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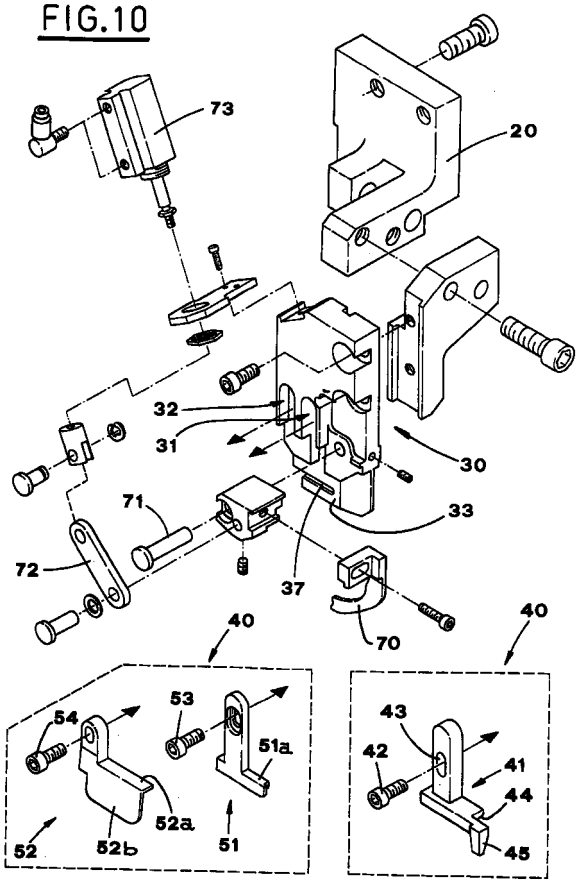
(54) Machine for stitching a shoe upper to an insole

(57) A shoe stitching machine includes a needle (7), which passes through the edges to be stitched arranged vertically and positioned one with respect to the other by a longitudinal guide (10). The longitudinal guide (10) includes a main body (30) forming a vertical support surface (33), arranged on a where the needle (7) enters said edges being stitched, and stop means (40) removably fastened to said main body (30) and adjustable in height with respect thereto. The stop means (40) define an upper abutment for the edge of the insole (1) carried by the support surface (33) and for the edge (3a) of the upper (3), situated beside the edge of the insole (1), on the side where the needle (7) enters the edge of the upper. A separating baffle (70), joined to the longitudinal guide (10), when in its working position (O), is introduced between the edges to be stitched in the part corresponding to the working area of a wrinkling head (66), carried by a respective wrinkling group and acting on the edge (3a) of the upper (3). The stop means (40) are of two types, one for IDEAL stitching method, including a prong (41), and the other, for S. CRISPINO stitching method, including a pair of teeth (51,52). The two types of stop means are mounted alternately to the machine according to the required stitching method, in both cases the knotted stitching is obtained using medium and thick threads.

FIG.10



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Description

[0001] The present invention relates to machines for stitching footwear.

[0002] As it is known, there are different types of footwear manufacture with well defined technical and aesthetic characteristics.

[0003] In two of these types, the so-called IDEAL and S. CRISPINO, the upper is open and firmly joined to a related insole made of a semi-rigid material, so as to obtain a unit, which is then joined with a sole made of leather, gum or the like.

[0004] Figures 1 and 1a show the IDEAL method, according to which the insole 1 is joined, by a peripheral seam 2, to the edge 3a of an upper 3, so that the border of the edge 3a is flush with the insole 1 along the whole outline of the latter.

[0005] Figures 2 and 2a show the first step of the S. CRISPINO method, according to which the insole 1 is joined to the edge 3a of the upper by means of a peripheral seam 2.

[0006] In this case, the border of the edge 3a protrudes from the outline of the insole 1 by a predetermined value, which is maintained more or less constant along the whole periphery.

[0007] During a second step (Figures 3 and 3a), the edge 3a is folded and glued to the lower surface of the insole 1, so as to cover the seam line 2.

[0008] The traditional way of joining the upper and the insole according to the above described methods, includes a pre-assembling operation, which is carried out before the stitching and during which the upper edge is glued to the insole in the joining area.

[0009] The pre-assembling operation requires the use of some lasts, includes several subsequent steps and necessitates machines prepared for this specific purpose, and is performed in the following order:

- application of glue to the upper and the insole, which glue can be reactivated later on;
- mounting the upper on the last and positioning of the insole;
- gluing the toe area by a first machine;
- gluing the hill area by a second machine;
- gluing the sides by a third machine;
- pressing the glued edge and possible trimming of the exceeding material (IDEAL method), so that it is flush with the in sole (so-called "wheeling step").

[0010] After the above steps have been completed, the upper-insole assembly is stitched by the machines of the type "Rapida" or "Blake", known in the footwear field.

[0011] It is quite evident from what above that such a procedure is so slow, difficult and expensive, that the above described IDEAL and S.CRISPINO methods cannot be performed but for very valuable and expensive shoes.

[0012] Another disadvantage of the above described methods derives from the fact that the above described techniques require highly specialized operators, with all the inconveniences caused thereby.

[0013] In order to avoid the above disadvantages, the Applicant filed a Patent Application No. BO97A 000552 on 10/09/1997, which discloses a "Method and apparatus for stitching footwear upper to a related insole".

[0014] According to this method, the upper is joined to the insole without using the lasts or any preliminary operations, such as edges previous gluing and pressing, but by stitching directly the edges by a special machine. This special machine includes a guide, which has vertical surfaces, on which the edges being stitched are held in suitable positions and are fed, while a needle is moved in a plane crosswise to the edges.

[0015] According to this method, the upper and the insole are equipped, along their edges, with a series of reference marks which must coincide with one another when the seam is completed, so as to verify the correct reciprocal positioning.

[0016] The apparatus is equipped with a wrinkling group, situated beside the guide and aimed at acting on the upper, so as to make wrinkles along its edge, thus making the longer peripheral extension of the upper match with the insole outline.

[0017] This method and apparatus are prepared explicitly for joining an upper to an insole obtained by the above described S. CRISPINO method.

[0018] The object of the present invention is to propose a machine, which uses the teachings of the above described method and can stitch an upper to an insole obtained by the IDEAL or S. CRISPINO method, by a simple substitution of some elements.

[0019] Another object of the present invention is to propose a machine, whose guiding means for the edges to be stitched are shaped in such a way, as to assure the stitching high quality and, at the same time, to make it easy for an operator to handle the upper and insole during the whole stitching process.

[0020] A further object of the present invention is to propose a machine, which can use medium and thick thread and which can perform knotted stitch.

[0021] The characteristic features of the proposed machine will be pointed out in the following description with reference to the enclosed drawings, in which:

- Figure 1 shows an upper joined to an insole according to the IDEAL method;
- Figure 1a shows an enlarged partially section view of the joining area of the upper and insole of Figure 1;
- Figure 2 shows an upper joined to an insole, in a first step of S. CRISPINO method;
- Figure 2a shows an enlarged partially section view of the joining area of the upper and insole of Figure 2;

- Figure 3 shows a second step of S. CRISPINO method;
- Figure 3a shows an enlarged partially section view of the joining area of the upper and insole of Figure 3;
- Figure 4 shows an exploded view of a shoe upper and an insole ready to be stitched by the proposed machine;
- Figures 5 and 6 show two working positions of the proposed machine stitching means, according to the IDEAL method;
- Figure 7 shows stitching of an upper to an insole according to a technique shown in Figures 1 and 1a;
- Figure 8 shows the proposed machine stitching means, when they are set according to the S. CRISPINO method;
- Figure 9 shows stitching of an upper to an insole according to a technique shown in Figures 2 and 2a;
- Figure 10 shows an exploded perspective view of the elements forming the guide.

[0022] The proposed machine is aimed at performing a peripheral seam 2, which joins firmly an insole 1 with an upper 3 of an open type.

[0023] The above mentioned peripheral seam 2 allows to obtain a insole-upper assembly, according to the IDEAL or S. CRISPINO methods, described in the introductory statement with reference to Figures 1, 1a and 2.

[0024] As it has been already stated, the seam shown in Figures 2 and 2a is the first step of S. CRISPINO method, according to which in a second step (Figures 3 and 3a), the upper edge is folded and glued to the lower surface of the insole, so as to cover the seam line.

[0025] The second step is performed with known machines, which are not part of the present invention; the step is described only to complete the information about the S. CRISPINO method.

[0026] Before being stitched together by the proposed machine, the insole 1 and the upper 3 are marked along their edges with a series of reference signs 4, 5 which must match after the seam has been completed (Figure 4).

[0027] According to a preferred, but not only embodiment, the proposed machine is obtained using a structure and associated means analogous to the ones described in the US Patent No. 4.848.252 granted to the Applicant.

[0028] The machine includes a head, which supports, among other elements, a longitudinal shaft equipped with a transversal arm 6.

[0029] A needle 7, extending along a circumferential arc, if fastened tangentially to one end of the transversal arm 6, coaxial with the shaft.

[0030] The needle 7 is operated on a plane transversal to a longitudinal guide 10, which supports and guides the edges to be stitched.

[0031] The needle 7 is made oscillate between an idle position, beside the guide 10, and a stitching position, in which the needle passes through a slot made in the guide 10, so as to pierce the edges to be stitched.

[0032] The shaft of the needle 7 reciprocates axially by strokes of predetermined step, in step relation with oscillation of the needle.

[0033] A crochet 8, equipped with a bobbin of stitching thread, cooperates with the needle 7, so as to perform a knotted stitch.

[0034] It is to be pointed out that the threads of the needle 7 and the crochet 8 bobbin can be of either medium or thick type.

[0035] The crochet 8 is situated beside the guide 10, on the side opposite to the one where the needle enters the slot, and is made translate axially, synchronously with the shaft of the needle 7.

[0036] A leather presser 9, situated on the side where the needle 7 enters the slot, moves transversely to the guide 10, in a suitable step relation with the needle 7 oscillation, so as to block the leather edges when the needle is being withdrawn.

[0037] A wrinkling group 60, also situated on the side where the needle 7 enters the slot, is operated to move alternately, in a direction longitudinal with respect to the guide 10 and crosswise thereto, in a suitable step relation with the guide 10 movement and with the needle 7 oscillation.

[0038] The wrinkling group 60 carries a small head 66, which acts on the edge to be stitched situated directly below it (shoe upper), so as to accelerate the movement thereof with respect to the other edge, thus wrinkling the edge in the stitching parts, where it is required, e.g. in the region of the shoe toe.

[0039] According to the machine obtained by the present invention, the guide 10 includes a main body 30, depending from a support 20, integral with the head of the proposed machine.

[0040] The lower part of the main body 30 is so shaped as to form a vertical support surface 33, situated on the side where the needle 7 enters the slot, with a slot 37, open from the side toward the head, which allows the needle 7 passage and the translation thereof together with the stitched edges.

[0041] The lower surface of the insole 1, arranged vertically together with the edge 3a of the upper 3, lies on the support surface 33, as will be explained later on.

[0042] Stop means 40, situated beside the support surface 33 and on the side where the needle 7 enters the slot, are fastened to the main body 30 in an adjustable position.

[0043] The edges of the upper 3 and the insole 1 go in abutment against the stop means 40, which define also a side stop for the edge 3a of the upper 3.

[0044] The stop means 40 cooperate with the support surface 33, so as to guide the edges of the upper 3

and the insole 1 in the region of the needle 7 transition.

[0045] According to a first embodiment, for stitching the upper and the insole with the IDEAL method, the stop means 40 are formed by a prong 41, removably fastened, by a screw 42, in a first seat 31 made in the main body 30.

[0046] The height of the prong 41 is adjustable with respect to the main body 30 by the slotted hole 43, through which the screw 42 passes and whose lower horizontal surface 44 defines a common abutment for the insole 1 and the upper 3.

[0047] The adjustment of the prong 41 height allows to change the distance between the borders of the edges and the seam line being realized.

[0048] The prong 41 is equipped also with a tooth 45, situated in the region of its end facing the edges to be stitched, while being introduced. The tooth 45 extends downwards with respect to horizontal surface 44, so as to support laterally the edge 3a of the upper 3 by maintaining it close to the corresponding edge of the insole 1.

[0049] According to another embodiment, for stitching the upper and the insole with the S. CRISPINO method, the stop means 40 are formed by a pair of feet 51, 52, removably fastened, by relative screws 53, 54, respectively in a first seat 31 of the main body 30 and in a second seat 32, situated beside the first one.

[0050] The first foot 51 forms a horizontal strip 51a, against which the upper part of the insole 1 goes in abutment.

[0051] The second foot 52 includes a horizontal strip 52a, which extends laterally downwards, so as to form a substantially vertical wall 52b.

[0052] The upper part of the upper 3 edge goes in abutment against the wall 52b and is supported laterally thereby.

[0053] The feet 51, 52 are adjustable in height, with respect to the main body 30, independently one from the other, by slots made in the through holes of the fastening screws, so as to obtain the desired protrusion of the edge 3a of the upper 3 with respect to the insole 1 and the desired position of the seam line, as has been already described for the prong 41.

[0054] A separating baffle 70, hinged to the main body 30 by a pivot 71, cooperates with the wrinkling group 60 in step relation therewith.

[0055] The separating baffle 70 has a semi-lunar shape and is joined, by a connecting rod 72, to an actuator 73, e.g. pneumatic, which makes the separating baffle 70 oscillate on a plane parallel to the support surface 33, between two positions, rest position "I" and working position "O", respectively.

[0056] When in the working position "O", the separating baffle 70 is introduced between the edges of the upper and the insole in the part corresponding to the working area of the head 66 of the wrinkling group 60.

[0057] The separating baffle 70 is aimed at limiting the action of the head 66 to the edge 3a of the upper 3, thus avoiding undesired translation of the edge of the insole 1 that could be provoked, due to friction, by the wrinkling of the upper 3 edge.

[0058] In order to stitch, it is necessary to prepare the machine in a suitable way, mounting and adjusting correctly the prong 41 for the IDEAL method or feet 51, 52 for the S. CRISPINO method.

[0059] Then, the operator introduces the edges of the upper and of the insole in the respective positions, i.e. the upper arranged on the side where the needle 7 enters the slot and the insole lying on the support surface 33 of the main body 30, making sure that the edges go in abutment against respective upper stops and that the reference signs 4, 5 pre-established as the stitching beginning are aligned with the needle 7 transition point.

[0060] Afterwards, the machine is started and the operator follows the edges to be stitched introduced into the guide 10 until the peripheral seam 2 is completed.

[0061] The operator operates the wrinkling group 60, e.g. during the toe stitching; this operation is synchronized with the command of the actuator 73 to bring the separating baffle 70 to the working position "O".

[0062] Therefore, the described machine can perform stitch an upper 3 to an insole 1 according to IDEAL or S. CRISPINO method, with only one operation and without using lasts or gluing.

[0063] The evident advantages of the proposed machine derive from the simplification with respect to the traditional systems, which results in enormous saving of time, less equipment and machines.

[0064] It is to be noted that the proposed machine use is extremely easy, thus it can be operated even by not highly specialized operators, which allows to keep the production costs low.

[0065] Consequently, the proposed machine allows to change radically the production techniques used so far, allowing to produce, with reasonable cost, shoes which were very expensive before.

[0066] The above described curved needle 7 can be substituted by a straight needle operated horizontally.

[0067] The proposed structure of the machine, which can use medium and thick thread and which can perform knotted stitch, allows to obtain a upper-insole assembly, which is very strong and impermeable.

[0068] Moreover, the obtained seam is very nice and regular, thus it can form an ornament of the shoe, leaving a large choice of the bottom type to be joined the unit upper-insole.

Claims

1. Machine for stitching an upper to a relative insole, said machine including:

   a longitudinal guide (10) joined to the machine head;
   a needle (7), operated in a plane transversal to

said guide (10) between an idle position, on a side of the guide (10) facing said upper (3), and a stitching position, in which the needle passes first through the edge of the upper (3) and then through the edge of the insole, said needle (7) being reciprocated, parallel to said guide (10), with strokes of a predetermined step;

a crochet (8), with a bobbin, of stitching thread, situated beside said guide (10) on the side opposite to the side where the needle (7) enters said upper, said crochet (8) aimed at cooperating with said needle to make a seam;

a wrinkling group (60), situated beside said guide (10) and equipped with a head (66), which is operated in alternate movement, crosswise to said guide (10), so as to engage the edge (3a) of the upper (3), and longitudinally to said guide (10), so as to wrinkle said edge (3a) of the upper (3), said machine being characterized in that said guide (10) includes :

a main body (30) integral with the machine head, with the lower part of said main body (30) forming a vertical support surface (33), arranged on a side where the needle (7) enters said upper, and acting as support against which the lower surface of said insole (1) goes in abutment;

stop means (40) fastened in an adjustable position to said main body (30) and acting as an upper abutment for said upper (3) and insole (1), as well as a lateral guide of said edge (3a) of the upper (3), said stop means (40) cooperating with said support surface (33) in guiding the edges, arranged one close to the other, at the needle (7) transition point;

a separating baffle (70), hinged to said main body (30) and joined to an actuator (73), which operates it to oscillate between two positions, rest position (I) and working position (O), respectively, with said working position (O) being defined in step relation with the operation of said wrinkling group (60), with said separating baffle (70), while in said working position, being introduced between the edges of said upper (3) and insole (1) in the part corresponding to the working area of said head (66).

2. Machine, according to claim 1, characterized in that said stop means (40), when used according to a technique, in which the ends of the upper and insole edges are aligned, are formed by a prong (41) removably fastened, by a screw (42), in a first seat (31) made in said main body (30), said prong (41) being adjustable in height and defining, with its lower horizontal surface (44) a common abutment for said edges.

3. Machine, according to claim 2, characterized in that said prong (41) is equipped with a tooth (45), situated at its end facing the edges to be stitched while being introduced, said tooth (45) extending downwards with respect to horizontal surface (44), so as to support laterally said edge (3a) of the upper (3).

4. Machine, according to claim 1, characterized in that said stop means (40), when used according to a technique, in which the edge (3a) of the upper (3) protrudes with respect to the edge of the insole (1), are formed by a pair of teeth (51,52), first and second, respectively, removably fastened, by relative screws (53,54), in corresponding first and second seats (31,32) made in said main body (30), with said feet (51,52) being adjustable in height independently one from the other, and including relative horizontal strips (51a,52a), which act as the abutments for the upper part of the insole (1) and said edge (3a) of the upper (3), respectively.

5. Machine, according to claim 4, characterized in that said second foot (52) includes a substantially vertical wall (52b), which extends laterally downwards of the relative horizontal strip (52a), so as to support laterally the edge (3a) of said upper (3).

6. Machine, according to claim 1, characterized in that said longitudinal guide (10) allows to realize a knotted stitching with two threads, either of medium or thick type, carried respectively by said needle (7) and said bobbin joined to the crochet (8).

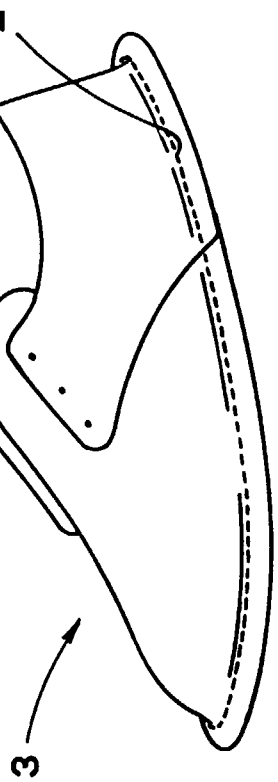


FIG.2

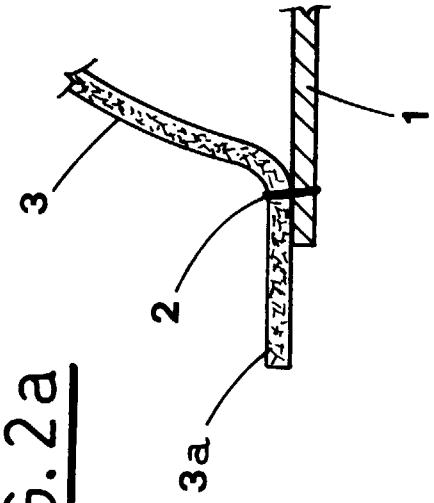


FIG.2a

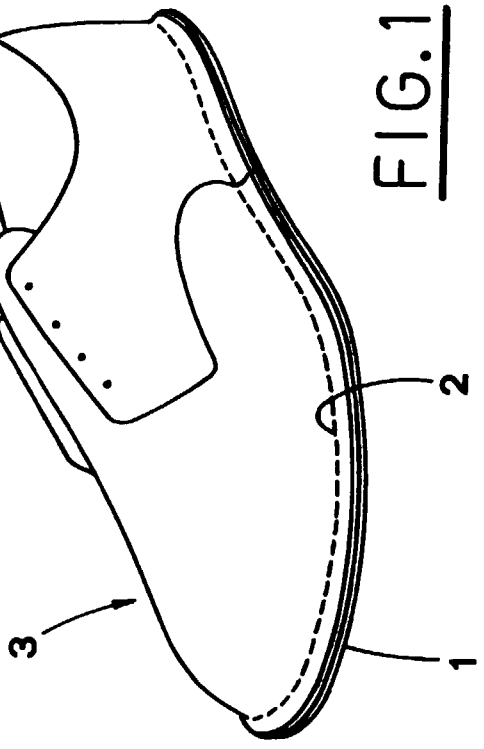


FIG.1

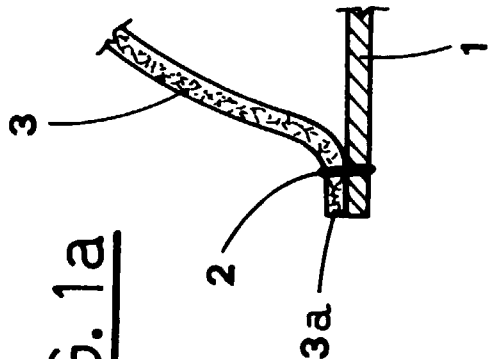


FIG.1a

FIG.4

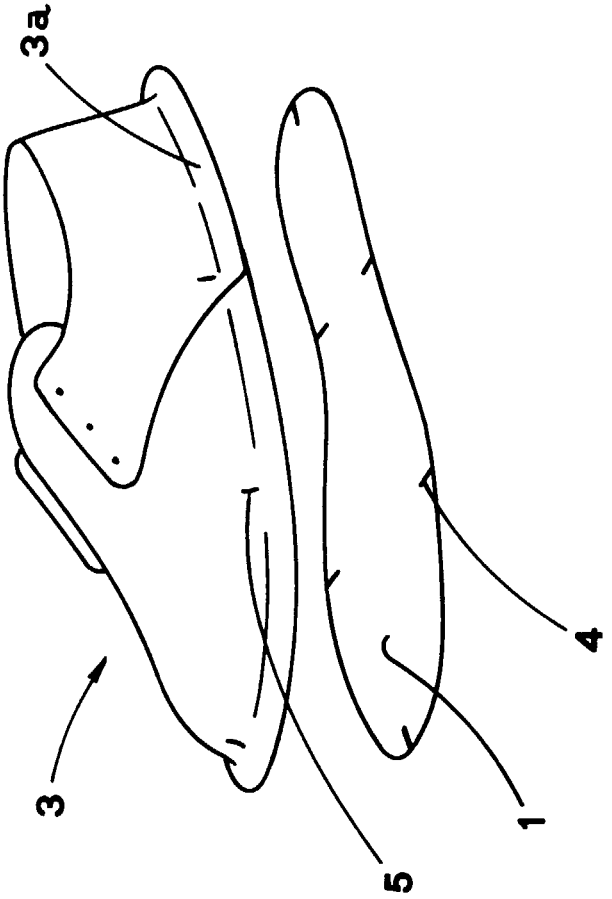


FIG.3

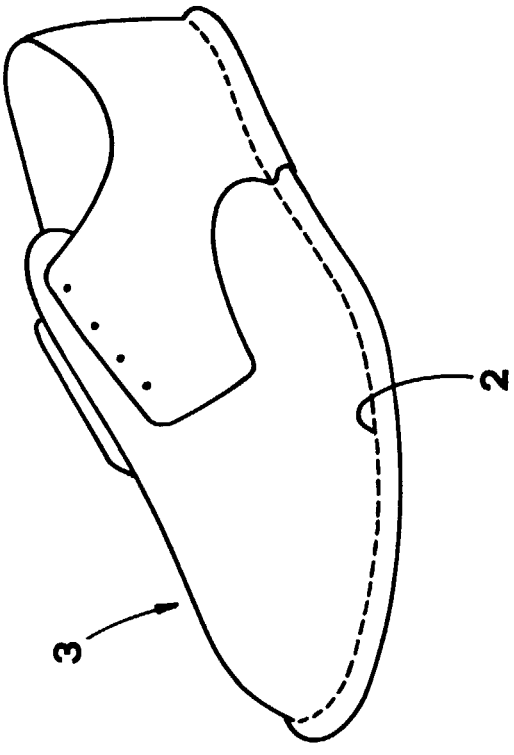
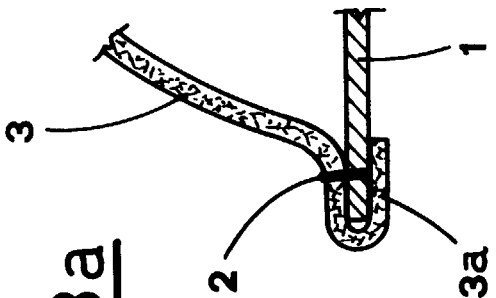


FIG.3a



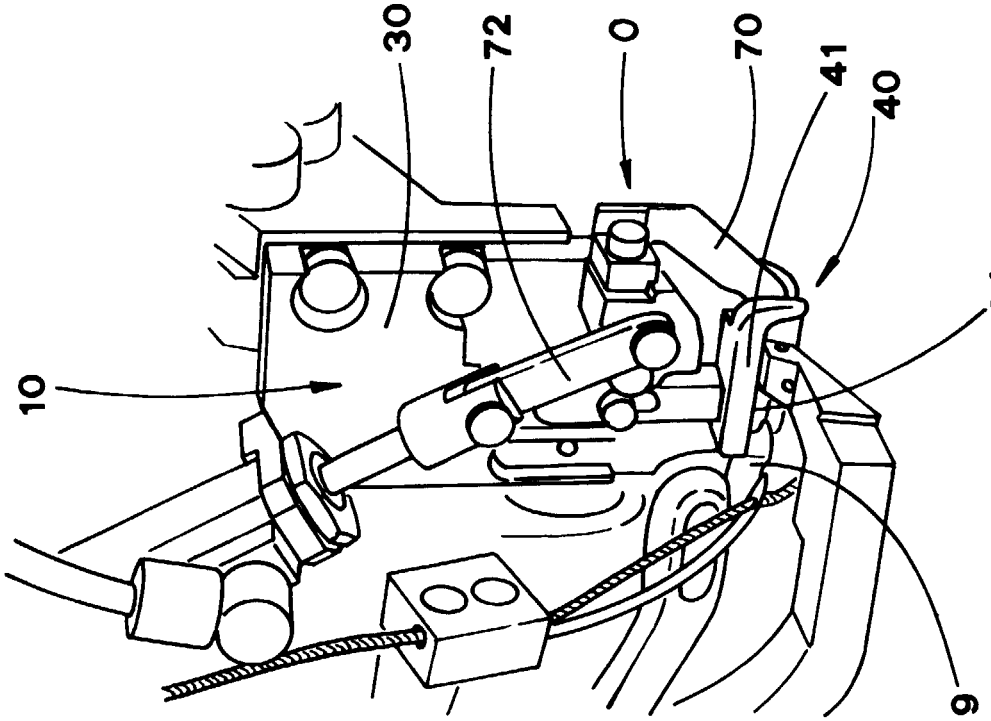


FIG.6

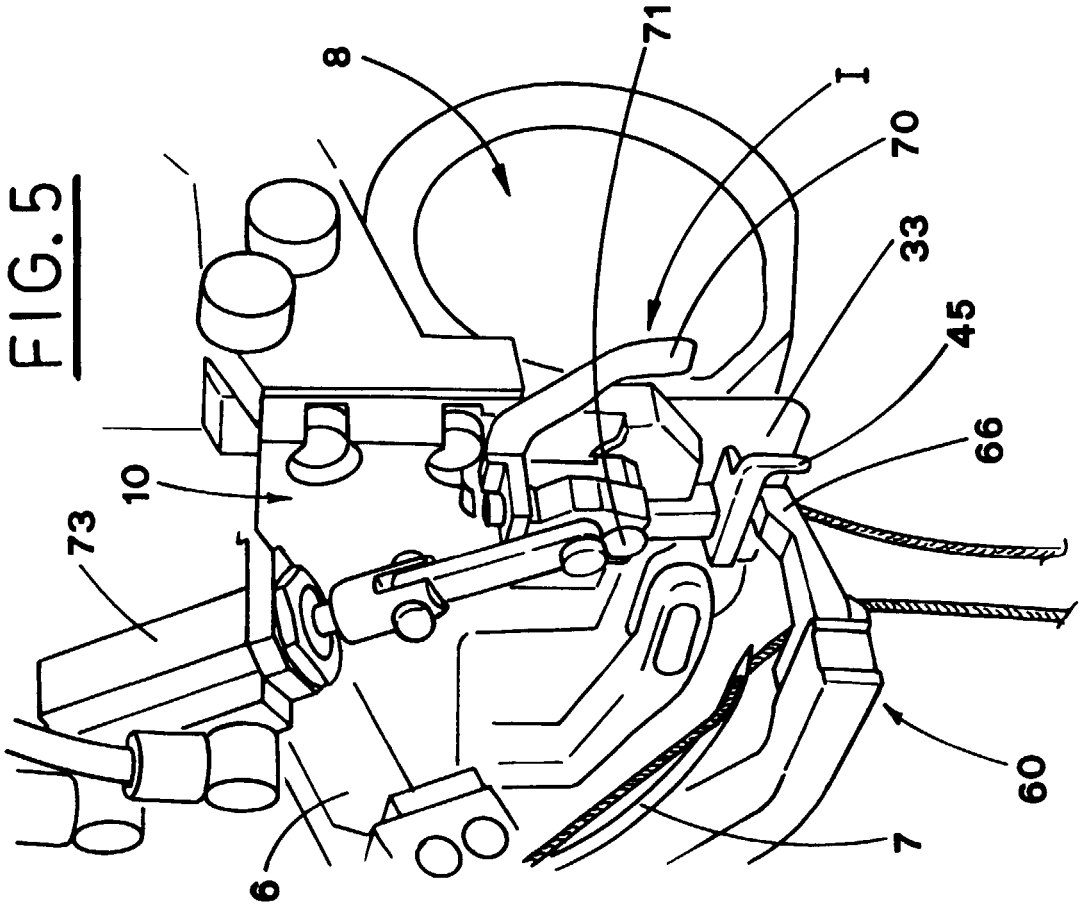


FIG.5

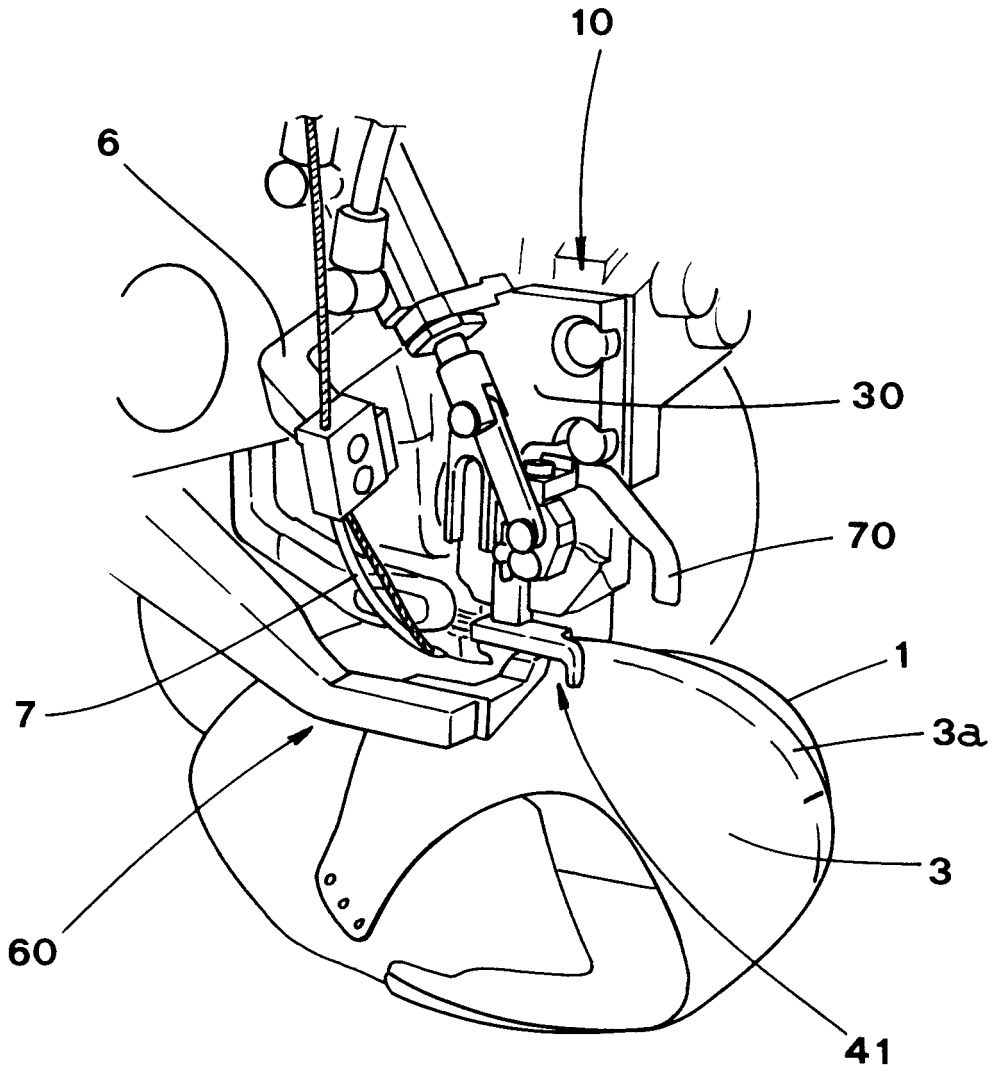
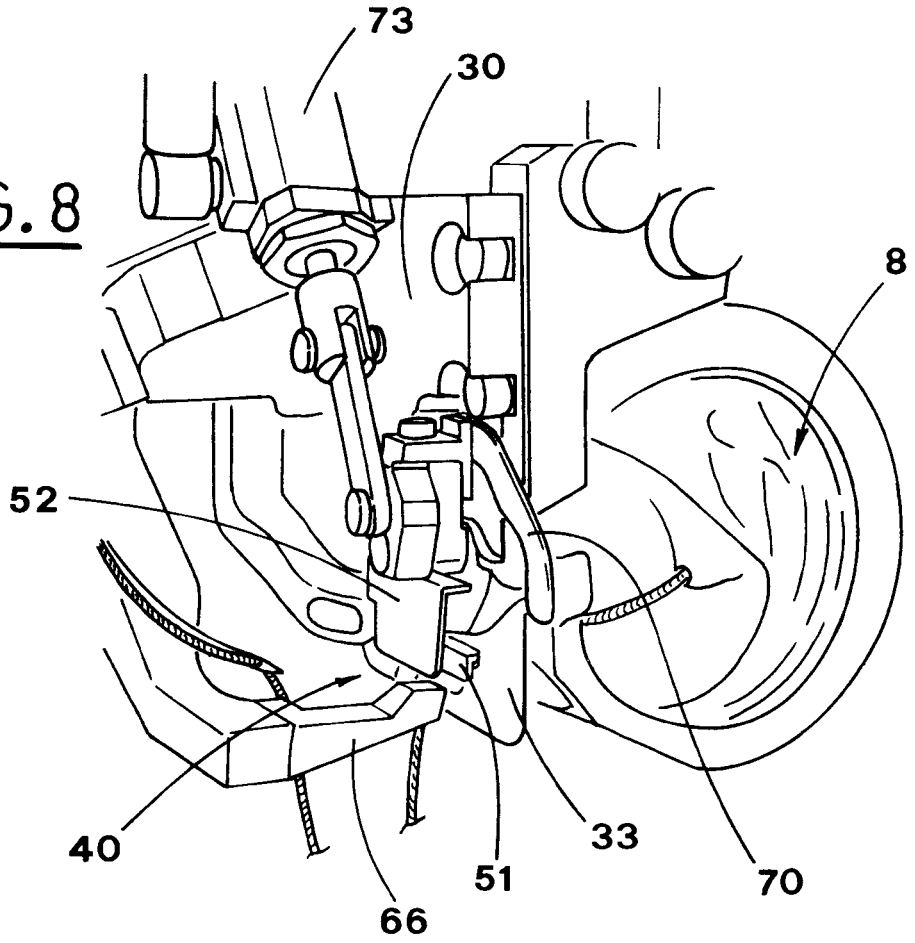


FIG. 7

FIG.8



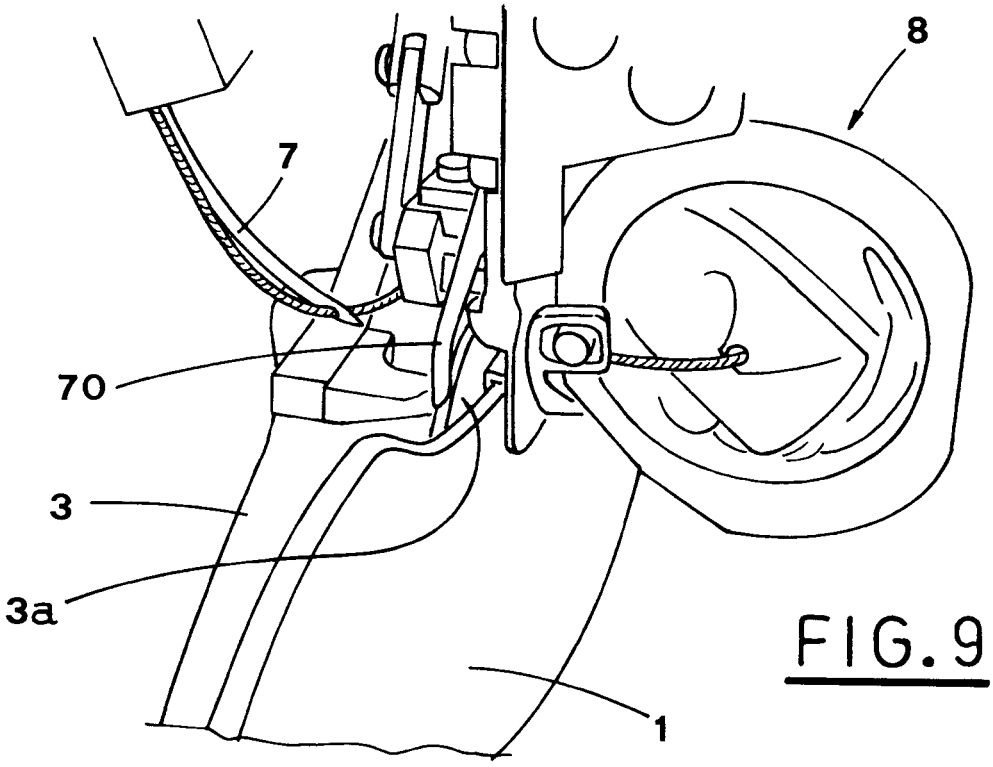
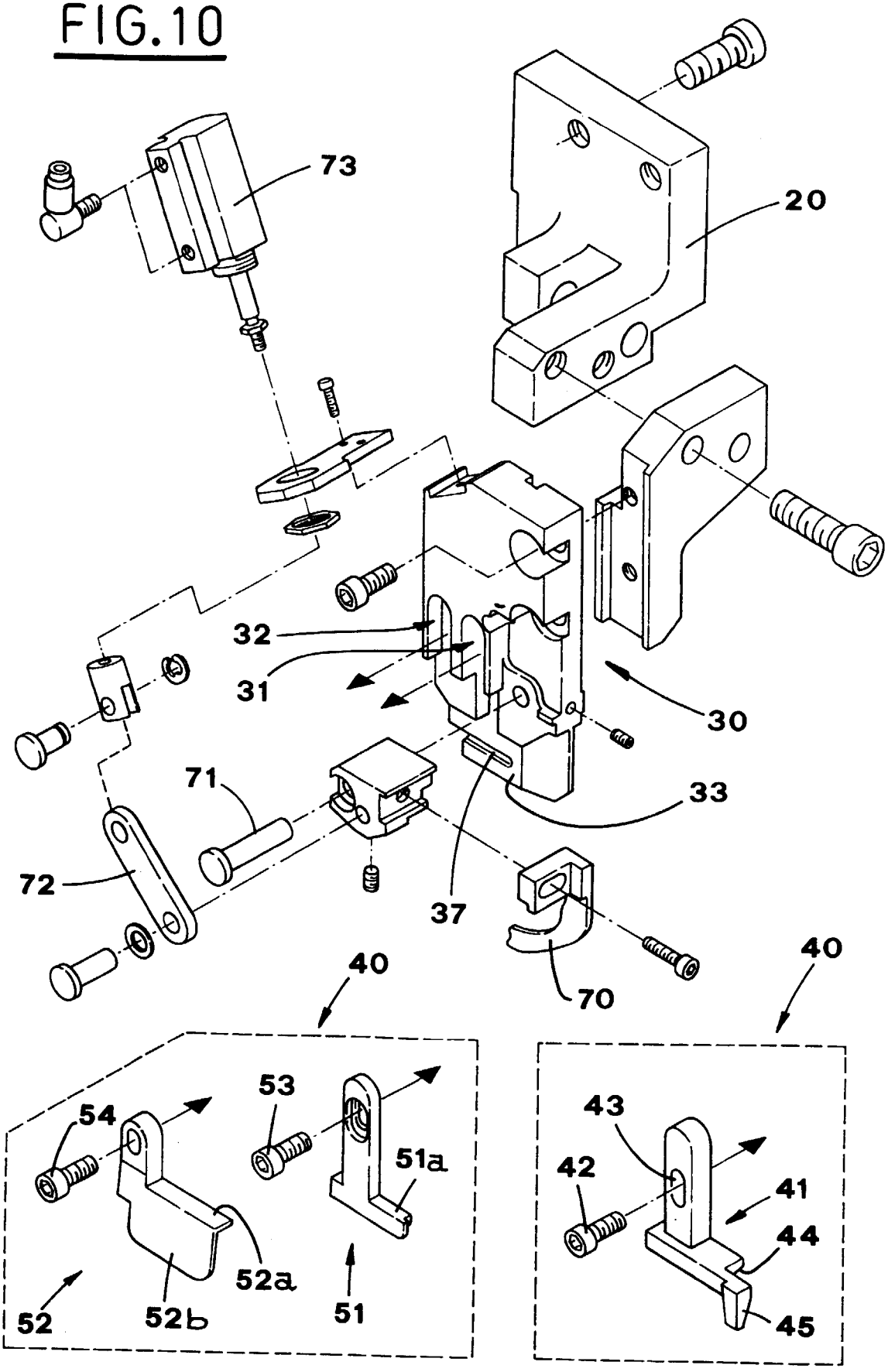


FIG.9

FIG.10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