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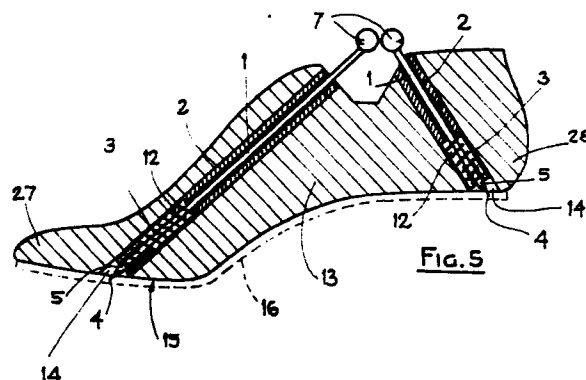
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54 **Automatic fixing device for insoles applicable to footwear lasts.**

57 A moving rod (1), sliding within a tubular body - (2) forced in a hole (14) of a last (13) or sliding directly in a hole (14') made in the last itself (13) has one end fitted with a comb (5) having pointed prongs (4) and the other end having spherical, or rounded ends (7). The pointed prongs (4) protrude from the bottom (15) of the last (13) while the other end is aligned with a pressor piston (8).

Two inclined and contrasted devices are mounted on each last, so that the points of the respective prongs (4) protrude from the bottom (15), resulting inclined, contrasted and orientated with one another, towards the toe (27) and towards the heel (28) respectively.

When the prongs (4) of the two devices are embedded into the insole surface (16) by the pressor piston (8) it remains adhering and fixed to the bottom (15) of the last (13) thanks to the contrasted orientation of the said prongs.



"AUTOMATIC FIXING DEVICE FOR INSOLES APPLICABLE TO FOOTWEAR LASTS".

The invention refers to an automatic device for insoles, applicable to footwear lasts, consisting of a movable rod, which slides within a tubular body where an elastic return member is housed, with numerous pointed prongs aligned with each other on one end.

One pair of the said rods is applied to each footwear last so that the prongs of one of them slightly protrude from the bottom of the last corresponding to and in the direction of the toe, and the prongs of the second slightly protrude from the said bottom, but corresponding to and in the direction of the heel.

Whereas, the other ends of the said rods protrude from the last neck and are aligned by pressors.

When footwear is made, one of the first processing phases consists in fixing the insoles to the lasts to allow the successive pre-assembly-assembly operations of the uppers. The preliminary, but fundamental operation is presently performed manually. The workers assigned to this operation must rest the corresponding insole on each over-turned last and fix it using numerous small nails. Once all the assembly operations of the uppers and the carding of their bottoms in the successive operations have been completed on the last the insoles must be released by removing the nails before the sole fixing operations are carried out.

The nail removing operation to release the insoles also requires the manual intervention of the operators.

The aim of this invention is to overcome the above mentioned manual nailing and nail-removal operations. The invention, as characterised by the claims, overcomes the problem by forming an automatic fixing device for insoles applicable to footwear lasts.

The following results are achieved by the use of a device of this type: the ends of the aligned prongs, present on the ends of each rod and protruding from the bottom of the lasts, are pushed into the surface of the insoles; due to the contrasting orientation of the two automatic fixing devices applied onto each last, the corresponding aligned prongs are in contrast with each other, the connection holds the insoles against the bottom of the lasts.

The advantages provided by this invention essentially consist in the fact that the coupling operation of the insoles to the lasts is made simple, rapid and automatic, the operation is performed mechanically with less need of labour; the connection between the insoles and lasts is sufficiently rigid as to guarantee the perfect execution of all

the successive operations; separation of the last from the insoles is achieved very easily, by simply sliding off the upper; the possible minor burrs produced by the prongs on the heel when sliding off the upper are however covered over by the finishing lining; the prongs of the toe device do not cause burrs, since their orientation corresponds to the extraction direction of the last. The invention will be described in greater detail here, with the help of the attached drawings, where:

fig. 1 represents a longitudinal cross-section of an initial embodiment of the device;

fig. 2 represents a longitudinal cross-section of the same device of fig.1, viewed at an orthogonal plane to the previous one;

fig. 3 represents a longitudinal cross-section of a second embodiment of the device;

fig.4 represents a longitudinal cross-section of a third solution of the device;

fig. 5 represents a transverse cross-section of a footwear last complete of the two fixing devices and

fig. 6 represents a schematic side view of a machine head equipped for the industrial use of the automatic fixing devices for insoles.

The figures represent automatic fixing devices for insoles, applicable to footwear lasts consisting essentially of a moving rod (1), that slides inside a tubular body (2) in which an elastic return member is housed (3) as for example, a spiral spring, with numerous prongs (4) on one end, the said prongs being pointed and aligned with one another in the form of a comb (5).

The other end of the rod (1) is preferably fitted with a spherical or rounded end (7), designed to support the impacts of a presser piston (8).

The body (2) that forms the guide in which the rod (1) can slide longitudinally, may be made in various ways. In fig.1 it consists of a simple length of tube and a return spring (3) is interposed between its ends (9) and the rear part of the comb (5). At the other end the body (2) has grooves (10) in which small guide pins slide (11) these maintain the rod (1) and the comb (5) aligned, in accordance with the pre-established orientation. In a second solution, illustrated in fig.3 the tubular guide body (2) is fitted with an internal cylindrical seat (12) in which the return spring (3) is inserted. The guide grooves (10') are realised here in the front part of the tubular body (2) and alignment is maintained via the sliding of the said comb (5) therein. The automatic fixing devices made in accordance with that illustrated previously, or according to possible variants are successively forced inside the holes (14) made in the lasts (13), until the pointed ends

of the prongs (4) kept in tension by the return spring (3) are made to protrude from their base - (15). Alternatively-a further valid, particularly economic solution and suitable for lasts (13) made with sufficiently resistant materials -the tubular body (2) may also be omitted, using the holes (14') made on the lasts (fig.4) directly as a guide for the rods (1). In any case two automatic fixing devices are applied to each one of the lasts (13) inclined and contrasted with one another, so that the relative pointed prongs (4) are inclined, opposed and oriented to one another towards the toe (27) and towards the heel (28) of the said last respectively.

The orientation of the prongs (4) i.e. of the combs (5) is substantially parallel to the base plane (15) of the last (13) and transverse to it.

In order to be used the last (13) is turned over and the insole (16) is placed on top of the last base (15); in this arrangement the prongs (4) are normally pushed inside the tubular bodies (2), or (14').

The overturned last (13) is then fitted onto the rear fixed pin (17) and on an adjustable front support (18), preferably made of an elastic material, such as rubber and similar products.

The insole (16) is successively pressed against the base (15) of the last (13) by a pair of upper pads (22) that oscillate about fulcrums (23) and are held by supports (24) the position and distance of which are adjusted by sliding along the guides - (25).

Analogously, the adjustable front buffer (18) is also held by a support (29) that can slide along the guide (19). The supports (24) and (29) are fitted with fixing screws (26) and (20).

The upper guides (25) in turn oscillate about an upper fulcrum (30) placed on the upper pressor piston (21). Adjustment of the buffer (18) and of the pads (22) and their oscillation about the fulcrums - (23) and (30) allow a perfect, rapid and simple fixing of the last (13) against the insole (16), irrespective of their shape and size.

Once the last (13) and the corresponding insole (16) are fixed in this way, the pressor piston, or hammer (8) is actioned, which by forcing against the spherical, or rounded ends (7) aligned thereto, exerts a force on the rods (1) causing them to slide towards the base (15) of the last (13). Thanks to the said sliding action, the prongs (4) of the combs (5) which had been pressed inside the last (13) by the pressure exerted by the positioning of the insole (16), but which however had remained in contact with it thanks to the effect of the return spring (3) become embedded in the surface of the said insole.

By separating the upper pressor piston (21) the upper pads (22) rise up and their last (13) can be withdrawn, together with its relative insole (16) fixed to it by the protruding prongs (4), embedded therein, in correspondance to the toe and the heel.

The inclined and contrasting orientation of the combs (5) and hence of the prongs (4), ensures perfect adhesion of the insole (16) to the corresponding last (13), which may be transferred to the successive processing phases.

From that illustrated and described it can be appreciated that the automatic fixing device significantly simplifies the operation of applying insoles and makes it more rapid since it is performed automatically, without requiring much labour.

The structural simplicity of the device permits its application rapidly and economically on any type of last (13) whether it is a new construction, or one existing already.

The pressor piston, or hammer (8) is preferably realised by a pneumatic, or hydraulic piston on the stem of which a round body, or roller is applied.

The hammer (8) and the ends (7) against which it rests, have rounded shapes to allow easy distribution of the force in the inclined directions of the rods (1).

In the continuation of the footwear processing the insole (16) will be released from the last (13) at the very moment that it will be slipped off the upper, not illustrated, which at that point will already be fixed to the insole. Due to the inclination of the prongs (4) corresponding to the heel (28) during extraction of the last (13), slight burrs are produced in correspondance to the point of each prong, which however are covered over by the finish lining. The prongs (4) of the device applied on the toe (27) of last (13) however do not cause any burrs, since their orientation corresponds to the direction of extraction of the last from the upper.

Claims

1) Automatic fixing device for insoles, applicable to footwear lasts, characterised by including a moving rod (1), that slides inside a tubular body (2) or - (14') and held in position by an elastic return member (3) having numerous pointed prongs (4) at one end, aligned with each other in the form of a comb (5) and the other end having a spherical or rounded end (7).

2) Automatic fixing device for insoles, according to claim 1, characterised by having grooves - (10), or (10') inside which small pins (11) or the edges of the comb (5), slide having a guiding and alignment function.

3) Automatic fixing device for insoles, according to claim 1, wherein the moving rod (1) slides in an independent tubular body (2) that is forcibly inserted in a hole (14) made in the last (13).

4) Automatic fixing device for insoles, according to claim 1, wherein the moving rod (1) slides directly in a hole (14') made in the last (13).

5) Automatic fixing device for insoles, according to claims 1 and 3, wherein the elastic return member consists of spiral spring (3) positioned between the end (9) of the tubular body (2) and the bottom of the comb (5).

6) Automatic fixing device for insoles, according to claims 1, 3 and 4, wherein the independent tubular body (2) or the hole (14') of the last (13) have an internal, cylindrical seat (12) in which the spiral spring is placed (3).

7) Automatic fixing device for insoles, according to claim 1, wherein the tips of the prongs (4) of each comb (5) protrude from the bottom (15) of the lasts (13) in a transverse position.

8) Automatic fixing device for insoles, according to claims from 1 to 7 wherein each last (13) has two of the said devices mounted, inclined and in

contrast, so that the points of the respective pointed prongs (4) protrude from the base (15) and are inclined, contrasted and orientated to each other, towards the toe (27) and towards the heel (28) respectively.

9) Automatic fixing device for insoles, according to claims from 1 to 8, wherein the last (13), with the corresponding insole (16) rested against its base (15) is held between a fixed rear pin (17) and an adjustable, elastic buffer (18) and a pair of upper oscillating pads (22) held under pressure by an upper piston (21) and adjustable supports (24) and which oscillate about fulcrums (23).

10) Automatic fixing device for insoles, according to claims from 1 to 9 wherein the spherical, or rounded ends (7) of the sliding rods (1) are aligned with a pressor piston (8).

11) Automatic fixing device for insoles according to claims from 1 to 10, wherein the end of the pressor piston (8) and the ends (7) have a rounded shape.

12) Automatic fixing device for insoles, according to claims from 1 to 11, wherein the pressor piston is of the hydraulic or pneumatic type.

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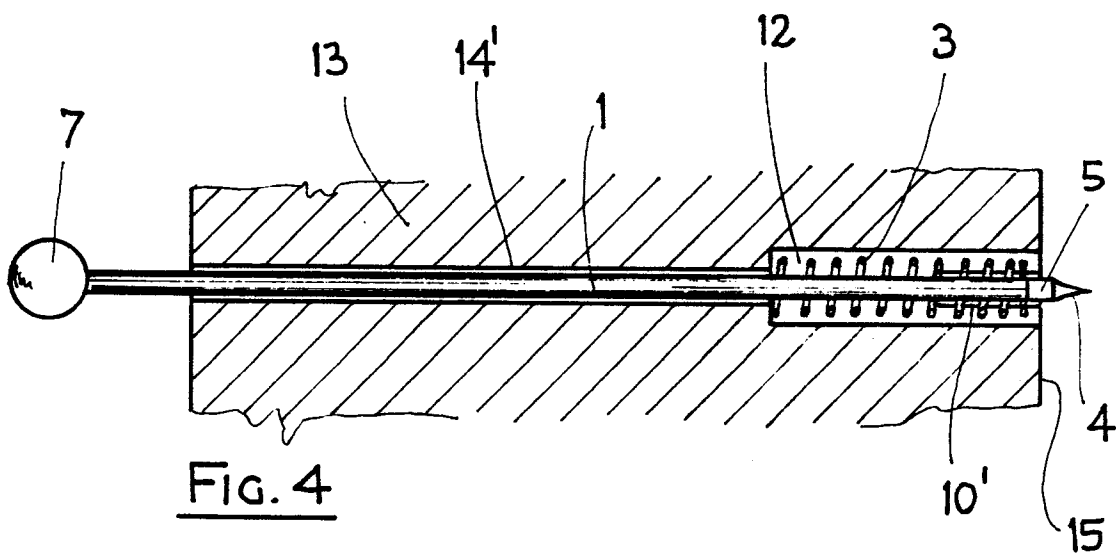
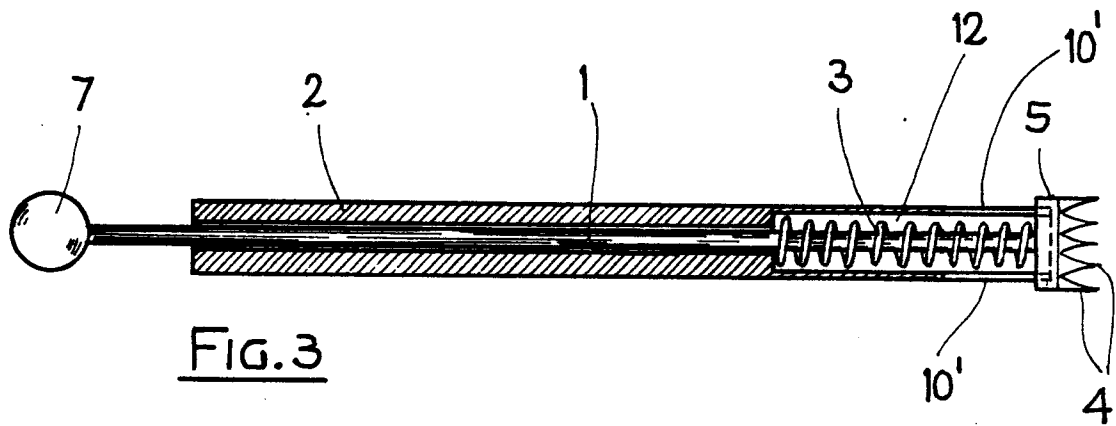
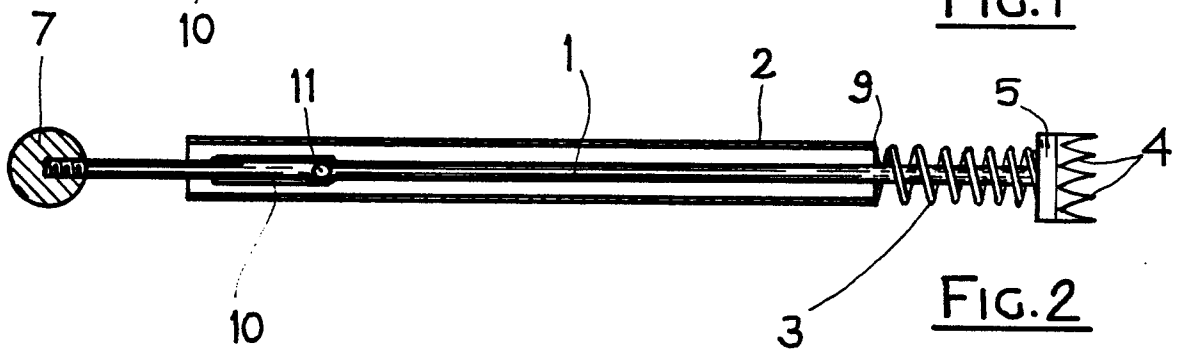
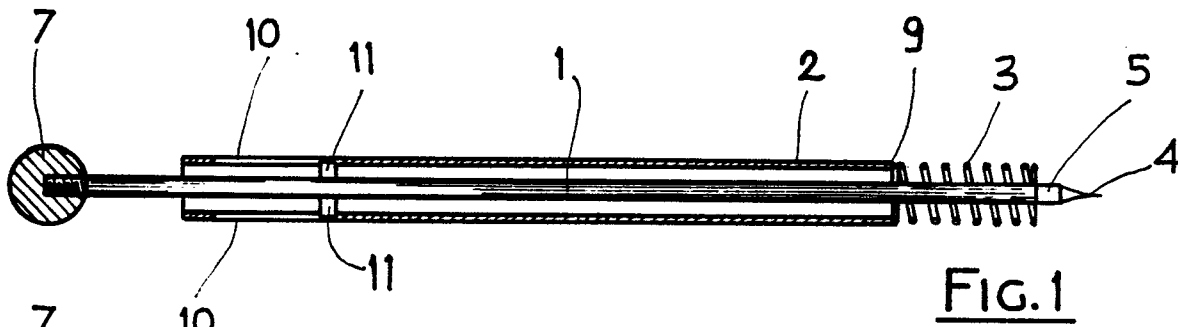
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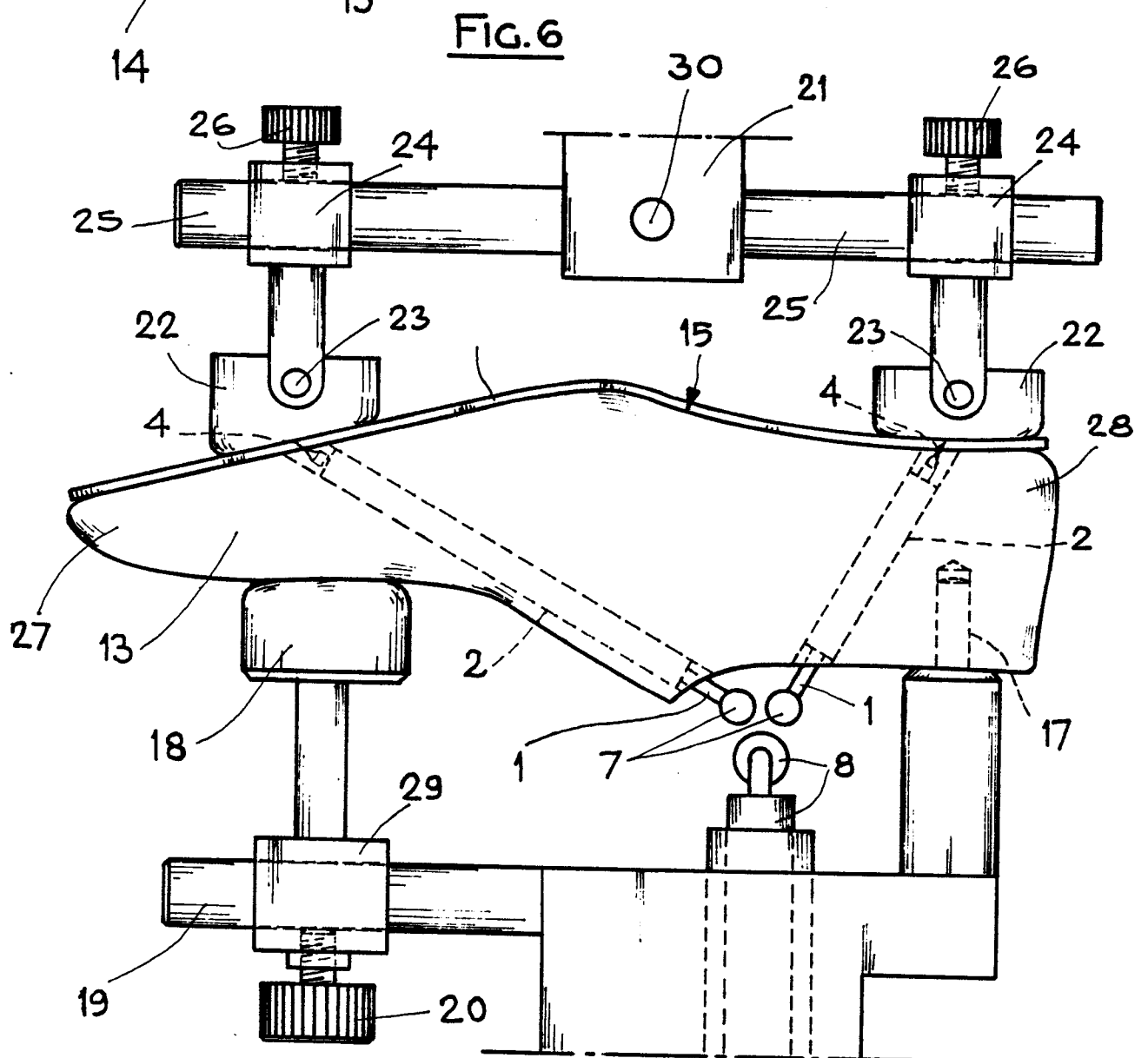
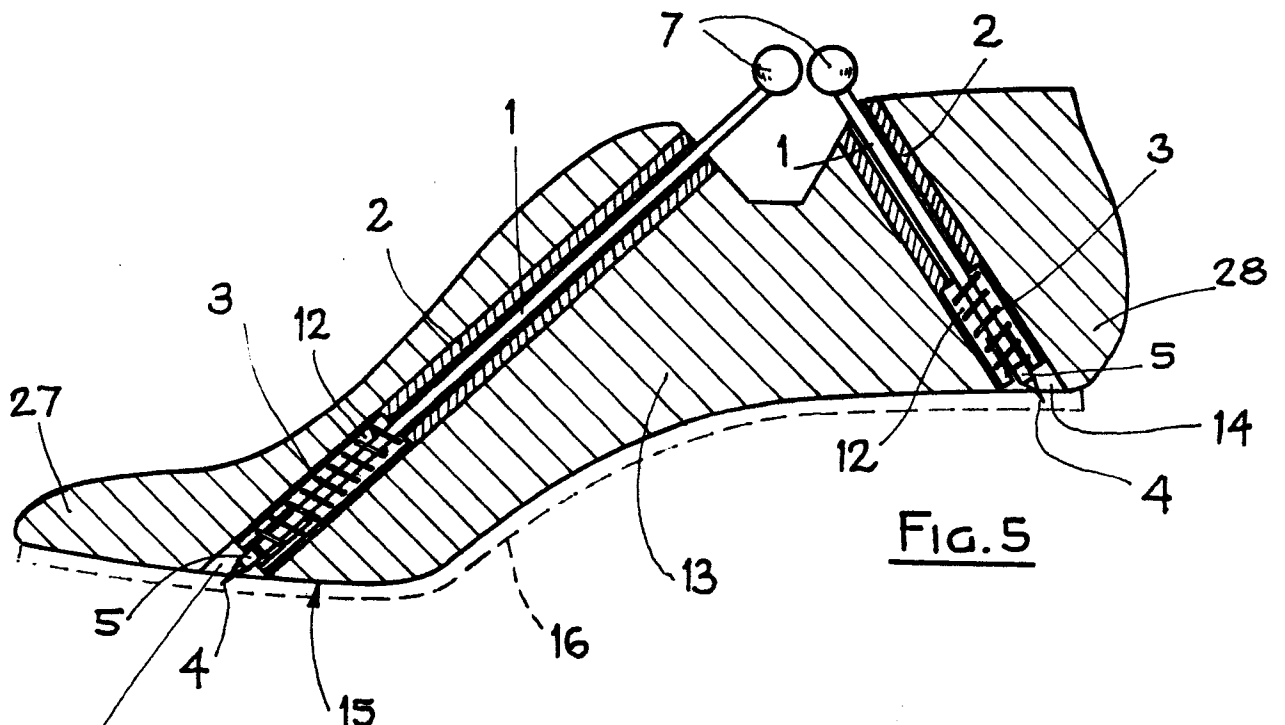
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EP 85 83 0280

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-1 806 417 (POOLE) * Figure 5 * ---	1, 3, 5, 6, 8	A 43 D 3/02 A 43 D 11/00
A	FR-A- 967 178 (ROMETTI) * Page 3, lines 50-56; figure 1, figure 12 * ---	1, 9-12	
A	DE-C- 644 115 (FAUL) * Figure 4 * ---	1	
A	US-A-1 370 574 (WRIGHT) * Figure 1 * ---	1	
A	US-A-3 935 609 (BROTCHIE) * Figure 2 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			A 43 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 02-07-1986	Examiner LOKERE H.P.
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	