(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 488 686 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
28.08.2013 Bulletin 2013/35

(21) Application number: **10787548.6**

(22) Date of filing: **11.10.2010**

(51) Int Cl.:
D05B 15/02 *(2006.01)* ***D05B 73/02*** *(2006.01)*

(86) International application number:
PCT/IB2010/054592

(87) International publication number:
WO 2011/045731 (21.04.2011 Gazette 2011/16)

(54) **A SYSTEM FOR SUPPORTING AND ORIENTATING FOR A CURVED- NEEDLE SEWING MACHINE**

TRÄGER- UND ORIENTIERUNGSYSTEM FÜR EINE BOGENNADELNÄHMASCHINE

SYSTÈME DE SUPPORT ET D'ORIENTATION POUR UNE MACHINE À COUDRE À AIGUILLE COURBE

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **13.10.2009 IT BO20090658**

(43) Date of publication of application:
22.08.2012 Bulletin 2012/34

(73) Proprietor: **Ciucani Mocassino Machinery S.r.l.**
63900 Fermo (FM) (IT)

(72) Inventor: **CENTANNI, Massimo**
I-63023 Fermo (FM) (IT)

(74) Representative: **Dall'Olio, Christian et al**
INVENTION S.r.l.
Via delle Armi, 1
40137 Bologna (IT)

(56) References cited:
EP-A1- 0 939 159
WO-A1-97/32070
WO-A2-99/56573
DE-A1- 10 224 001
DE-C1- 19 538 362
US-A- 5 487 348

EP 2 488 686 B1

Printed by Jouve, 75001 PARIS (FR)

Description

TECHNICAL FIELD

[0001] The invention relates to the technical sector of sewing machines, with particular reference to curved-needle sewing machines, frequently used in the shoe industry.

BACKGROUND ART

[0002] The original architecture underpinning these machines has been the object of industrial invention patents in various countries (see for example US 4,848,252).

[0003] The curved needle is borne at the free end of an arm, keyed radially on a shaft arranged longitudinally in the machine head.

[0004] The shaft is destined to be activated with an oscillating alternating motion, such as to move the needle between two extreme positions, along a curved trajectory that is concentric with the degree of curvature of the needle itself.

[0005] The machine is provided with suitable support and guide means, destined to define a correct positioning of the flaps of leather during sewing.

[0006] In the outward oscillation the needle first passes through an edge of a flap and then into the other, exiting laterally therefrom in order to enter a rotating-hook system, commonly known as a crochet, which cooperates with the needle in order to form the sewing stitch.

[0007] In appropriate phase-relation with the outward oscillation of the needle, a holding foot is activated to press the flap, facing from the side of the crotchet in an opposite direction to the advancing of the needle, such as to support the thrust of the needle.

[0008] With the needle engaged in the flaps, the longitudinal shaft is axially translated in synchrony with the crotchet by an amount that is equal to a predetermined stitching step, thus determining the advancement of the material to be sewn.

[0009] The needle return oscillation is then commanded, which determines its disengagement from the material and enables an opposite translation to be performed, by a same amount, by the shaft-needle-crotchet group to return them into the initial position.

[0010] Starting from the original machine, specific add-on equipment has been realised for obtaining adaptations of machines that are suitable for special work operations.

[0011] In the ambit of these adaptations, sometimes arms of various shapes are provided, to which the support and guide means of the material to be stitched are fixed.

[0012] The arms are associated to relative bases, different time by time, on which the head of the machine is fixed in a pre-established position.

[0013] The adaptations have in turn given rise to patents: for example, Italian patent N°1.310.413, as well as documents WO 96/17989, WO 96/20305 and WO 96/20306.

[0014] Apart from these, there is also Italian patent N°1.299.967, which describes an adaptation which enables sewing an open-type upper to a relative bottom of pressed synthetic material.

[0015] In this adaptation, the head of the machine is mounted in an inclined trim instead of vertical, thanks to a base predisposed therefor; in this position, together with an appropriate conformation of the support and guide means which enables vertically arranging the bottom to be sewn, an ascending trajectory is obtained between the needle entry point in the upper and the exit point in the bottom.

[0016] As the exit point is higher than the entry point, a needle exit angle is realised in the flank of the bottom which is more favourable and therefore produces a better-arranged stitching.

[0017] The construction of the machines in the various augmented versions therefore comprises a series of common parts and a certain number of specific details, relating to each of the possible adaptations.

[0018] As they have to be produced in limited numbers with respect to common machines, the specific details inevitably lead to higher costs.

[0019] In some cases, as in the moulding of the arms and the bases, these costs are increased by the fact that the working needs impose the realising of minimum-number batches which at times can remain in the warehouse for long periods of time, depending on how sales orders are faring.

[0020] The fact that the arms and bases are comprised in the kit of elements characterising a particular add-on part makes it problematic, if not impossible for the client to perform a transformation of a machine of one type into a machine of another type, should production requirements change.

[0021] Document WO-A-99 56573 discloses a method for stitching a shoe upper to related sole which comprises introduction of a stitching member inside the upper, that is associated to the sole of the shoe to be stitched. The stitching member includes a needle guided slidingly at a free end of the stitching member and cooperating with a crochet, situated outside the shoe, so as to make a stitching. The needle is curved and is moved along a circular path extending from inside toward outside the shoe to be stitched. The circular path has rotation center coinciding with the center of the curve of the needle. During stitching step, the upper joined to the related sole of the shoe to be stitched is moved by driving means equipped with a support for the shoe, while the position of this stitching member is kept unchanged.

SUMMARY OF INVENTION

AMENDED SHEET

[0022] The aim of the present invention is therefore to provide a support and orientating system of a curved-

needle sewing machine, conformed such as to be usable, with a small number of simple adaptations, in all possible augmented adaptations on a same machine, and all in such a way as to increase the number of shared parts in the various versions.

[0023] A further aim of the invention is to provide a system which enables substitution of one set-up with another, while changing only a limited number of pieces and without this leading to a reduction in the functionality and reliability of the new set-up.

[0024] A still further aim of the invention consists in providing a system whose actuation leads to contained costs in relation to the performance it provides.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The characteristics of the invention will emerge from the following description of a preferred embodiment of the support and orientation system of the invention, in accordance with what is set out in the claims and with the aid of the accompanying figures of the drawings, in which:

figure 1 is an exploded perspective view of the modular elements of the proposed system;

figure 2 is a schematic lateral view of a machine with a first set-up and the system in a first trim configuration;

figure 3 is a schematic front view of the machine of figure 2;

figure 4 is a schematic lateral view of a machine with a second set-up and the system in the first trim-up configuration;

figure 5 is a schematic front view of the machine of claim 4;

figure 6 is a schematic lateral view of a machine in a third set-up and the system in the first trim configuration;

figure 7 is a schematic front view of the machine of figure 6;

figure 8 is a schematic lateral view of a machine exhibiting a fourth set-up and the system in the first trim configuration;

figure 9 is a schematic front view of the machine of figure 8;

figure 10 is a schematic lateral view of a machine in a fifth set-up, and the system in a second trim configuration;

figure 11 is a schematic front view of the machine of figure 10;

figure 12 is a larger-scale view of a portion of the machine of figure 7;

figure 13 is a larger-scale view of a portion of the machine of claim 11;

figure 14 is a front view of a second embodiment of the system associated to the machine, in the first trim configuration;

figure 15 is a front view of the system of figure 14 in the second trim configuration.

BEST MODE FOR CARRYING OUT THE INVENTION

[0026] With reference to the figures of the drawings, 1 denotes a curved-needle sewing machine, of substantially known type, in which activating means are provided, housed in the operating head 2 of the machine 1 and not illustrated, destined to set a shaft 3 in alternating oscillation, which shaft 3 is arranged longitudinally in the head 2 (figures 12, 13).

[0027] An arm 4 is radially keyed on the shaft 3, with a curved needle 5 borne at a free end thereof; in this way, the needle 5 moves between two extreme positions along a curved trajectory R which is concentric to the radius of curvature of the needle 5 and arranged in a vertical plane, transversal to the axis of the shaft 3.

[0028] The curved needle 5 in its outward run passes, in order, the edges L1, L2 of two flaps, brought up to one another, and then it partially enters a rotating hook device 6, commonly known as a crochet, with which it cooperates for forming the sewing stitch.

[0029] With the needle 5 engaged in the flaps L1, L2, the longitudinal shaft 3 is axially translated in synchrony with the crochet 6, by an amount which is the same as a predetermined stitching step, which determines the advancing of the material to be sewn.

[0030] The return oscillation of the needle 5 is then commanded, which causes the needle 5 to disengage from the material and enables an opposite translation of a same amount of the shaft-needle-crochet group in order to return it into the initial position thereof.

[0031] The system of the invention, denoted in its entirety by 10, comprises modular elements provided in order to be associated below the head 2 and to be fixed to an underlying work plane P, with the modular elements being usable in at least two trim configurations C1, C2, considered with respect to the oscillation plane of the needle 5, in the first of which the head 2 of the machine is arranged vertically, while in the second the head 2 is inclined by a predetermined angle.

[0032] In the illustrated example (see figure 1) the following modular elements are comprised:

a column 11;

at least a spacer organ 12;

two rectangular covering casings, respectively a first casing 13 and a second casing 14.

[0033] The column 11 exhibits a prismatic shape, in which an upper surface 11A is defined, destined to couple with the lower part of the head 2, a lower surface 11 B, parallel to the first, bordered by an edge 11 C, a front wall 11 D and a lateral wall 11E, both interested by a plurality of holes 110, for example threaded holes, arranged in predetermined arrays which enable fastening, by means of threaded organs, of various arms, as will be specified herein below.

[0034] The rectangular casings 13, 14 are respectively provided to be fixed to the front walls 11 D, and the lateral walls 11 E, in assembly combinations which will be more fully described herein below.

[0035] The spacer organ 12 is constituted, for example, by a plate destined to be positioned flankingly between the work plane P and the lower surface 11 B of the column 11, at the lateral wall 11E.

[0036] The opposite surfaces 12A, 12B of the plate 12, destined to abut, respectively, the column 11 and the work plane P, are specially cut obliquely such that the overall angle formed is the same as the inclination angle of the operating head 2, sub-divided between one surface 12A and the other 12B, according to the corresponding rest angle.

[0037] Two triangular casings 15 are preferably associated to the spacer plate 12, destined to cover the empty zones between the edge 11 C and the work plane P.

[0038] In a constructional variant, the spacer plate 12 and the casing 15 are realised in a single body.

[0039] The column 11 is destined to define the first trim configuration C1 of the head 2 and, in this case, it is fixed directly to the work plane P, for example by screw means (not illustrated) engaged in holes 11 F realised in the edges 11 C (see figures from 2 to 9).

[0040] In order to define the second trim configuration C2 of the head 2 it is sufficient to inferiorly couple the spacer plate 12 to the column 11, by means of screw fastening means of known type and not illustrated in detail; the triangular casings 15, which are without any structural function, are then applied (figures 10, 11).

[0041] The following is a description, by way of non-limiting example, of the assembly combinations of the system 10 relative to some trim configurations of the machine 1.

[0042] In figures 2 and 3, the machine 1 is in vertical trim configuration C1 and is realised with a first known set-up X1 (Italian patent no. 1,310,413), in which the support and guide means of the material to be sewn (not illustrated) are fastened directly to the head 2.

[0043] Since no arms are fixed to the column 11, both the rectangular casings 13, 14 are applied thereto.

[0044] In figures 4 and 5, the machine is in vertical trim configuration C1 and is defined by a second known set-up X2 (US patent 4, 848, 252), in which the relative guide and support means 20 are fixed to an end of a first shaped arm 21, which is fixed to the lateral wall 11E and extends projectingly up to the zone underlying the needle 5.

[0045] Only the first casing 13 is fixed to the column 11, for covering the holes 110 afforded in the front wall 11 D.

[0046] In figures 6 and 7, the machine 1, in the vertical trim configuration C1, is configured in a third known set-up X3, for example the one described and illustrated in document WO 96/17989 or, alternatively, the WO 96/20305, or WO 96/20306.

[0047] In the trim configuration X3 in all the cited variants the relative guide and support means 30 of the material to be cut are fixed to the ends of a second shaped arm 31, which is fastened to the front wall 11D and extends projectingly up to the zone underlying the needle 5.

[0048] Only the second casing 14 is fixed to the column 11, for covering the holes 110 afforded in the lateral wall 11 E.

[0049] In figures 8 and 9, the machine, in vertical trim configuration C1 is configured in a fourth set-up X4, as in the patent application for industrial invention no. BO2009 R000378, filed in the name of the present Applicants.

[0050] Also in this fourth trim configuration X4 the support and guide means 40 of the material to be sewn are fixed to the end of the shaped arm 41, which is fixed to the front wall 11 D and extends projectingly up to the zone underlying the needle 5.

[0051] The shaped arm 41, as illustrated, can advantageously be the same as the second shaped arm 31 of the third trim configuration X3, only fixed lower with respect thereto due to the greater height development of the means 40.

[0052] The second casing 14 is fixed to the column 11, for covering the holes 110 afforded in the lateral wall 11E.

[0053] In figures 10 and 11, the machine 1, in the inclined configuration C2, is defined by a fifth known trim configuration X5 (IT 1,299,967), in which the relative guide and support means 50 of the material to be sewn are fixed directly to the head 2.

[0054] Since no arm is fixed to the column 11, both the rectangular casings 13, 14 are applied to the column 11.

[0055] Figures 12 and 13 highlight, by direct comparison, the differences that occur in the sewing action between a vertical-trim machine C1 and an inclined-trim machine C2.

[0056] In figure 12, relating for example to set-up X3, it can be seen how the two flaps L1, L2 to be sewn are symmetrically positioned with respect to a vertical plane Y which contains the axis of the shaft 3 which activates the needle 5.

[0057] Consequently the entry point of the needle 5 of the first flap L1 (on the left in figure 12) is at the same height as the exit point from the second flap L2.

[0058] Figure 13, relating to the fifth trim configuration X5, partially illustrates the support and guide means 50 of the material to be sewn, the material in this case being constituted by an open-type upper T and a bottom F made of a pressed synthetic material.

[0059] The means 50 comprise an upper guide 51 and a lower guide 52 which determine, for the bottom, a substantially-vertical arrangement; the arrangement is optimal for facilitating the manual action the operator has to perform during sewing in order to guide the material towards the sewing zone.

[0060] The guides 51, 52 are specially positioned such that the needle 5 follows an ascending trajectory R between the entry point, in the upper T, and the exit point, in the flank of the bottom F.

[0061] The orientation of the trajectory R, with the exit point higher, defines an exit angle of the needle 5 which is more convenient, and thus gives a better stitching, from the aesthetic point of view too.

[0062] Figures 14 and 15 illustrate a second embodiment 10, in which the following modules, among others, are included:

a base 212;

a turret 211.

[0063] The base 212 exhibits an upper surface 212A arranged inclined, with respect to the horizontal, by a predetermined angle.

[0064] The turret 212 exhibits the relative lower surface 211 B destined to couple with an upper surface 212A of the base 121 and inclined, with respect to the horizontal by a same angle as the upper surface 212A.

[0065] The base 212 is fixed to the work plane P with a first orientation K1 (figure 14), while the turret 211 is made solid to the lower part of the operating head 2, such that the shorter part in terms of height is on the entry side of the needle 5.

[0066] A first coupling combination in which the inclination of the upper surface 212A of the base 212 and the inclination of the lower surface 211 B of the turret 211 are opposite, determines the first vertical trim configuration C1 of the turret 211 and the overlying machine 1.

[0067] By rotating the base 212 by 180°, and bringing it into a second orientation K2 (figure 15), a second coupling combination is determined, in which the inclinations of the upper surface 212A and the lower surface 211B are summed, such that the turret 211 and the overlying machine 1 are arranged in the second trim configuration C2, inclined by a double angle with respect to the inclination of the upper surfaces 212A and the lower surface 211 B.

[0068] The positive characteristics of the proposed system clearly emerge from the foregoing. It is very versatile and with only a few simple adjustments enables all the possible set-up configurations of the machine to be reached.

[0069] The advantages deriving from having a greater number of common parts in the various machines are easily understood, as are the rationalisation of production and of the warehouse, leading to a considerable saving in terms of costs.

[0070] A further advantageous aspect is that a machine using the proposed system can be transformed into a machine having a different trim by changing only a limited number of parts, leading to savings in terms of transformation costs.

[0071] The above is intended as a non-limiting example, and any modifications in details which might be brought to the system for technical and/or functional reasons, are considered to fall within the ambit of protection of the following claims.

Claims

1. A system for supporting and orientating for a curved-needle sewing machine, the curved needle being borne by an arm (4) keyed radially on a shaft (3) arranged longitudinally in an operating head (2) of the machine, the shaft (3) being destined to move the needle (5) oscillatingly in a vertical plane, transversal to an axis of the shaft (3), between two extreme positions of a curved trajectory (R), which curved trajectory (R) is concentric with a radius of curvature of the needle (5), in order to pass through edges (L1, L2) of two overlapping flaps of a material to be sewn, and thereafter to cooperate with a rotating-hook device (6) in order to form a stitch, with the shaft (3) axially translated in an up-and-down motion in phase relation with oscillation thereof, in a step of predetermined entity in order to actuate, during an outward run, advancement of the two flaps (L1, L2) involved in the sewing; the system being **characterised in that** it comprises modular elements (11, 12) interposed between the operating head (2) and an underlying work plane (P) to define, for the operating head of the machine, at least a determined trim configuration (C1, C2) with respect to the oscillating plane of the needle.

2. The system of claim 1, **characterised in that** the modular elements comprise a prismatic column (11) comprising an upper surface (11A), destined to couple with a lower part of the head (2), and a lower surface (11 B), parallel to the upper surface (11A), the column (11) being destined to be fixed directly to the work plane (P) at the lower surface (11B) in order to define a first trim configuration (C1) of the operating head (2) which is vertical.

3. The system of claim 1, **characterised in that** the modular elements comprise: a prismatic column (11), an upper surface (11A) of which is destined to couple with the lower part of the operating head (2);

at least a spacer means (12) fixed at a side thereof to the lower surface (11 B) of the column and at another side thereof to the work plane (P), the spacer means (12) and the column (11) defining a second trim configuration (C2) of the operating head (2) which is inclined by a predetermined angle.

4. The system of claim 2, **characterised in that** it comprises a first shaped arm (21), removably projectingly blocked by fastening means to a lateral wall (11E) realised in the column (11), which first shaped arm (21) bears, at a remaining end thereof, in a zone underlying the needle (5), support and guide means (20) of the material to be sewn.

5. The system of claim 2, **characterised in that** it comprises a second shaped arm (31, 41) removably projectingly blocked by fastening means to a frontal wall (11D) realised in the column (11), which second shaped arm (31, 41) bears, at a remaining end thereof, in a zone underlying the needle (5), support and guide means (30, 40) of the material to be sewn.

6. The system of claim 5, **characterised in that** it comprises a first casing (13) for covering the frontal wall (11 D) when the second arm (31, 41) is not constrained to the column (11).

7. The system of claim 4, **characterised in that** it comprises a second casing (14) for covering the lateral wall (11E) when the first arm (21) is not constrained to the column (11).

8. The system of claim 2 or 4 or 5 or 6, **characterised in that** the column (11) exhibits an edge (11 C) bordering the lower surface (11 B), in which edge (11 C) holes (11 F) are afforded to enable transit of screw means for fastening the column (11) to the work plane (P).

9. The system of claim 3, **characterised in that** the spacer means (12) is constituted by a plate destined to be positioned vertically, in which relative opposite surfaces (12A, 12B) which contact respectively the column (11) and the work plane (P) are obliquely positioned according to a corresponding rest angle.

10. The system of claim 9, **characterised in** the two triangular casings (15) are associated to the spacer plate (12), which triangular casings (15) are intended to cover empty zones between a lower limit of the column (11) and the work plane (P).

11. The system of claim 10, **characterised in that** the spacer plate (12) and the triangular casings (15) are made in a single body.

12. The system of claim 1, **characterised in that** the modular elements comprise a base (212) and an overlying turret (211), mutually coupled at an upper surface (212A) of the base (212) and a lower surface (121B) of the turret (211), the upper surface (212A) and the lower surface (211B) being inclined by a predetermined angle with respect to a horizontal.

13. The system of claim 12, **characterised in that** the base (212) is fixed to the work plane (P) at a first orientation (K1) in order to define a first coupling combination in which an inclination of the upper surface (212A) is oppositely-directed to an inclination of the lower surface (212B) in order to define the first trim configuration (C1) of the operating head (2) in which the operating head (2) is vertical.

14. The system of claim 12, **characterised in that** the base (212) is fixed to the work plane (P) at a second orientation (K2) thereof in order to define a second coupling combination in which an inclination of the upper surface (212A) is equally-directed with an inclination of the lower surface (212B) in order to define the second trim configuration (C2) of the operating head (2), in which the operating head (2) is inclined by a doubled angle with respect to the inclination of the upper surface (212A) and the lower surface (212B).

Patentansprüche

1. Träger- und Orientierungssystem für eine Bogennadelnähmaschine, worin die Bogennadel von einem Arm (4) getragen wird, der radial auf eine Welle (3) gekeilt ist, die in Längsrichtung in einem Arbeitskopf (2) der Maschine angeordnet ist, wobei die Welle (3) dafür bestimmt ist, die Nadel (5) in einer senkrechten Ebene, die zu einer Achse der Welle (3) quergerichtet ist, hin und her zu bewegen zwischen zwei Endlagen einer kurvenförmigen Bahn (R), wobei diese kurvenförmige Bahn (R) konzentrisch mit einem Krümmungsradius der Nadel (5) ist, um die Ränder (L1, L2) von zwei einander überlagerten Laschen eines Nähgutes zu durchdringen, und anschließend mit einer Drehgreifervorrichtung (6) zur Bildung eines Nahtstiches zusammenzuwirken, wobei die Welle (3) in axialer Richtung in einer Auf- und Abwärtsbewegung in Phasenbeziehung zu der Hin- und Herbewegung um einen Schritt vorbestimmter Größe bewegt wird, um während einer Hinbewegung den Vorschub der zwei zu nähenden Laschen (L1, L2) zu bewirken; wobei das System **dadurch gekennzeichnet ist, dass** es modulare Elemente (11, 12) beinhaltet, die zwischen dem Arbeitskopf (2) und einer darunterliegenden Arbeitsfläche (P) angeordnet sind, um für den Arbeitskopf der Maschine zumindest eine vorgegebene Positionseinstellung (C1, C2) in Bezug auf die Bewegungsebene der

Nadel zu definieren.

2. System nach Anspruch 1, **dadurch gekennzeichnet, dass** die modularen Elemente eine prismatische Säule (11) beinhalten, die eine obere Fläche (11A) aufweist, die dazu bestimmt ist, mit einem unteren Teil des Kopfes (2) verbunden zu werden, und eine untere Fläche (11B), die parallel zu der oberen Fläche (11A) ist, wobei die Säule (11) dazu bestimmt ist, an der unteren Fläche (11B) direkt auf der Arbeitsfläche (P) befestigt zu werden, um eine erste Positionseinstellung (C1) des Arbeitskopfes (2) mit vertikaler Ausrichtung zu definieren.

3. System nach Anspruch 1, **dadurch gekennzeichnet, dass** die modularen Elemente Folgendes beinhalten: eine prismatische Säule (11), deren obere Fläche (11A) dazu bestimmt ist, mit dem unteren Teil des Arbeitskopfes (2) verbunden zu werden; zumindest ein Abstandhalterelement (12), das mit einer Seite an der unteren Fläche (11B) der Säule und mit der anderen Seite an der Arbeitsfläche (P) befestigt ist, wobei das Abstandhalterelement (12) und die Säule (11) eine zweite Positionseinstellung (C2) des Arbeitskopfes (2) definieren, die um einen vorgegebenen Winkel geneigt ist.

4. System nach Anspruch 2, **dadurch gekennzeichnet, dass** es einen ersten geformten Arm (21) beinhaltet, der abnehmbar und überstehend mit Befestigungsmitteln an einer Seitenwand (11E), die an der Säule (11) ausgebildet ist, befestigt ist, wobei dieser erste geformte Arm (21) an seinem anderen Ende, in einem unterhalb der Nadel (5) gelegenen Bereich, Träger- und Führungsmittel (20) für das Nähgut trägt.

5. System nach Anspruch 2, **dadurch gekennzeichnet, dass** es einen zweiten geformten Arm (31, 41) beinhaltet, der abnehmbar und überstehend mit Befestigungsmitteln an einer Vorderwand (11D), die an der Säule (11) ausgebildet ist, befestigt ist, wobei dieser zweite geformte Arm (31, 41) an seinem anderen Ende, in einem unterhalb der Nadel (5) gelegenen Bereich, Träger- und Führungsmittel (30, 40) für das Nähgut trägt.

6. System nach Anspruch 5, **dadurch gekennzeichnet, dass** es ein erstes Gehäuse (13) beinhaltet, das zur Abdeckung der Vorderwand (11D) dient, wenn der zweite Arm (31, 41) nicht mit der Säule (11) verbunden ist.

7. System nach Anspruch 4, **dadurch gekennzeichnet, dass** es ein zweites Gehäuse (14) beinhaltet, das zur Abdeckung der Seitenwand (11E) dient, wenn der erste Arm (21) nicht mit der Säule (11) verbunden ist.

8. System nach Anspruch 2 oder 4 oder 5 oder 6, **dadurch gekennzeichnet, dass** die Säule (11) einen Rand (11C) aufweist, der die untere Fläche (11B) umrahmt, wobei in dem Rand (11C) Bohrungen (11F) angefertigt sind, um das Durchführen von Verschraubungsmitteln zur Befestigung der Säule (11) an der Arbeitsfläche (P) zu ermöglichen.

9. System nach Anspruch 3, **dadurch gekennzeichnet, dass** das Abstandhalterelement (12) aus einer Platte besteht, die hochkant angeordnet ist und in der entsprechende, einander gegenüberliegende Flächen (12A, 12B), die jeweils in Berührung mit der Säule (11) beziehungsweise mit der Arbeitsfläche (P) gelangen, gemäß eines entsprechenden Auflagewinkels schräg ausgerichtet sind.

10. System nach Anspruch 9, **dadurch gekennzeichnet, dass** zwei dreieckige Gehäuse (15) mit der Abstandhalterplatte (12) verbunden sind, wobei diese dreieckigen Gehäuse (15) dazu bestimmt sind, die leeren Bereiche zwischen einem unteren Ende der Säule (11) und der Arbeitsfläche (P) abzudecken.

11. System nach Anspruch 10, **dadurch gekennzeichnet, dass** die Abstandhalterplatte (12) und die dreieckigen Gehäuse (15) einteilig ausgeführt sind.

12. System nach Anspruch 1, **dadurch gekennzeichnet, dass** die modularen Elemente eine Basis (212) und einen darüber angeordneten Turm (211) beinhalten, die an einer oberen Fläche (212A) der Basis (212) und einer unteren Fläche (211B) des Turms (211) miteinander verbunden sind, wobei die obere Fläche (212A) und die untere Fläche (211B) um einen vorgegebenen Winkel relativ zur Horizontalen geneigt sind.

13. System nach Anspruch 12, **dadurch gekennzeichnet, dass** die Basis (212) mit einer ersten Ausrichtung (K1) an der Arbeitsfläche (P) befestigt ist, um eine erste Verbindungskombination zu definieren, in der eine Neigung der oberen Fläche (212A) gegengerichtet zu der Neigung der unteren Fläche (211B) ist, um die erste Positionseinstellung (C1) des Arbeitskopfes (2) zu erhalten, in der der Arbeitskopf (2) vertikal ausgerichtet ist.

14. System nach Anspruch 12, **dadurch gekennzeichnet, dass** die Basis (212) mit einer zweiten Ausrichtung (K2) an der Arbeitsfläche (P) befestigt ist, um eine zweite Verbindungskombination zu definieren, in der eine Neigung der oberen Fläche (212A) gleichgerichtet zu der Neigung der unteren Fläche (211B) ist, um die zweite Positionseinstellung (C2) des Arbeitskopfes (2) zu erhalten, in der der Arbeitskopf (2) um einen Winkel geneigt ist, dessen Maß das Doppelte der Neigung der oberen Fläche (212A) und

der unteren Fläche (211B) beträgt.

Revendications

1. Un système de support et d'orientation pour une machine à coudre à aiguille courbe, l'aiguille courbe étant portée par un bras (4) radialement claveté sur un arbre (3) disposé longitudinalement dans une tête opérationnelle (2) de la machine, ledit arbre (3) étant destiné à mouvoir l'aiguille (5) en oscillation dans un plan vertical, transversal à un axe de l'arbre (3), entre deux positions extrêmes d'une trajectoire courbe (R), ladite trajectoire courbe (R) est concentrique à un rayon de courbure de l'aiguille (5), de manière à passer à travers des bords (L1, L2) de deux pans superposés d'un matériau à coudre, et à coopérer ensuite avec un dispositif à crochet pivotant (6) pour réaliser une couture, avec ledit arbre (3) déplacé en translation axiale selon un mouvement de montée et de descente en relation de phase avec son oscillation, selon un pas d'ampleur prédéfinie afin de déterminer, pendant une course de sortie, l'avance des deux pans (L1, L2) concernés par la couture ; le système étant **caractérisé en ce qu'**il comprend des éléments modulaires (11, 12) interposés entre la tête opérationnelle (2) et un plan de travail (P) sous-jacent pour définir, pour ladite tête opérationnelle de la machine, au moins une configuration d'assiette définie (C1, C2) par rapport au plan oscillant de l'aiguille.

2. Le système selon la revendication 1, **caractérisé en ce que** les éléments modulaires comprennent une colonne prismatique (11) comprenant une surface supérieure (11A), destinée à s'accoupler avec une partie inférieure de la tête (2), et une surface inférieure (11B), parallèle à la surface supérieure (11A), la colonne (11) étant destinée à être fixée directement au plan de travail (P) au niveau de ladite surface inférieure (11B) de manière à définir une première configuration d'assiette (C1) de la tête opérationnelle (2) qui est verticale.

3. Le système selon la revendication 1, **caractérisé en ce que** les éléments modulaires comprennent : une colonne prismatique (11), dont une surface supérieure (11A) est destinée à s'accoupler avec la partie inférieure de la tête opérationnelle (2) ; au moins un élément d'écartement (12) fixé d'un côté à la surface inférieure (11B) de la colonne et de l'autre côté au plan de travail (P), l'élément d'écartement (12) et la colonne (11) définissant une deuxième configuration d'assiette (C2) de la tête opérationnelle (2) qui est inclinée d'un angle donné.

4. Le système selon la revendication 2, **caractérisé en ce qu'**il comprend un premier bras profilé (21), bloqué en porte-à-faux de façon amovible par des moyens de fixation à une paroi latérale (11E) réalisée dans la colonne (11), ledit premier bras profilé (21) porte, au niveau de son extrémité restante, dans une zone située au-dessous de l'aiguille (5), des moyens (20) de support et de guidage du matériau à coudre.

5. Le système selon la revendication 2, **caractérisé en ce qu'**il comprend un deuxième bras profilé (31, 41) bloqué en porte-à-faux de façon amovible par des moyens de fixation à une paroi avant (11D) réalisée dans la colonne (11), ledit deuxième bras profilé (31, 41) porte, au niveau de son extrémité restante, dans une zone située au-dessous de l'aiguille (5), des moyens (30, 40) de support et de guidage du matériau à coudre.

6. Le système selon la revendication 5, **caractérisé en ce qu'**il comprend un premier carter (13) pour couvrir la paroi avant (11D) lorsque le deuxième bras (31, 41) n'est pas contraint à la colonne (11).

7. Le système selon la revendication 4, **caractérisé en ce qu'**il comprend un deuxième carter (14) pour couvrir la paroi latérale (11E) lorsque le premier bras (21) n'est pas contraint à la colonne (11).

8. Le système selon la revendication 2 ou 4 ou 5 ou 6, **caractérisé en ce que** la colonne (11) présente un bord (11C) entourant la surface inférieure (11B), dans ledit bord (11C) sont réalisés des trous (11F) pour permettre le passage de moyens à vis afin de fixer la colonne (11) au plan de travail (P).

9. Le système selon la revendication 3, **caractérisé en ce que** l'élément d'écartement (12) consiste en une plaque destinée à être positionnée verticalement, dans laquelle des surfaces opposées (12A, 12B) correspondantes, qui sont en contact respectivement avec la colonne (11) et le plan de travail (P), sont disposées obliquement en fonction d'un angle d'appui correspondant.

10. Le système selon la revendication 9, **caractérisé en ce que** les deux carters triangulaires (15) sont associés à la plaque d'écartement (12), lesdits carters triangulaires (15) sont destinés à couvrir des zones vides entre une limite inférieure de la colonne (11) et le plan de travail (P).

11. Le système selon la revendication 10, **caractérisé en ce que** la plaque d'écartement (12) et les carters triangulaires (15) sont réalisés en un corps unique.

12. Le système selon la revendication 1, **caractérisé en ce que** les éléments modulaires comprennent une base (212) et une tourelle surjacente (211), mutuel-

lement accouplées au niveau d'une surface supérieure (212A) de la base (212) et une surface inférieure (211B) de la tourelle (211), la surface supérieure (212A) et la surface inférieure (211B) étant inclinées d'un angle donné par rapport à l'horizontale.

13. Le système selon la revendication 12, **caractérisé en ce que** la base (212) est fixée au plan de travail (P) avec une première orientation (K1) de manière à définir une première combinaison d'accouplement dans laquelle une inclinaison de la surface supérieure (212A) est orientée dans une direction opposée par rapport à une inclinaison de la surface inférieure (211B) de manière à définir la première configuration d'assiette (C1) de la tête opérationnelle (2) dans laquelle cette même tête opérationnelle (2) est verticale.

14. Le système selon la revendication 12, **caractérisé en ce que** la base (212) est fixée au plan de travail (P) avec une deuxième orientation (K2) de manière à définir une deuxième combinaison d'accouplement dans laquelle une inclinaison de la surface supérieure (212A) est orientée dans la même direction qu'une inclinaison de la surface inférieure (211B) de manière à définir la deuxième configuration d'assiette (C2) de la tête opérationnelle (2), dans laquelle cette même tête opérationnelle (2) est inclinée d'un angle double par rapport à l'inclinaison de la surface supérieure (212A) et de la surface inférieure (211B).

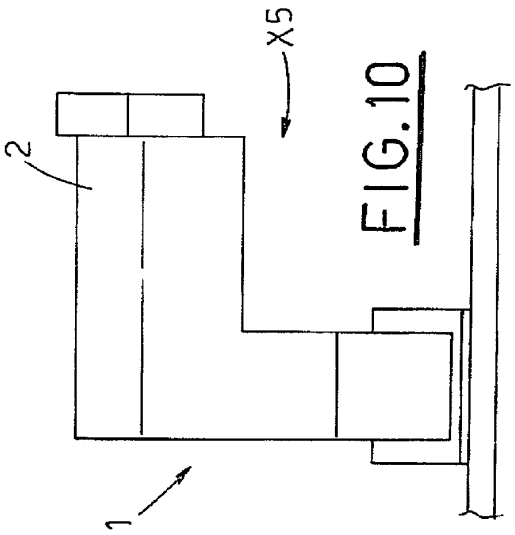


FIG.10

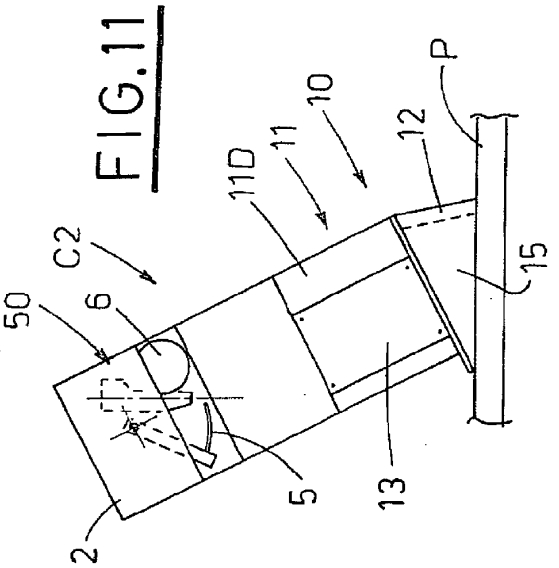


FIG.11

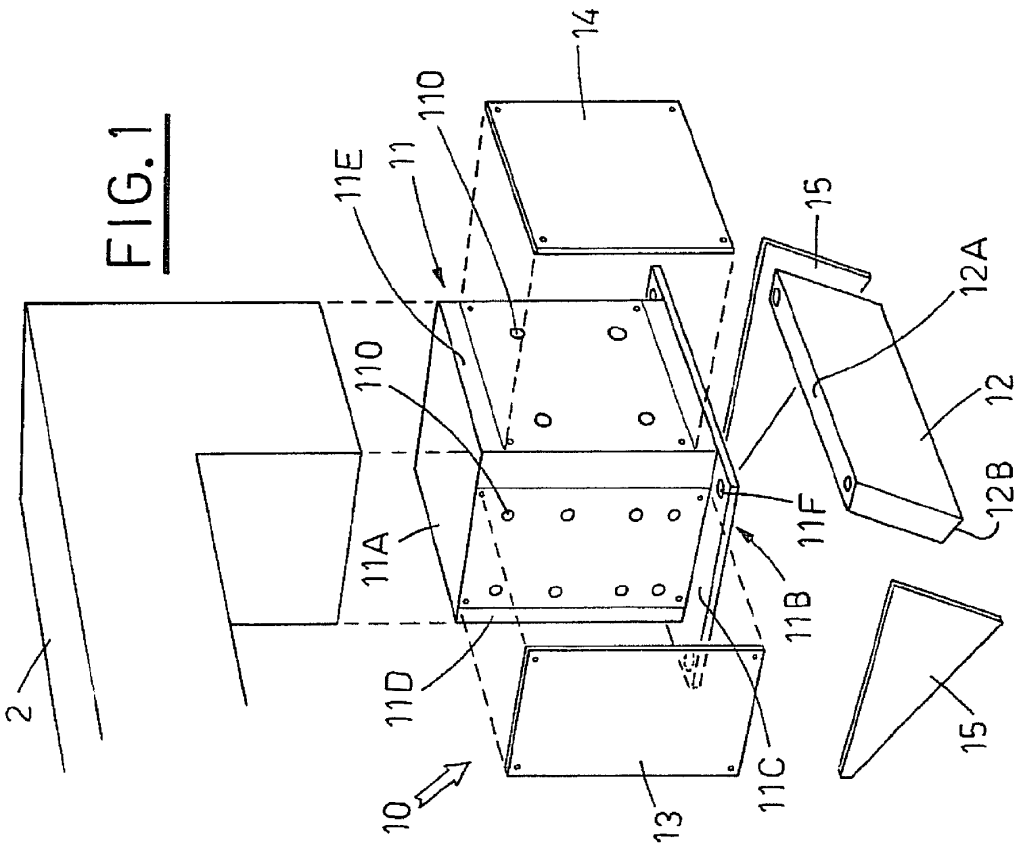


FIG.1

FIG. 3

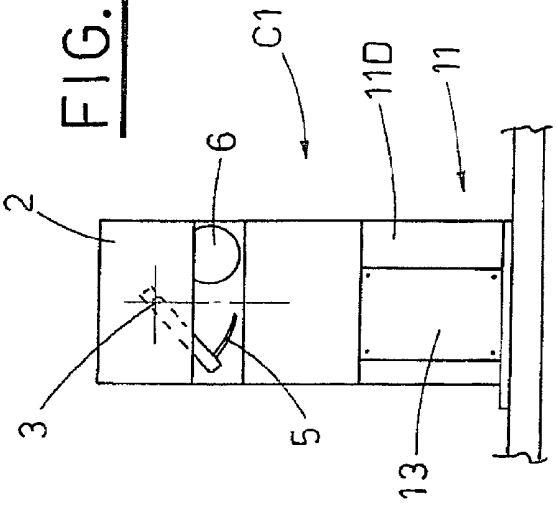


FIG. 5

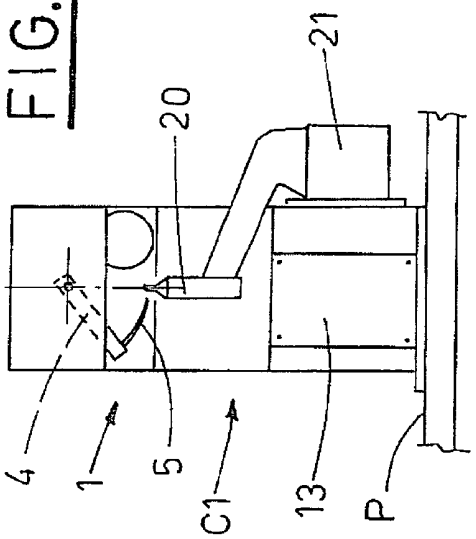


FIG. 2

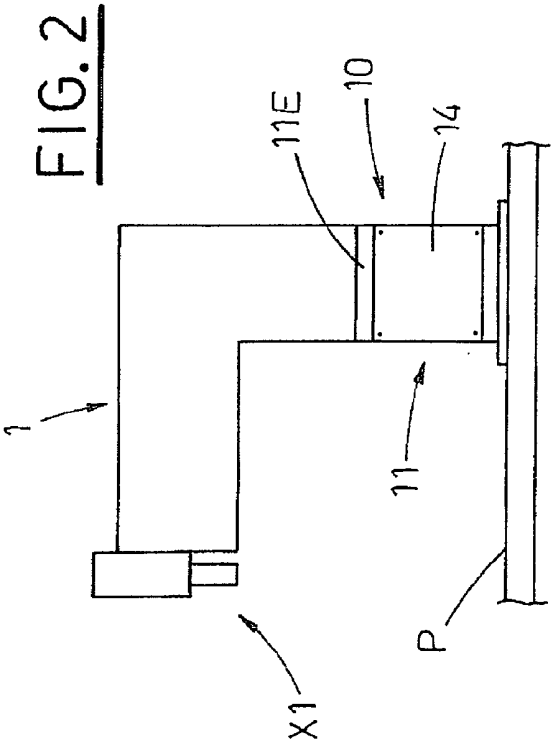


FIG. 4

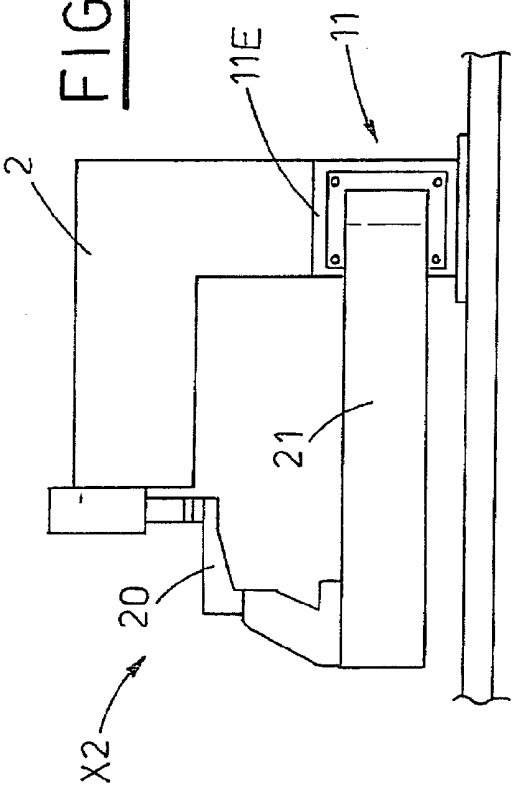


FIG. 7

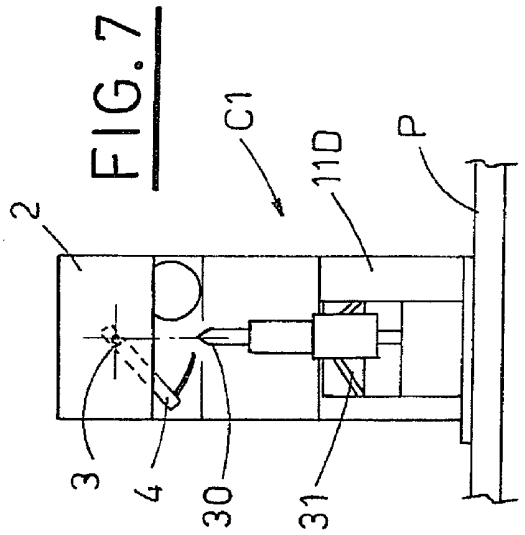


FIG. 9

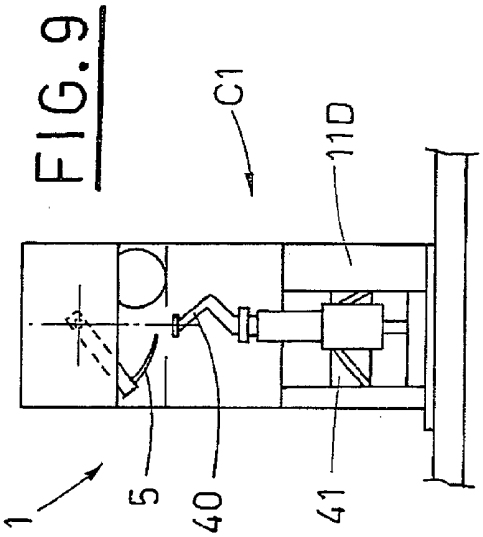


FIG. 6

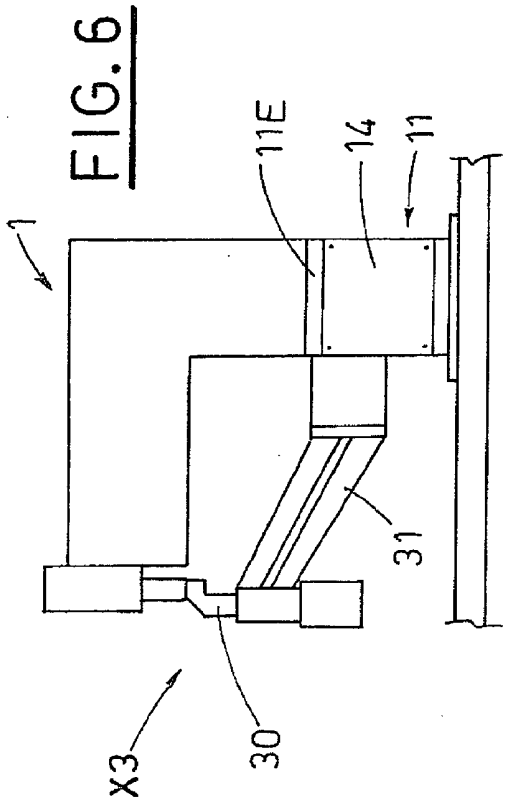
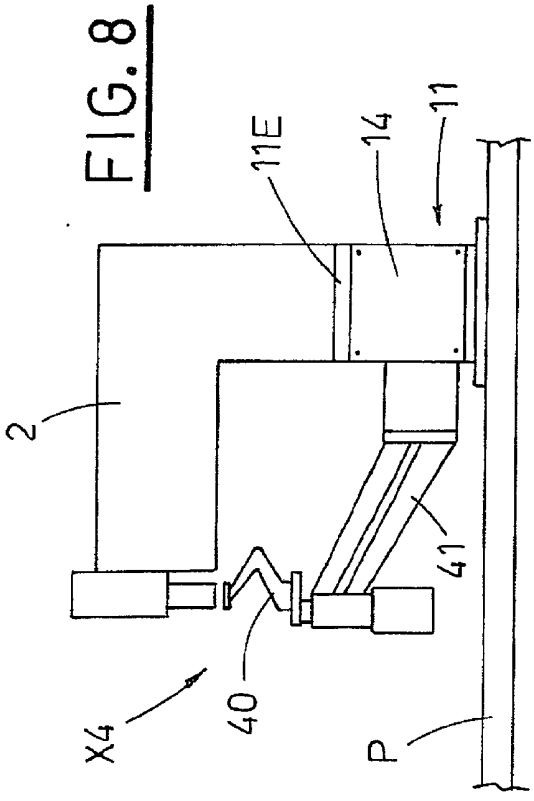


FIG. 8



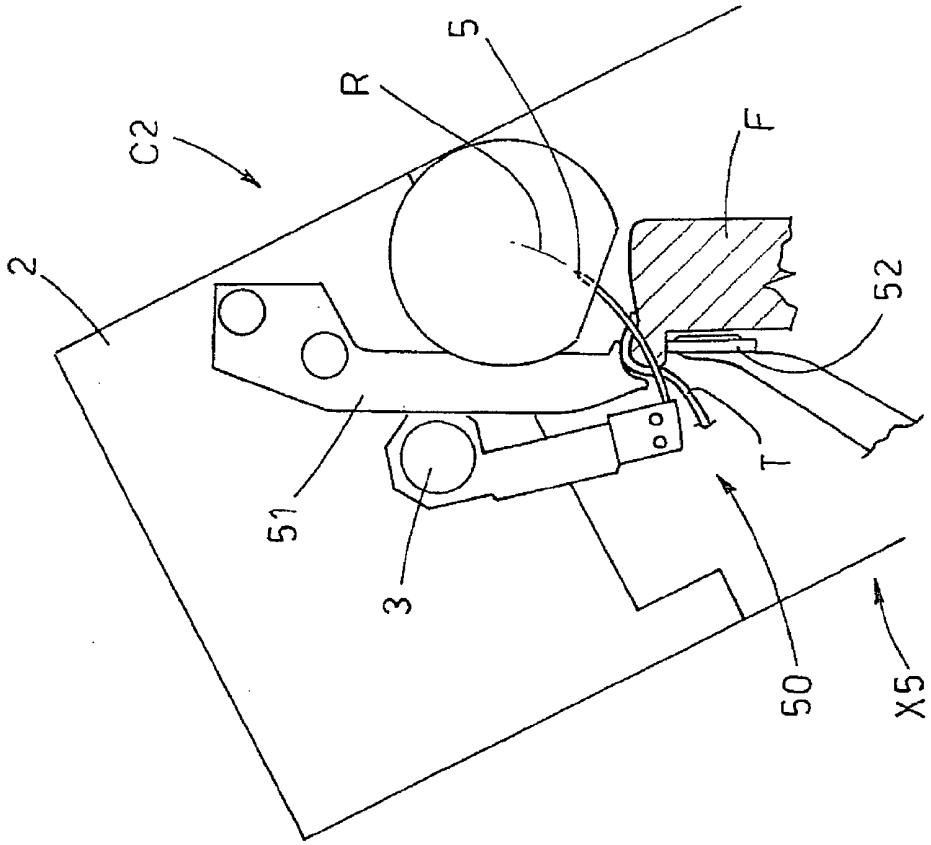


FIG.13

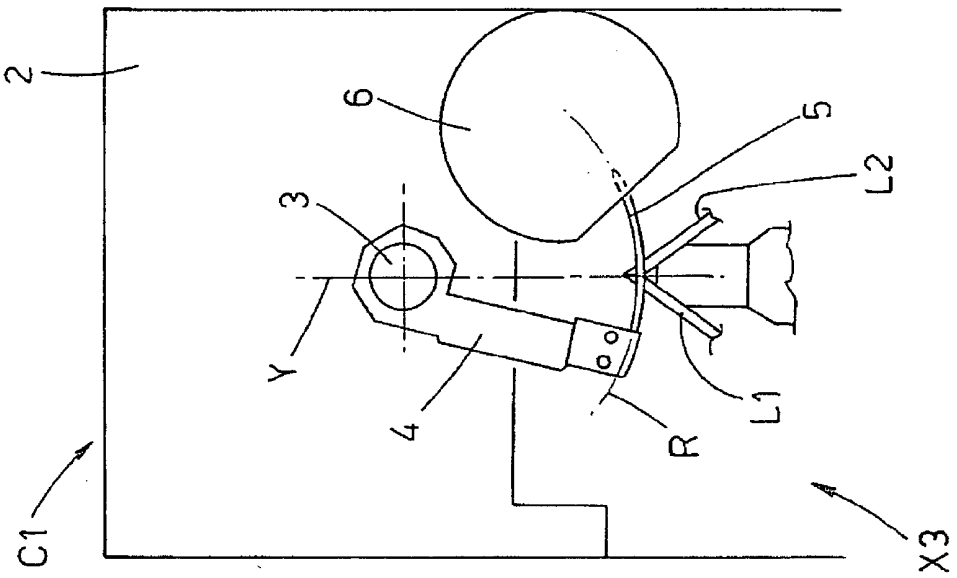
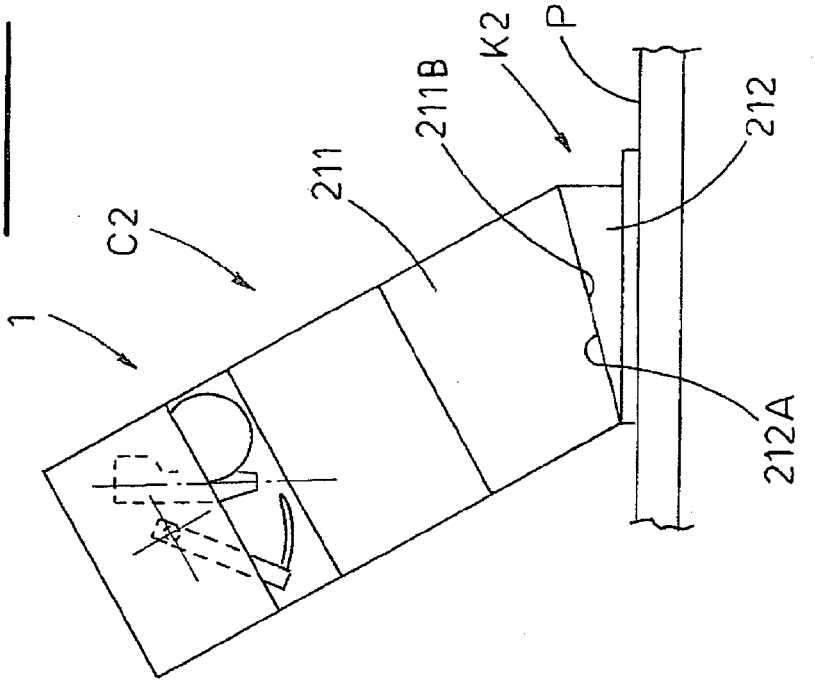


FIG.12

FIG.15



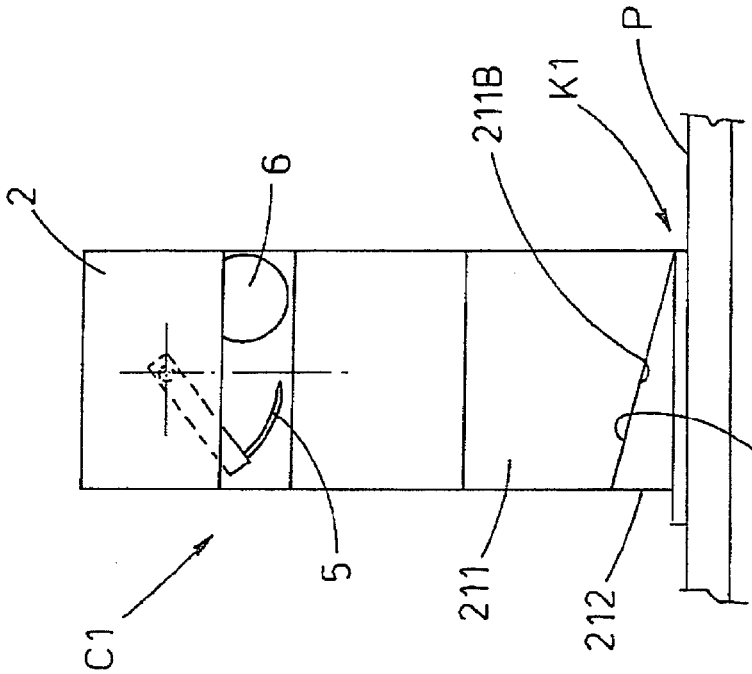


FIG.14

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 4848252 A **[0002] [0044]**
- IT 1310413 **[0013] [0042]**
- WO 9617989 A **[0013] [0046]**
- WO 9620305 A **[0013] [0046]**
- WO 9620306 A **[0013] [0046]**
- IT 1299967 **[0014] [0053]**
- WO 9956573 A **[0021]**