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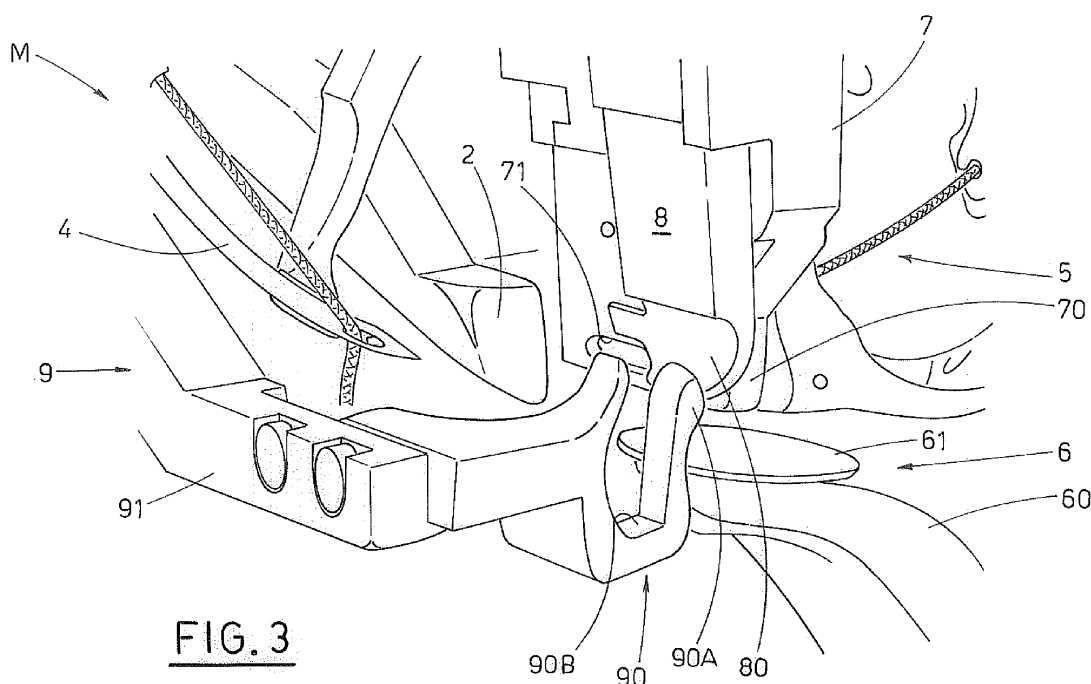
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(54) **A method and a sewing machine for realising a semi-finished workpiece to be used in constructing a shoe**

(57) The method enables obtaining a semi-finished workpiece (100) to use in construction of a GOODYEAR type shoe. The semi-finished workpiece (100) is constituted by joining, by means of a single ring-stitching (C): an underfoot insole (101) provided on a lower surface thereof with a perpendicular border (102); an open upper (103); a welt (104) having a linear development which is sufficient to form a ring around the upper (103). The ring

stitching (C) is realised by means of a sewing machine (M) having a curved needle (4), which enables the welt (104), the upper (103) and the border (102) to be positioned so that the needle (4) crosses them in order with each of the stitches (P) of the ring stitching (C). With the method and the machine (M) actuating it, the semi-finished workpiece is obtained without the aid of forms, nails, stapes, glue and pliers, which are necessary in the prior art methods.



**FIG. 3**

**Description****DESCRIPTION OF THE INVENTION**

**[0001]** The present invention relates to the technical sector relating to the realisation of shoes, with particular reference to those shoes known as the GOODYEAR type.

**[0002]** The above name identifies a particular method with which highly-prestigious, very sturdy and comfortable shoes are realised.

**[0003]** The GOODYEAR method is made up of operating steps that are almost all manually performed by highly-specialised craftsmen, and long times are required for them, involving high costs.

**[0004]** The GOODYEAR method comprises using an underfoot insole made of a flexible material to a surface of which, destined to be facing downwards, a sort of rim is applied which follows the perimeter profile of the underfoot insole, at a suitable distance from the edge.

**[0005]** The insole is fixed using nails to a form on which an open upper is also keyed and fixed; the flap of the upper is gripped using pliers, pulled towards the insole and progressively joined to the external wall of the rim using glue and staples in such a way that at the end the upper is stretched on the form and solidly constrained to the underfoot insole.

**[0006]** To enable the tines of the pliers to get a sufficient grip, the upper is initially cut to a larger dimension, and after joining with the underfoot insole is trimmed so that the flap thereof is flush with the rim.

**[0007]** A welt is fixed externally of the flap of the upper joined to the rim, using a stitching that involves the flap and the rim.

**[0008]** The stitching can be done by hand, using an awl, or by machine of known type with one thread only, realising a chain stitch.

**[0009]** In the compartment defined internally of the wall a soft and transpiring insert is positioned and glued, for example made of cork and/or latex.

**[0010]** In a bottom, preferably made of leather and without any heel, glue is applied in the upper surface, and a similar glue is applied to the inner surface of the welt and the insert.

**[0011]** The bottom is glued to the assembly of the upper-insole-welt-insert, still on the form.

**[0012]** The peripheral gluing between the welt and the bottom is completed, for example with the aid of pressing machines having counter-rotating rollers.

**[0013]** The join between the bottom and the welt is stabilised by a ring stitching that surrounds the whole shoe, for example using known-type sewing machines.

**[0014]** With successive operations the following is carried out:

hot-stretching the upper to make it adhere perfectly to the form and copy the shape thereof;

applying the heel;

finishing the flanks of the bottom and the heel with a milling machine

painting the flanks to obtain the finishing in the desired colour;

removing the form.

**[0015]** The GOODYEAR method, as can be understood from the above, is in practice sub-divided into two operating groups, with the first being aimed at obtaining a semi-finished workpiece constituted by the joining of the upper, underfoot insole and welt, while the second relates to the application of the bottom to the workpiece and the finishing of the shoe.

**[0016]** It is clear to the expert in the field how the first group of operations includes the greater operating difficulties, which only especially able operators are able to do satisfactorily; long working times are inevitable and must be accepted.

**[0017]** The second group of operations, on the other hand, exhibits a lower degree of difficulty that falls within the capabilities of an average operator.

**[0018]** The majority of the production costs for a GOODYEAR shoe therefore relate to the performing of the first group of operations and the correlated need to contemporaneously perform operations of a plurality of shoes, i.e. a sufficient number of operators and machines with adequate spaces and an adequate number of forms.

**[0019]** Given the high prestige of GOODYEAR shoes, high quality leathers are obviously used for realising the upper; the need to start with a larger profile of the upper so that it can be gripped with the pliers leads to production of trimmed waste that in terms of cost increases is by no means insignificant.

**[0020]** One of the advantages that make the GOODYEAR shoes especially appreciated by the clientele relates to the great comfort thereof, as the plantar rest is soft and self-modelling and the foot cannot come into contact with the stitching seams that join the upper to the underfoot insole.

**[0021]** In GOODYEAR shoes, in which the welt is sewn with chain stitching, a further drawback can arise deriving from the presence of a fault in the stitching, which can lead to a progressive releasing of the thread and thus to the detaching of the bottom; the natural tendency of such stitching to tighten the stitches consequently to the flexing of the shoe can lead the shoe to take on an anomalous arched shape in a downwards direction.

**[0022]** The applicant of the present application produces and markets machines for sewing with a curved needle destined for sewing elements, for example uppers, to relative bottoms, for realising shoes.

**[0023]** The curved needle is borne at the free end of an arm, keyed radially on a shaft arranged longitudinally in the head of the machine.

**[0024]** The shaft is destined to be activated in alternating oscillating motion, such as to move the needle between two end positions, along a curved trajectory that is concentric to the degree of curvature of the needle itself.

**[0025]** The machine is provided with suitable support and guide means, suitable for defining a correct position of both the upper and the bottom during the stitching.

**[0026]** In the outward oscillation the needle passes first through the lower edge of the upper, then enters into a rotary hook device, commonly known as the crotchet, which cooperates with the needle such as to form the stitching point which is of the type having two knotted threads.

**[0027]** In suitable phase relationship with the outward oscillation of the needle, a retaining foot is activated, which presses the bottom in the opposite direction to the advancing of the needle, such as to withstand the thrust of the said needle.

**[0028]** With the needle engaged in the upper and the bottom, the longitudinal shaft is translated axially, in synchrony with the crotchet, by an amount that is equal to a predetermined sewing step, determining the advancing of the material to be sewn.

**[0029]** Then the needle return oscillation is commanded, which causes disengagement of the material and enables an opposite translation to be performed, of a same amount, of the shaft-needle-crotchet group in order to return them into the initial position.

**[0030]** The above-described machine, due to its intrinsic characteristics, is considered interesting as the base of development for a sewing machine that can serve the purpose of the present invention.

**[0031]** The aim of the present invention is thus to provide a method and a sewing machine for realising a semi-finished workpiece to be used in the construction of a shoe, the semi-finished workpiece being constituted by the joining of an upper, an underfoot insole and a welt according to the GOODYEAR method, realised more simply, rapidly and economically with respect to the GOODYEAR method, the semi-finished workpiece being suitable for being subsequently used for a corresponding shoe of the GOODYEAR type.

**[0032]** A further aim of the invention consists in providing a method which enables obtaining the semi-finished workpiece with a single sewing operation performed by the sewing machine which carries out the method, without any requirement for the use of a form, nails and/or glue.

**[0033]** A still further aim of the invention relates to the desire to provide a method and a sewing machine such as to be usable for obtaining the semi-finished workpiece, an underfoot insole with a rim that is identical to the rim used in the known-type process, as mentioned in the preamble hereto.

**[0034]** A still further aim of the invention is to be able to use, in the realisation of the above-mentioned semi-finished workpiece, an upper cut without the perimeter

portion destined to become trimmed waste, which is required in the prior art, such as to save precious leather.

**[0035]** The above aims are attained by means of a method for realising a semi-finished workpiece to be used in constructing a shoe, the semi-finished workpiece being of a type comprising: an underfoot insole provided on a side surface thereof with a perpendicular border, arranged in a closed loop and shaped such as to follow a perimeter profile of the underfoot insole, at an appropriate distance from an external limit thereof; an open upper; a welt having a linear development which is sufficient to form a ring around the upper; the method being **characterised in that** it comprises following steps:

positioning the underfoot insole in a sewing machine such that a sewing needle thereof is destined to transversally intersect the perpendicular border from an outside towards an inside of the underfoot insole;

positioning the open upper in the sewing machine, facing in an opposite direction to the perpendicular border and in such a way that the perimeter edge of the upper is flanked to the outside of the perpendicular border and aligned in height with the free end thereof, at least in a zone in which the sewing needle acts;

positioning the welt in the sewing machine, flanked to the outside of the upper and the perpendicular border, such that it is aligned in height therewith, at least in the zones in which the sewing needle acts;

simultaneous sewing of the welt, the upper and the perpendicular border, passed-through in order by the needle at each stitch of the sewing, resulting in a definition of a seam of stitching developing in a ring which interests the entire development of the welt, the upper and the perpendicular border.

**[0036]** The machine usable for actuating the above method is of a type comprising: a curved needle, borne at a free end of a lever activated in alternating oscillating motion such as to move the curved needle between two end positions along a curved trajectory that is concentric to a radius of curvature of the needle, the end positions respectively being retracted, in which it is external of the elements to be sewn, and advanced, in which it is destined to pass through the elements and enter a rotary hook device provided such as to cooperate with the curved needle in order to realise sewing stitches of a type having two knotted yarns; horizontal translating means for translating the curved needle and rotary hook device synchronically, with alternating motion, in runs of a size that is of a predetermined step, for each of the sewing stitches; the semi-finished work-piece being of a type comprising: an underfoot insole provided on a surface thereof with a perpendicular border, arranged in a closed loop and shaped such as to follow a perimeter profile of

the underfoot insole, at an appropriate distance from an external limit thereof; an open upper; a welt having a linear development which is sufficient to form a ring around the upper; the sewing machine being **characterised in that** it comprises:

a support destined to restingly support the underfoot insole, vertically mobile between a lowered rest position and a raised working position;

an abutment, destined to abuttingly intercept the underfoot insole resting on the support, in phase relation with the raised working position thereof, the abutment being provided with a slot suitable for enabling transit of the curved needle and entry thereof into the rotary hook device as well as a horizontal translation of the needle, the support and the abutment being such as to define, for the underfoot insole, a position that is such that the curved needle is destined to transversally intersect the perpendicular border from outside the underfoot insole towards an inside thereof;

a separating and guiding wall, substantially vertical, flanked to the abutment and extending horizontally for a tract preceding the tract in which the curved needle acts, destined to insert between the external side of the perpendicular border and the perimeter edge of the open upper, arranged flanked and aligned to the perpendicular border;

a U-shaped foot arranged externally of the separation and guide wall, on a vertical plane that is practically perpendicular thereto and associated to activating organs of the sewing machine, a branch of the U closer to the separation and guide wall being destined to laterally contain the upper which advances towards the sewing zone, and a recess of the U being destined to define a rest and a guide for the welt in entry towards the sewing zone, the welt being destined to be arranged flanked to the outside of the upper and the perpendicular border, such that an upper limit of a profile thereof is aligned with the upper and the perpendicular border;

actuator means associated to the separation and guide wall, destined to raise it into a non-interfering position with the semi-finished workpiece, for realising final stitches of a ringed sewing seam realised by the sewing machine such as to mutually join the welt, the upper and the perpendicular border and which interests a whole development thereof.

**[0037]** The above-described method and machine enable fully attaining all the set aims, i.e. obtaining a semi-finished workpiece constituted by the joining of an upper, an insole and a welt, with the steps of the known GOOD-YEAR method, but in a much simpler and more rapid way

that is consequently economical with respect thereto, while losing nothing in terms of quality and constructional accuracy, which is indeed improved.

**[0038]** The semi-finished workpiece obtained with the present invention is perfectly suitable, therefore, for subsequent use for a corresponding shoe of the GOOD-YEAR type, with the carrying out of remaining productive steps.

**[0039]** The original aspect of the method and machine actuating the method relates to the fact that the semi-finished workpiece is realised with a single sewing operation, without any required use of a form, nails and/or glue.

**[0040]** Note the fact that the sewn seam joining the elements of the semi-finished workpiece is of a type having two threads with a knotted stitch, which is much sturdier than the seam having the chain stitch, and lacks the drawbacks of the latter.

**[0041]** An important advantageous aspect of the method of the invention is inherent to the use, for the semi-finished workpiece, of an underfoot insole having a "wall" identical to the one used in the known methods, that is easily obtainable from specialised producers at industrial prices.

**[0042]** Other not insignificant advantages of the invention derive from the fact that pliers are no longer necessary for stretching the upper on the form: the first of these is the in the realisation of the semi-finished workpiece a smaller upper can be used, while obtaining the same final dimension of the workpiece; in this way precious leather is saved; the second advantage is that the trimming of the upper is avoided after it has been joined to the underfoot insole.

**[0043]** Both above-cited advantages reduce production costs.

**[0044]** With the proposed method and the sewing machine that carries out the method, excellent shoes can be made in series that up to now have been produced manually; thus they can be sold at more acceptable prices without renouncing anything in terms of quality or appearance, as the shoes are indistinguishable from those made using a manual process.

**[0045]** The characteristics of the invention will more fully emerge from the following description of a preferred embodiment of the method as well as the sewing machine which embodies the method, according to what is set out in the claims and with the aid of the accompanying figures of the drawings, in which:

- figure 1 is a perspective view of the underfoot insole, the open upper and the welt destined to constitute the semi-finished workpiece;
- figure 2 is an enlarged-scale illustrated of the section of the welt, obtained along plane II-II of figure 1;
- figure 3 is a partial perspective view of the sewing machine of the invention, from the needle inlet side,

without the elements to be sewn;

- figure 3A illustrates a detail of an element shown in figure 3 from a different point of view;
- figure 4 partially illustrates the machine in a similar view to that of figure 3, during the sewing of the semi-finished workpiece;
- figure 5 again illustrates the machine during the sewing operation, from a different angle;
- figure 6 is a larger-scale schematic section view of the needle of the sewing machine during the realisation of a sewing stitch;
- figure 7 illustrates, in cross section, the semi-finished workpiece obtained using the method and the machine of the invention;
- figure 8 is a perspective view of a finished shoe which uses the semi-finished workpiece;
- figure 9 is a larger-scale illustration of a cross-section of the shoe of figure 8;
- figure 10 partially illustrates, in a perspective view, an underfoot insole which can be prepared as an alternative to the semi-finished workpiece;
- figure 11 illustrates, in a section view, a portion of the underfoot insole of figure 10, predisposed for use;
- figure 12 is a similar view to that of figure 6 with the insole of figure 11.

**[0046]** With reference to the figures, 100 denotes the semi-finished workpiece obtained using the method and the machine of the present invention. the machine, only partially illustrated, is denoted by reference letter M. The workpiece 100, in a known way, comprises: an underfoot insole 101 provided on a side surface thereof with a perpendicular border 102, arranged in a closed loop and shaped such as to follow a perimeter profile of the underfoot insole 101, at an appropriate distance from an external limit thereof; an open upper 103; a welt 104 having a linear development which is sufficient to form a ring around the upper 103; the method being **characterised in that** it comprises following steps:

positioning the underfoot insole 101 in a sewing machine M such that a sewing needle 4 thereof is destined to transversally interest the perpendicular border 102 from an outside towards an inside of the underfoot insole 101;

positioning the open upper 103 in the sewing ma-

chine M, facing in an opposite direction to the perpendicular border 102 and in such a way that the perimeter edge 103B of the upper 103 is flanked to the outside of the perpendicular border 102 and aligned in height with the free end thereof, at least in a zone in which the sewing needle 4 acts;

positioning the welt 104 in the sewing machine M, flanked to the outside of the upper 103 and the perpendicular border 102, such that it is aligned in height therewith, at least in the zones in which the sewing needle 4 acts;

simultaneous sewing of the welt 104, the upper 103 and the perpendicular border 102, passed-through in order by the needle 4 at each stitch P of the sewing, resulting in a definition of a seam of stitching developing in a ring C which interests the entire development of the welt 104, the upper 103 and the perpendicular border 102.

**[0047]** In a preferred embodiment of the method, marking of at least a reference sign is provided in the underfoot insole 101 and a corresponding reference sign in the upper 103, to be performed before positioning of the underfoot insole 101 and the upper 103 in the sewing machine M.

**[0048]** On completion of the sewing step, the reference signs must be aligned in order to confirm correct reciprocal positioning.

**[0049]** According to the shape of the upper 103 and the underfoot insole 101, a plurality of reference signs can be marked on both, indicating for example the centre of the toe and the heel, the beginning and the end of the curvature of the stitch and the heel and the start point of the stitching.

**[0050]** For some models of upper 103 and the insole 101, the development of the perimeters thereof is the same; in this case, during the sewing step, the advancing of the welt 104, upper 103 and border 102 is the same for each stitch P of the ring shaped seam C.

**[0051]** For other models, the development of the perimeter of the upper 103, before sewing, is greater than that of the insole 101; in the presence of this characteristic, according to the prior art, the skin of the upper 103 has to be curled in the area of the tip, such as to recover the greater development and to obtain, at the same time, the arching thereof.

**[0052]** In this case, during the stitching the same advancement of the welt 104, upper 103 and 102 is provided for each stitch P which does not concern the area of the shoe tip, while there will be an advancement of the upper 103 that is increased by a predetermined amount compared to the advancement of the welt 104 and border 102, for each sewing stitch P inserted in the above-mentioned zone of the tip.

**[0053]** The sewing machine M used for the realization of the semi-finished workpiece 100 is preferably obtained

starting from a known machine, produced by the same Applicant, of which mention was made in the introduction, and comprising:

a head 1, in which the drive mechanisms are housed, powered by an electric motor (not shown);

a curved needle 4, borne at the free end of a lever 3 radially keyed on a first shaft (not shown), arranged longitudinally in the head 1 and protruding at the front part thereof; the lever 3 is actuated, by the drive mechanism, in alternating oscillating motion, so as to move the curved needle 4 between two extreme positions along a curvilinear trajectory concentric with the radius of curvature of the needle 4 itself, respectively retracted, in which it is external to the elements to be sewn, and advanced in which it is destined to pierce the later;

a device with a rotary hook 5, known as a crotchet, positioned by a side of the needle 4, borne at the free end of a second shaft, also not shown, arranged parallel to the first; the crotchet 5 is destined to internally receive the needle 4 in a phase relation with its advanced position as well as cooperating with the needle for realising the stitches of the two-thread knotted type C.

**[0054]** With the needle 4 engaged in the crotchet 5, the crotchet 5 and the longitudinal shaft bearing the lever 3 are translated axially in synchrony, by a width that is equal to a predetermined step of sewing P, determining the advancing of the sewing material.

**[0055]** In phase relation with the exit of the needle 4 from the crotchet 5 and the material to be sewn, a translation of the same amount is impressed on both in the opposite direction to bring them back into the initial position.

**[0056]** In appropriate phase relation with the return oscillation of the needle 4, a holding foot 2 is actuated, which presses the material in the opposite direction to the returning of the needle 4, thus facilitating the release thereof.

**[0057]** The sewing machine M is equipped to make it suitable for sewing together the welt 104, the upper 103 and the underfoot insole 101 and realise the semi-finished workpiece 100.

**[0058]** To this end, the machine M of to the invention is provided with a support 6, suitable for restingly supporting the insole 101 and vertically mobile between a lowered rest position and a raised work position, through the action of actuator organs, e.g. tyres, not shown.

**[0059]** The support 6 is constituted, in the example of the figures, by a shaped arm 60, pivoted with a practically vertical axis to a base, not shown, integral with the head 1.

**[0060]** The shaped arm 60 bears a wheel 61 at the top thereof, which is idle and has an axis that coincides with the oscillating axis of the arm 60 (figure 3).

**[0061]** A turret body 7 is solidly constrained to the head 1, which body 7 inferiorly conforms an abutment 70, suitable for abuttingly intercepting the insole 101 restingly arranged on the wheel 61 of the support 6, when the support 6 is in the raised working position thereof.

**[0062]** The insole 101 is therefore loosely tightened slidably between the wheel 61 and the abutment 70, while the perpendicular border 102 is placed against it by the internal side thereof.

**[0063]** A horizontal slot 71 is formed in the abutment 70, which is destined to enable transit of the needle 4 and entry thereof into the crotchet 5, as well as the horizontal translation of the needle 4 in synchrony therewith (figure 3).

**[0064]** The support 6 and abutment 70 therefore define, for the insole 101, a position such that the curved needle 4, in its oscillating movement, transversally interests the perpendicular border 102, from the outside towards the inside.

**[0065]** A substantially vertical separating and guiding wall is arranged at the side of the abutment 70, which wall is horizontally extended for a tract preceding the tract in which the needle 4 acts and destined to insert between the external side of the perpendicular border 102 and the perimeter edge 103B of the upper 103, with the upper arranged flanked and aligned to the border 102.

**[0066]** The separating and guiding wall 80 is profiled at the lower end of a slide, vertically slidable in a seating afforded in the body 7 of the abutment 70 and associated to actuator means 81 (visible only partially in figure 4) by means of a bracket 82.

**[0067]** The actuator means 81, constituted for example by a pneumatic jack, define two positions for the separating and guiding wall 80, respectively, a lowered operating position (figures 3, 4, 5) and a raised non-operative position (not shown).

**[0068]** In the operating position, the separating and guiding wall 80 facilitates the correct progress of the insole 101 and the upper 103 and also cooperates with a crinkling group 9, which will be more fully described here-in below, suitable for operating on the upper.

**[0069]** In the non-operating position, the separating and guiding wall 80 is in a non-interfering position with respect to the semi-finished workpiece 100, to enable the realization of the final stitches P of the sewing ring seam C.

**[0070]** A U-shaped foot 90 is arranged externally of the separating and guiding wall 80, on a vertical plane practically perpendicular to the wall, fixed to a rod 91 belonging to the crinkling group 9.

**[0071]** The branch 90A of the U-shape that is closer to the separating and guiding wall 80 is destined to laterally contain the upper 103, which advances towards the sewing area, while the recess 90B of the U-shape forms a support and a guide for the welt 104 in input to the same sewing area, in which, as already specified, it must be arranged flanked to the outside of the upper 103 and perpendicular border 102, so that the upper limit of

the profile thereof is aligned with the upper and border.

**[0072]** In a constructional variant, not shown, a height-adjustable foot is provided, removably fixed to the column 7 above the slot 71 and destined to define an upper abutment for the welt 104.

**[0073]** The U-shaped foot 90 is kept in a fixed position for models of upper 103 and insole 101 in which the development of the respective perimeters is the same and where, consequently, equal advancement is required of the welt 104, upper 103 and border 102 for each stitch P of the ring sewn seam C.

**[0074]** The crinkling group 9 is activatable on command of the operator and is destined to increase the advancement of the upper sole 103 with respect to the insole 101 and the welt 104.

**[0075]** The U-shaped foot 90 "U" is pushed transversally to the upper 103 in phase relation with the realization of each sewn stitch P up to pressing on the surface of the upper with the corresponding branch 90A, which is provided with a tooth 90D (see in particular figure 3A), destined to increase the friction.

**[0076]** The corresponding portion of upper 103 is therefore clamped between the foot 90 and the opposing separating and guiding wall 80.

**[0077]** The foot 90 is then, is translated in the same advancement direction as given by the needle-crotchet group for the transport of the material, in order to obtain the predetermined increment in advancement, and then is newly distanced from the upper 103 when the needle 4 is engaged therein, and translated in the opposite direction to repeat the cycle.

**[0078]** There now follows a description of the operating process that enables the semi-finished workpiece 100 to be obtained with the sewing machine M.

**[0079]** The support 6 is lowered to allow the insole 101 to be introduced, with the perpendicular border 102 facing upwards and inserted between the abutment 70 and the separating and guiding wall 80; then the support 6 is raised into the working position to hold it.

**[0080]** If there is, in the underfoot insole 101, a start-sewing marked reference, the sign has to be aligned with the oscillating plane of the needle 4.

**[0081]** The upper 103 is then positioned, with the perimeter edge 103B thereof facing up and flanked to the perpendicular border 102, at least in the sewing area.

**[0082]** If a start-sewing reference sign is also marked in the upper 103, the sign must be aligned with the sign on the insole 101.

**[0083]** The end of the welt 104 is also arranged at the position of the needle 4, the welt 104 being positioned as previously described with respect to the upper 103 and the border 102, which will be pierced in order as each of the stitches P (figure 6) is sewn.

**[0084]** At this point, the operator starts the machine M and commences sewing, taking care to accompany the advancement of the insole 101 and the upper 103 with the hands, while the welt 104, once the first stitch P has been sewn, is drawn automatically.

**[0085]** During stitching, the operator rotates the shaped arm 60 into the appropriate positions so as not to hinder the smooth progress of the semi-finished workpiece 100 under construction.

5 **[0086]** If the model requires the greater development of the perimeter of the upper 103 with respect to that of the insole 101, the operator activates the crinkling group 9 at the start of the curvature of the tip of the semi-finished workpiece 100 and deactivates it at the end of the operation, availing of any relevant reference marks that may be present.

10 **[0087]** Before the machine carries out the last stitch P, the operator commands the lifting of the separating and guiding wall 80 into the non-operative position, in order to close the ring of the sewing seam C.

15 **[0088]** After cutting the threads, the support 6 is lowered again and the semi-finished workpiece 100 extracted (figure 7); the workpiece can now pass on to the second group of operating steps, mentioned in the introduction hereto, which will lead to the creation of a shoe 200 as shown in figures 8 and 9.

20 **[0089]** The second group of operating steps, not illustrated in detail since they are not part of the invention, comprises in order:

25 positioning and fixing the insert 110 in the underfoot insole 101;

30 bonding the bottom 120 to the semi-finished workpiece 100;

35 pressing the welt 104 onto the bottom 120, for example by means of a machine equipped with counter-rotating rollers;

40 sewing the welt 104 to the bottom 120, for example with a curved sewing machine needle;

45 heating the upper 103, for example, with an aluminium form equipped with electrical heaters;

insertion of the form in the upper 103;

stretching the upper 103, for example in a kiln for a predetermined time;

application of the heel;

50 levelling the sides of the bottom and the heel, for example with a milling machine;

painting the sides to obtain the desired finish colour;

finishing operations on the shoe;

55 extraction of the form.

**[0090]** The shoe 200 thus obtained is fully compliant

to a GOODYEAR shoe type and is indistinguishable therefrom.

**[0091]** The semi-finished workpiece 100 can be realized in an identical manner to what has been described above with insole 201 of a different type, illustrated in figures 10 and 11, in place of the traditional insole with the perpendicular border 102 considered up to this point.

**[0092]** The preferably leather insole 201 is prepared by making an oblique incision T in its face destined to be facing towards the bottom of the shoe.

**[0093]** In this way a flap 202 is defined, close to the outer edge, which, by means of a suitable machine, is rotated up to placing it almost perpendicular to the relative surface (figure 11).

**[0094]** Figure 12 shows the realisation of a sewing stitch P by the curved needle 4, with which the flap 202 is joined to the upper 103 and to the welt 104.

**[0095]** It is understood that the above description is presented by way of non-limiting example, and any modifications in details thereof aimed at improving the effectiveness of the method and/or the functionality of the sewing machine are considered henceforth to fall within the scope of protection defined in the following claims.

## Claims

1. A method for realising a semi-finished work-piece to be used in the construction of a shoe, the semi-finished work-piece (100) being of a type comprising: an underfoot insole (101) provided on a side surface thereof with a perpendicular border (102), arranged in a closed loop and shaped such as to follow a perimeter profile of the underfoot insole (101), at an appropriate distance from an external limit thereof; an open upper (103); a welt (104) having a linear development which is sufficient to form a ring around the upper (103); the method being **characterised in that** it comprises following steps:

positioning the underfoot insole (101) in a sewing machine (M) such that a sewing needle (4) thereof is destined to transversally interest the perpendicular border (102) from an outside towards an inside of the underfoot insole (101); positioning the open upper (103) in the sewing machine (M), facing in an opposite direction to the perpendicular border (102) and in such a way that the perimeter edge (103B) of the upper (103) is flanked to the outside of the perpendicular border (102) and aligned in height with the free end thereof, at least in a zone in which the sewing needle (4) acts;

positioning the welt (104) in the sewing machine (M), flanked to the outside of the upper (103) and the perpendicular border (102), such that it is aligned in height therewith, at least in the zones in which the sewing needle (4) acts;

simultaneous sewing of the welt (104), the upper (103) and the perpendicular border (102), passed-through in order by the needle (4) at each stitch (P) of the sewing, resulting in a definition of a seam of stitching developing in a ring (C) which interests the entire development of the welt (104), the upper (103) and the perpendicular border (102).

2. The method of claim 1, **characterised in that** marking of at least a reference sign is provided in the underfoot insole (101) and a corresponding reference sign in the upper (103), to be performed before positioning of the underfoot insole (101) and the upper (103) in the sewing machine (M), the reference signs being destined to be aligned at the end of the sewing step.
3. The method of claim 1, **characterised in that** during the sewing step the welt (104), the upper (103) and the perpendicular border (102) are together advanced for each stitch (P) of the ringed sewing seam (C).
4. The method of claim 1, **characterised in that** during the sewing step the same advancement of welt (104), the upper (103) and the perpendicular border (102) for each stitch of sewing (P) is comprised, where the tip of the upper (103) is not involved, while an advancement of the upper (103) is provided that is augmented by a predetermined value with respect to an advancement of the welt (104) and the perpendicular border (102), for each stitch of sewing (P) localised in the tip zone.
5. A sewing machine for realising a semi-finished work-piece to be used in construction of a shoe, the machine (M) being of a type comprising: a curved needle (4), borne at a free end of a lever (3) activated in alternating oscillating motion such as to move the curved needle (4) between two end positions along a curved trajectory that is concentric to a radius of curvature of the needle (4), the end positions respectively being retracted, in which it is external of the elements to be sewn, and advanced, in which it is destined to pass through the elements and enter a rotary hook device (5) provided such as to cooperate with the curved needle (4) in order to realise sewing stitches (P) of a type having two knotted yarns; horizontal translating means for translating the curved needle (4) and rotary hook device (5) synchronically, with alternating motion, in runs of a size that is of a predetermined step, for each of the sewing stitches (P); the semi-finished work-piece (100) being of a type comprising: an underfoot insole (101) provided on a surface thereof with a perpendicular border (102), arranged in a closed loop and shaped such as to follow a perimeter profile of the underfoot insole



(101), at an appropriate distance from an external limit thereof; an open upper (103); a welt (104) having a linear development which is sufficient to form a ring around the upper (103); the sewing machine (M) being **characterised in that** it comprises:

a support (6) destined to restingly support the underfoot insole (101), vertically mobile between a lowered rest position and a raised working position;

an abutment (70), destined to abuttingly intercept the underfoot insole (101) resting on the support (6), in phase relation with the raised working position thereof, the abutment (70) being provided with a slot (71) suitable for enabling transit of the curved needle (4) and entry thereof into the rotary hook device (5) as well as a horizontal translation of the needle (4), the support (6) and the abutment (70) being such as to define, for the underfoot insole (101), a position that is such that the curved needle (4) is destined to transversally interest the perpendicular border (102) from outside the underfoot insole (101) towards an inside thereof;

a separating and guide wall (80), substantially vertical, flanked to the abutment (70) and extending horizontally for a tract preceding the tract in which the curved needle (4) acts, destined to insert between the external side of the perpendicular border (102) and the perimeter edge (103B) of the open upper (103), arranged flanked and aligned to the perpendicular border (102);

a U-shaped foot (90) arranged externally of the separation and guide wall (80), on a vertical plane that is practically perpendicular thereto and associated to activating organs of the sewing machine (M), a branch (90A) of the U closer to the separation and guide wall (80) being destined to laterally contain the upper (103) which advances towards the sewing zone, and a recess (90B) of the U being destined to define a rest and a guide for the welt (104) in entry towards the sewing zone, the welt (104) being destined to be arranged flanked to the outside of the upper (103) and the perpendicular border (102), such that an upper limit of a profile thereof is aligned with the upper (103) and the perpendicular border (102);

actuator means (81) associated to the separation and guide wall (80), destined to raise it into a non-interfering position with the semi-finished workpiece (100), for realising final stitches (P) of a ringed sewing seam (C) realised by the sewing machine (M) such as to mutually join the welt (104), the upper (103) and the perpendicular border (102) and which interests a whole development thereof.

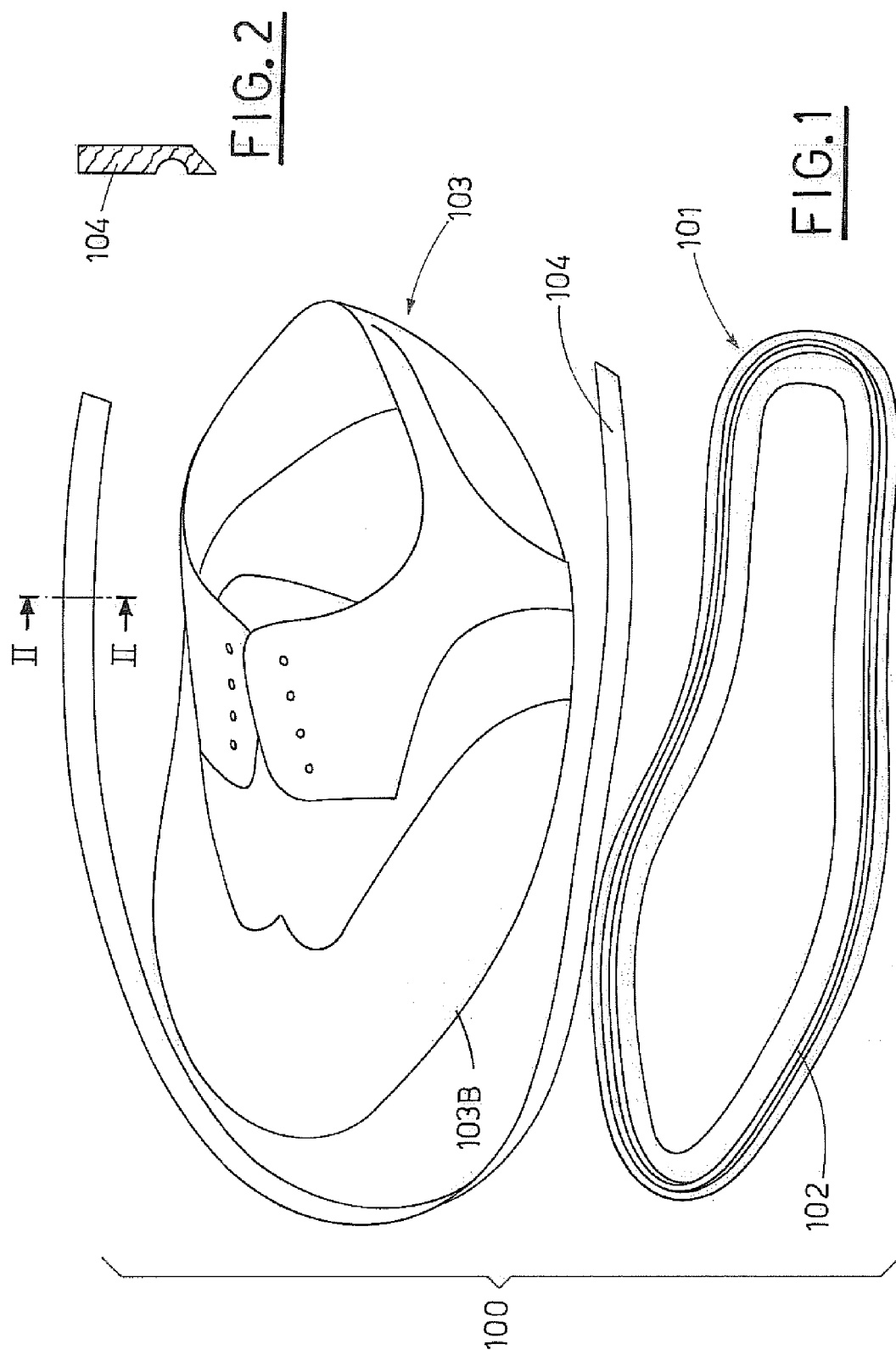
6. The machine of claim 5, **characterised in that** the support (6) is constituted by a profiled arm (60), pivoted with a practically vertical axis to a relative base and bearing at a top thereof an idle wheel (61) having a rotation axis that coincides with the rotation axis of the arm (60).

7. The machine of claim 5, **characterised in that** the separating and guide wall (80) is conformed at a lower end of a slide (8), the slide (8) being slidable vertically in a seating afforded in the body (7) of the abutment (70), and is associated to the actuator means (81) via a bracket (82).

8. The machine of claim 5, **characterised in that** the U-shaped foot (90) is fixed to a rod (91) belonging to a crinkling group (9), provided in the machine (M) and activatable on command such as to increase the advancement of the upper (103) with respect to the advancement of the welt (104) and underfoot insole (101), the branch (90A) of the foot (90) being pushed, in consequence of the activation of the crinkling group (9) to press on the surface of the upper (103) and to draw the upper (103), abutted on the opposite side by the separating and guide wall (80), towards the needle (4).

9. The machine of claim 8, characterised that at least a tooth (90D) is present in the branch (90A) of the U-shaped foot (90), which tooth (90D) is destined to increase adherence between the branch (90A) and the surface of the upper (103).

10. The machine of claim 5, **characterised in that** a height-adjustable foot is comprised, positioned above the slot (71), destined to define an upper abutment for the welt (104).



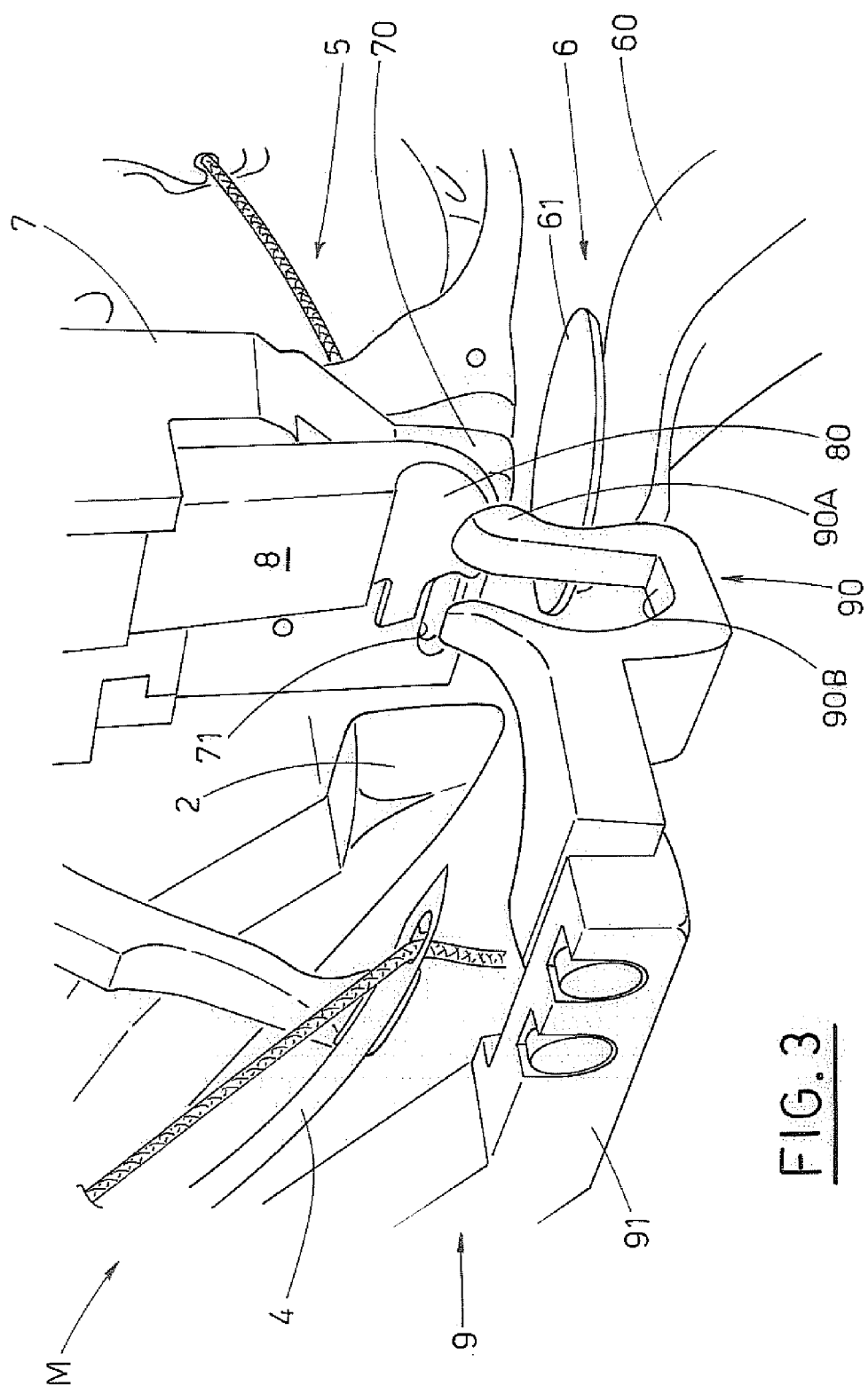
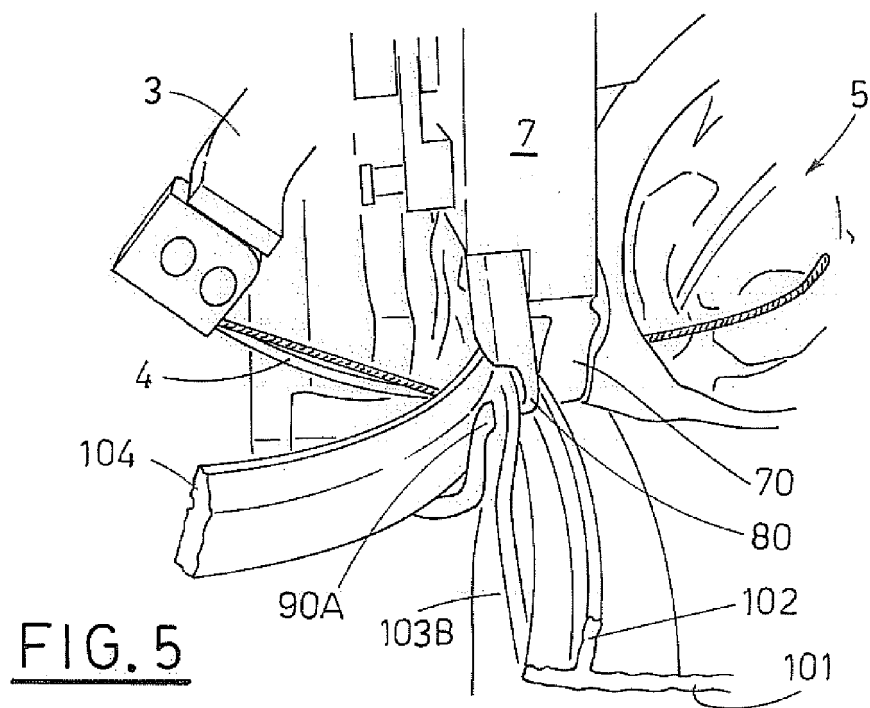
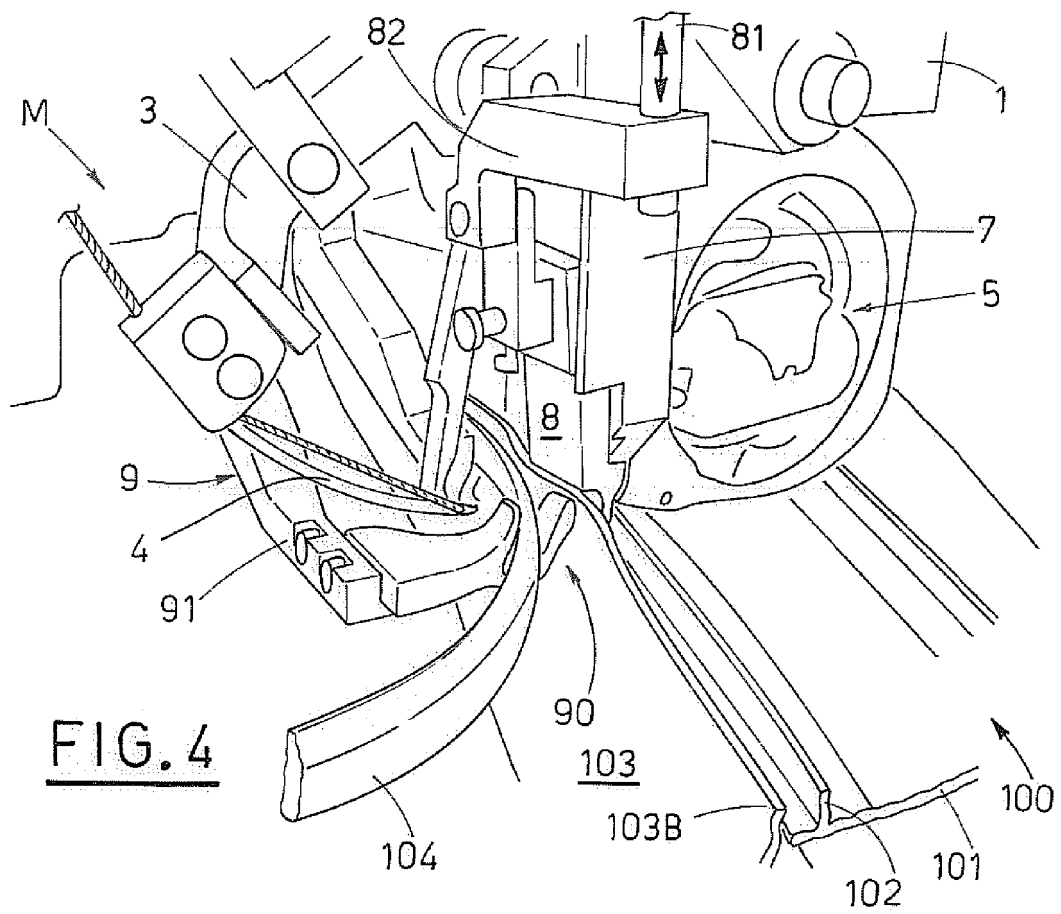
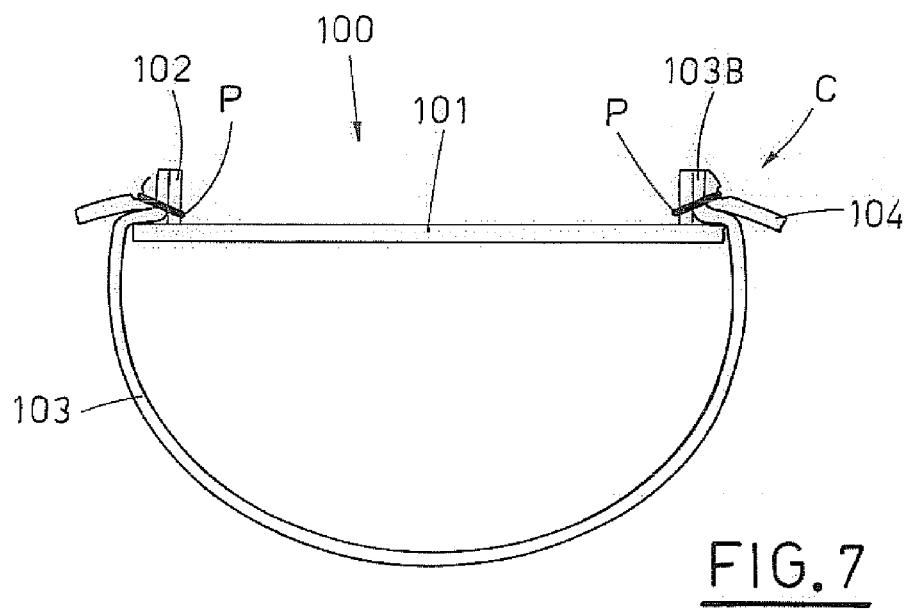
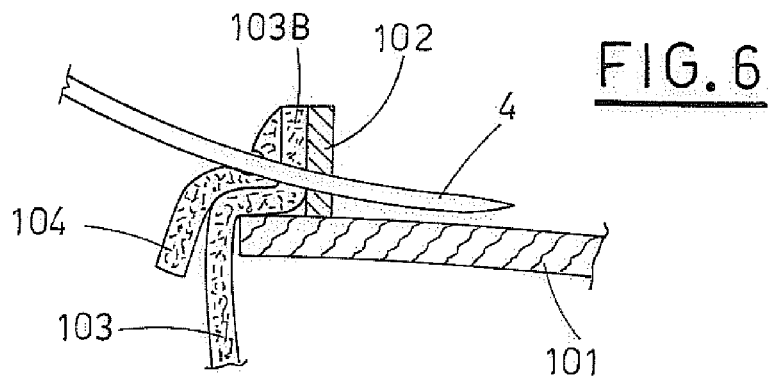
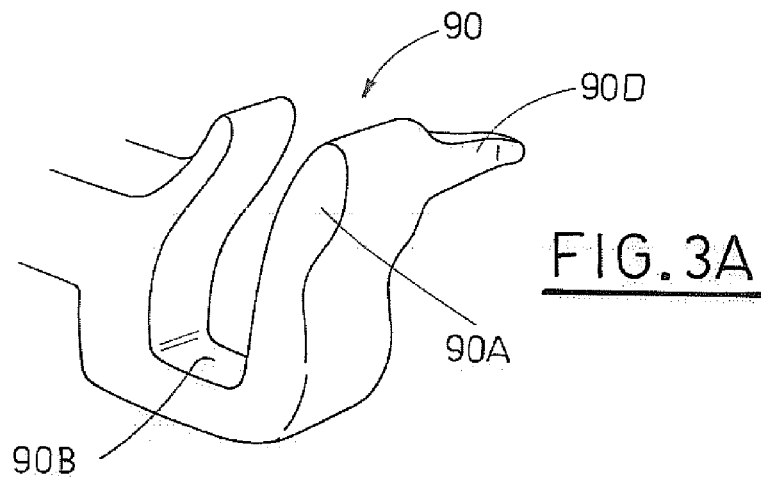


FIG. 3





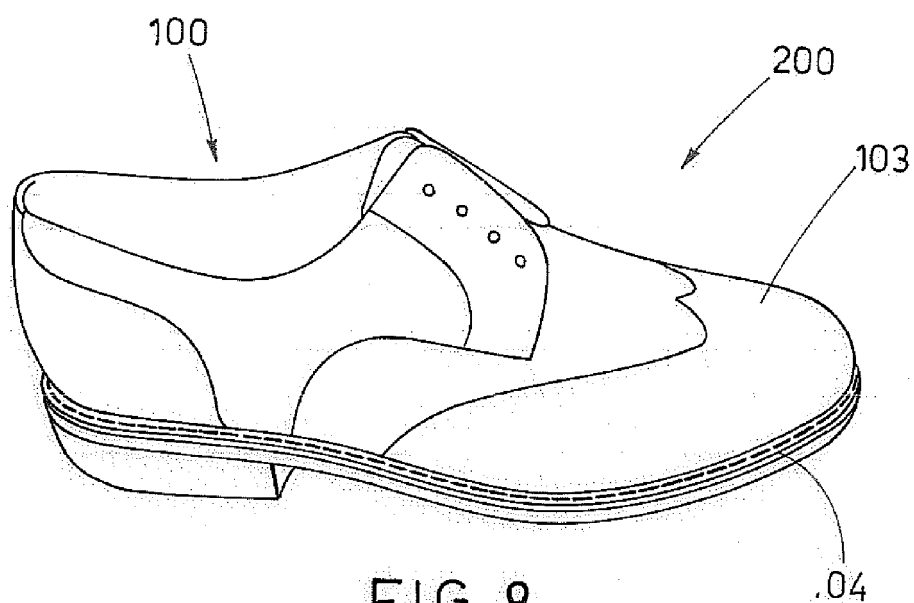


FIG. 8

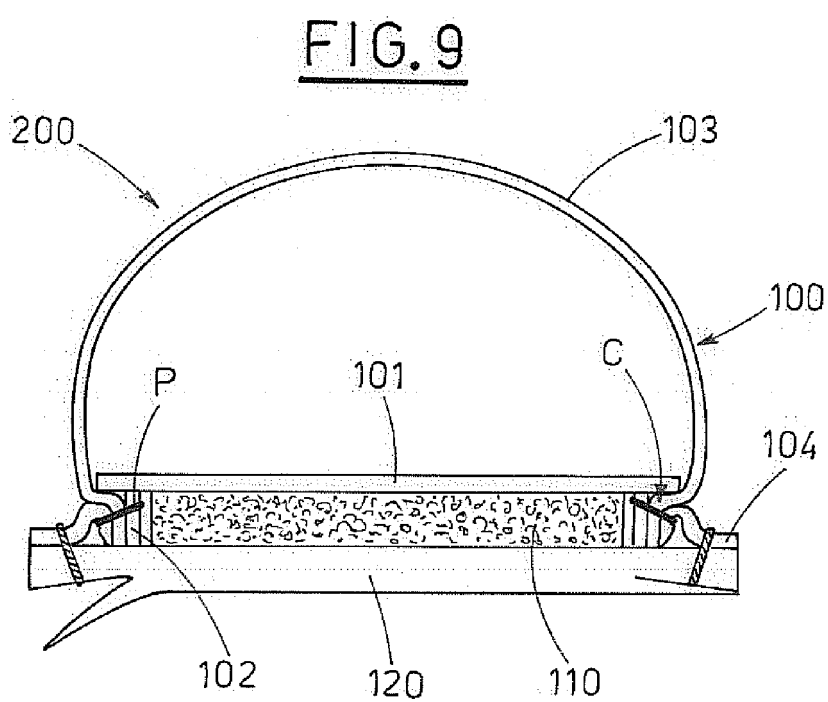


FIG. 9

FIG.10

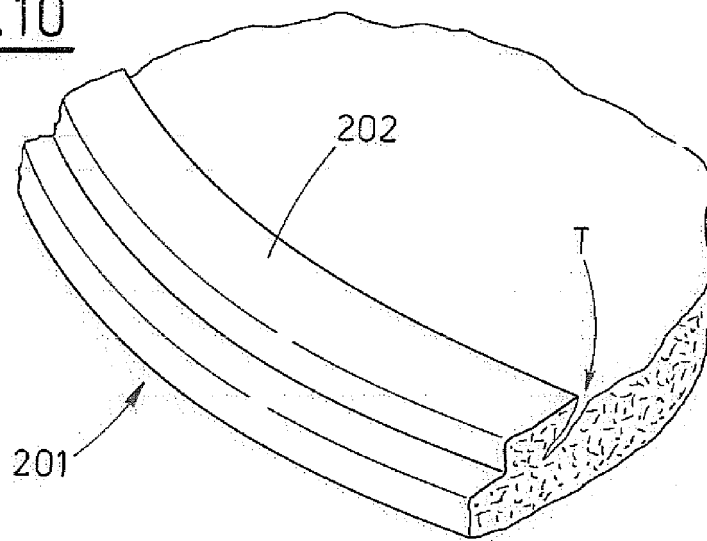


FIG.11

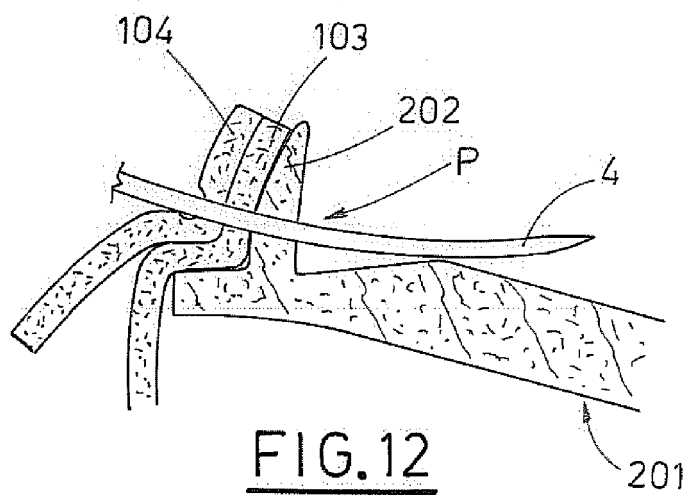
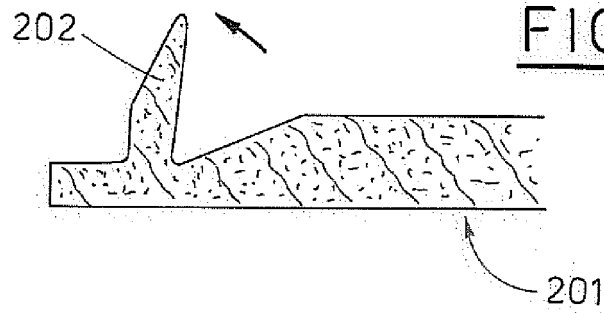


FIG.12



## EUROPEAN SEARCH REPORT

Application Number  
EP 12 15 8280

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                    |                                                                               |                                                                                                                                                                                                                                                                              |                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim                                                                                                                                                                                                                                                            | CLASSIFICATION OF THE APPLICATION (IPC) |
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| The present search report has been drawn up for all claims                                                                                                                                                                                             |                                                                               |                                                                                                                                                                                                                                                                              |                                         |
| Place of search<br>The Hague                                                                                                                                                                                                                           |                                                                               | Date of completion of the search<br>15 June 2012                                                                                                                                                                                                                             | Examiner<br>Cianci, Sabino              |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                               | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                         |

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15-06-2012

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