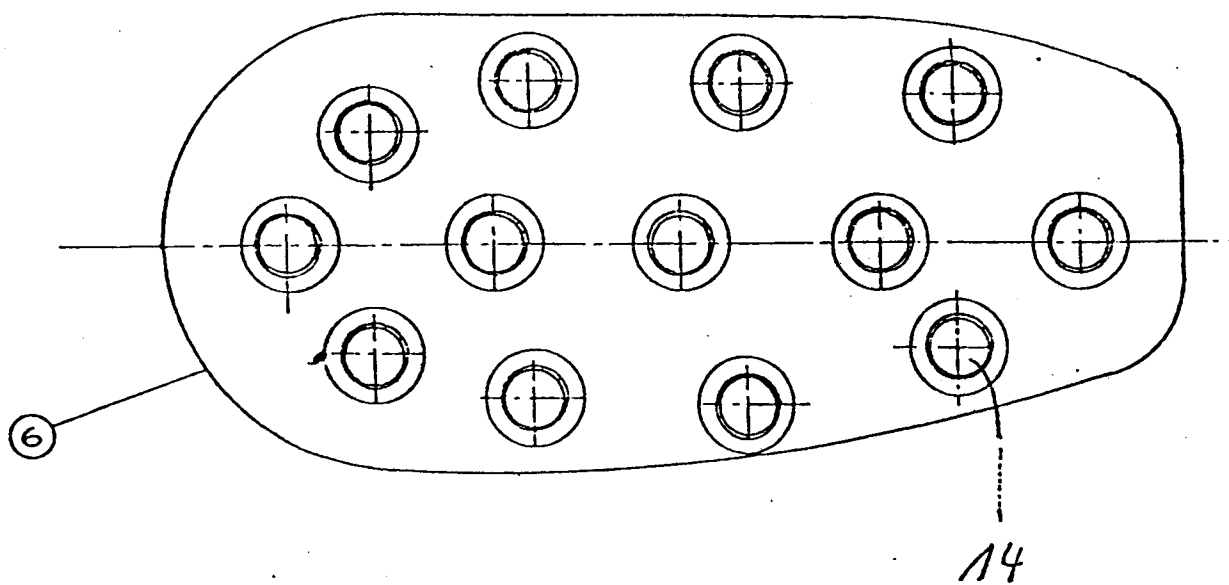


Fig 4

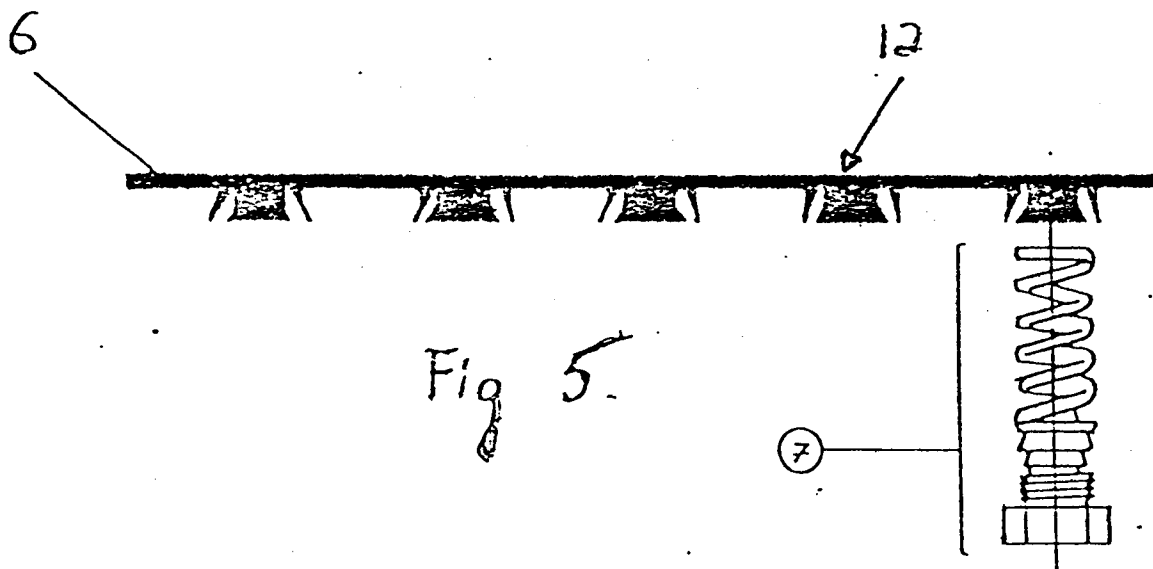


Fig 5

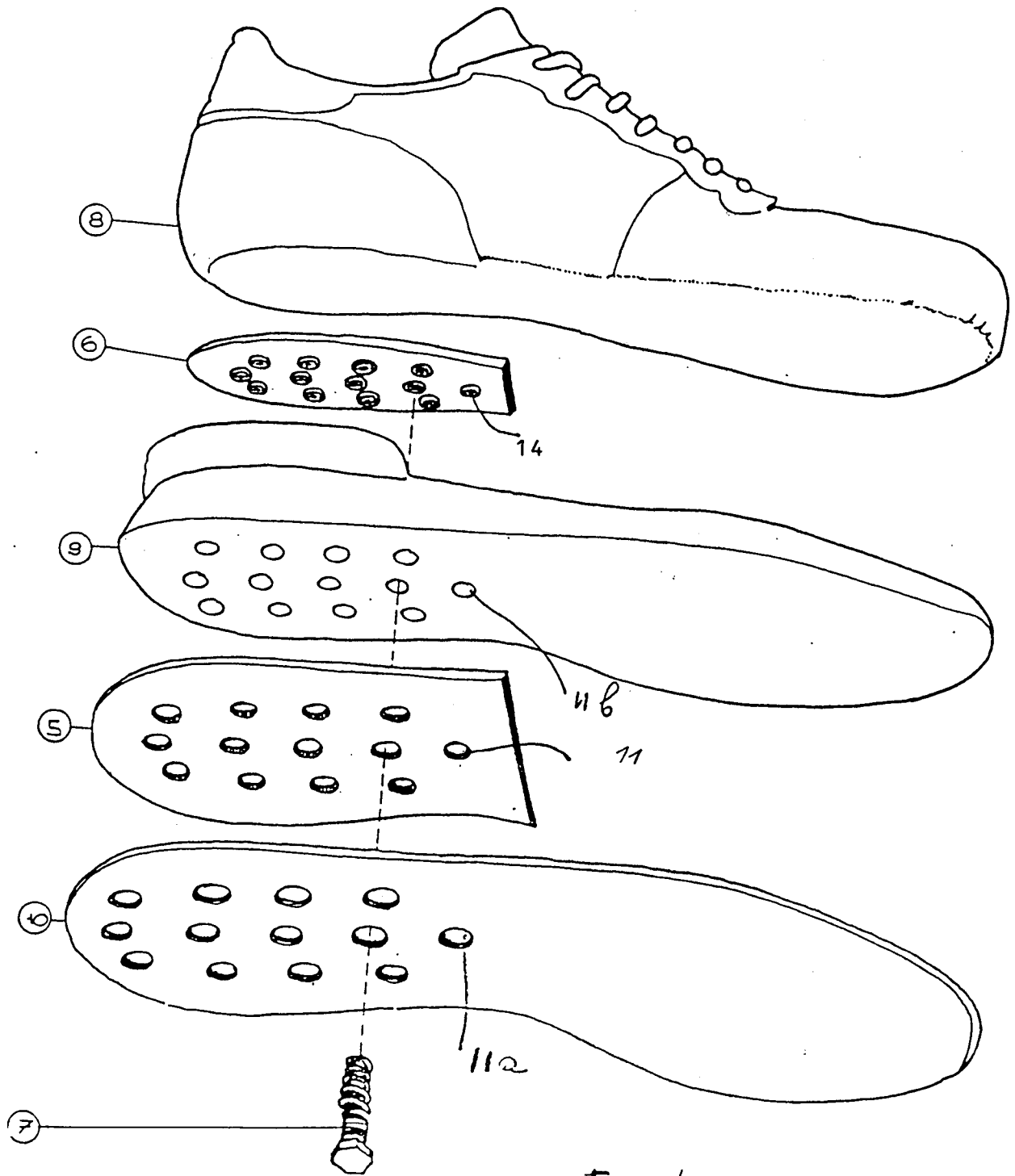


Fig 6



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ⁴)
X	US-A-2 721 400 (S. ISRAEL)	1, 7, 8	A 43 B 21/30 A 43 B 13/18
X	FR-A-2 577 119 (TECHNISYNTHESE)	1	
A	FR-A- 871 303 (R. PRADEAU)	3	
A	LU-A- 31 816 (A. TENNINA)	1	
A	US-A-2 710 460 (G. STASINOS)	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ⁴)
			A 43 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 04-12-1986	Examiner DECLERCK J.T.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	