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(54) **Rig for folding the edge of the upper onto a last in a footwear manufacturing machine**

Vorrichtung zum Falten einer Kante des Oberleders auf einer Leiste von einer  
Schuhherstellungsmaschine

Dispositif de pliage des bords d'une empeigne sur une forme d'une machine pour la fabrication de  
chaussures

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## Description

**[0001]** The present invention relates to a rig for folding the edge of the upper onto a last in a footwear manufacturing machine.

**[0002]** In the making of footwear, machines are known which provide for the cementing of the edge of the upper to the insole in the area of the forepart of the shoe. Such machines comprise a support on which is positioned a shoemaker's last, to which the insole is applied and onto which the upper is tautened, a series of clasps which grip and stretch the upper, members which secure the last on the support, devices which deposit cement on the insole in the area of the forepart of the shoe, and two articulated plates which provide in said fore-region for the folding of the upper, released by the clasps, onto the insole of the shoe for cementing.

**[0003]** The articulated plates have inner edges which interfere with the upper on the last in order to perform the folding. To assist the plates there are provided two opposing lateral pads which are brought against the upper laterally in the middle part of the shoe and which hold the upper pressed against the last in order to aid the folding of the upper by the plates in proximity to this middle region. The reason for this is that the folding of the upper in proximity to this middle region is very critical for the profile which the shoe has in this region and that, especially in certain types of footwear, the rear part is fairly rigid and adversely affects the folding.

**[0004]** However, despite the use of these pads, the plates might not succeed in properly folding the upper in proximity to this middle region and hence the upper might be only partially cemented to the insole. As this may cause creases in the shoe at the end of making, it becomes necessary to detach and re-cement the upper in this critical region. This operation is carried out manually and this involves a loss of time on the part of the operator and hence a drop in productivity, and furthermore, being a manual operation, it may also not be too accurate.

**[0005]** Document GB-A-1154871 discloses a footwear manufacturing machine comprising a rig for folding the edge of the upper over a last. The folding rig comprises a pair of forepart wipers which are advanced and closed to wipe the upper inwardly over the edge of the forepart of the insole. For lasting the shank portion of the shoe the machine is provided with a pair of lasting units carried on the ends of piston rod extending from fluid operated cylinders. Each lasting unit comprises a resilient band (56) which extends over and between two legs, the band being secured by a clamp.

**[0006]** The object of the present invention is to overcome the aforesaid drawbacks.

**[0007]** This object is achieved by means of a rig for folding the edge of the upper onto a last according to claim 1.

**[0008]** Preferred embodiments of the rig are given in dependent claims 2-11

**[0009]** To provide a better understanding of the invention, a description of a non-limiting illustrative embodiment thereof will be given below, illustrated in the appended drawings in which:

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Fig. 1 shows a partial perspective view of a folding rig according to the invention;

Fig. 2 shows the folding rig of Fig. 1 in an operating position;

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Fig. 3 shows the folding rig of Fig. 1 in a subsequent operating position;

Figs. 4, 5 and 6 show diagrammatically the operation of the folding rig of Fig. 1.

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**[0010]** The folding rig illustrated operates in a machine for making footwear of the type indicated in the introduction, that is, one comprising a support on which is positioned a shoe last to which the insole is applied and over which the upper is tautened, a series of clasps

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which grip and stretch the upper, members which secure the last on the support, and devices which deposit cement on the insole in the area of the forepart of the shoe.

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**[0011]** The figures illustrate only the last, labelled A, with insole and upper, labelled B and C respectively, and furthermore the series of clasps, labelled P.

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**[0012]** The folding rig comprises two plates 10 which articulate around a common centre of rotation and which are actuated by suitable mechanisms, partially visible in the figures, in such a way as to move and rotate, and thus to operate on the forepart of the shoe. At its free end each plate 10 has a wedge 11.

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**[0013]** This description will not dwell on the plates and their mechanisms as these are of known type in regard to their structure and operation.

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**[0014]** The folding rig moreover comprises two auxiliary devices 20 arranged on opposite sides with respect to the support on which the last A is positioned.

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**[0015]** Each device 20 is mounted on a bed 21 of the machine, visible in Fig. 1 only, on which is mounted a pneumatic actuator 22 fitted with an actuating rod 23 operating along a direction X substantially perpendicular to the axis Y of the last A positioned on the support, and in the vicinity of a middle part of the shoe. The rod 23 is integral with a substantially "C"-shaped support 24 mounted perpendicularly to the rod. The bottom arm of the support 24 is fixed to the rod 23, while the top arm of the support 24 carries, elastically, a further arm 25 which extends parallel to the rod 23 towards the last A; in particular, the arm 25 is hinged at 36 in a block 37 at the end of the top arm of the support 24, and a spring 38 mounted on a screw 39 screwed into the block 37 keeps the arm 25 elastically in position. The rod 23 and the arm 25 carry two respective anchoring heads 26 and 27 integrally at their free ends. The ends of a flexible tape 28 are fixed to the heads 26 and 27 in such a way that the tape is tensioned between the said heads. The forward or backward movement of the rod 23 clearly involves an identical movement of the tape 28. A bar 29

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parallel to the rod 23 and fitted, in proximity to its other end, with a tooth 30, is fixed to the bottom arm of the "C"-shaped support 24, at one end. Next to the bar 29, in a suitable position, there is provided an arresting contrivance 31 comprising a pawl 32 intended to interfere with the tooth 30 of the bar 29, actuated by a pneumatic actuator 33 and restored to the rest position by a spring 34.

[0016] An electronic facility 35, shown diagrammatically in Fig. 1 only, is also envisaged and provides for coordinating the movements of the plates 10, of the auxiliary devices 20 controlling the actuating of the actuators 22 and 33, and of the other members, not illustrated, of the machine.

[0017] The operation of the folding rig described and illustrated is as follows.

[0018] Once the last A together with the insole B and the upper C has been located on the support, the upper C has been gripped and tautened by the clasps P and the last has been suitably secured, the two tapes 28 are firstly moved forward by the actuators 22, followed by the plates 10, so as to reach, starting from the initial position illustrated in Figs. 1 and 4, an intermediate position illustrated in Figs. 2 and 5. The tapes 28 reach this intermediate position by virtue of the immobilizing of the teeth 30 against the pawls 32. After these operations cement is placed on the insole B. Then, again by means of the actuators 22, and disengaging the pawls 32 from the respective teeth 30 using the actuators 33, the tapes 28 are brought against the last A so as to embrace the upper C, and subsequently the plates 10 with their wedges 11 are made to advance and rotate so that they fold the upper C, released from the clasps P, onto the insole B for cementing, as illustrated in Figs. 3 and 6.

[0019] In this way the upper C is folded by the tapes 28 under the middle part of the shoe, below the level of the plates 10, as clearly visible in Fig. 6, and this allows perfect folding of the upper by the plates 10 onto the forepart of the shoe and hence complete cementing of the upper onto the insole.

[0020] The fact is stressed that this is achieved by substituting the devices 20 for the pads and corresponding actuators of the prior art, so as not to raise the cost of the machine.

[0021] The devices 20 are obviously simple and hence highly reliable.

[0022] Furthermore, the tapes 28 can adapt to lasts of various shape, given their flexibility.

[0023] The elastic connection of the arms 25 to the "C"-shaped supports 24 makes it possible to compensate for excessive tensions in the tapes 28 during folding. The screws 39 enable the elastic loading of the springs 38 on the arms 25 to be adjusted.

[0024] The position of the devices 20 on the bed 21 in a direction parallel to the axis Y can be adjusted, by for example connecting the devices to the bed via suitable guides and securing the devices in the preselected position by means of suitable securing members. This

adjustment allows adaptation, in addition to that seen earlier, of the devices to lasts of different shapes.

[0025] The arresting devices 31 turn out to be particularly advantageous for synchronizing the movements of the devices 20 with the movements of the plates 10.

[0026] The tapes can be replaced with flexible elements which fulfil equivalent functions, supported and propelled in any manner.

[0027] In the case of the use of tapes as in the example, the tapes can be supported by structures of a layout other than those shown. The structures illustrated turn out however to be particularly simple and effective.

[0028] Other types of actuators may be used, for example hydraulic, electric or other actuators.

[0029] The tapes can also be elastic and in this case the elastic connection of the arms to the "C"-shaped supports can be dispensed with.

[0030] The arresting devices can also be omitted in the case in which the electronic facility has suitable sensors to enable it to regulate the movement of the tapes with the movement of the plates. Such securing devices turn out however to be particularly simple and effective.

## Claims

1. Rig for folding the edge of the upper onto a last, in a footwear manufacturing machine which provides for supporting the last (A), to which the insole (B) is applied, and onto which the upper (C) is tautened, for gripping and stretching the upper (C) and for keeping the last (A) secured, comprising:

- means (10,11) for folding the upper (C) onto the insole (B) in the area of the forepart of the shoe in order to fix the upper to the insole, and
- flexible elements (28) arranged on opposite sides of the last (A) in the vicinity of a middle part of the shoe which are movable between a retracted position in which they are withdrawn from the last (A) and an advanced position in which they embrace the flanks of the last (A), thereby folding the upper (C) onto the insole (B),

**characterised in that** said means (10,11) for folding the upper (C) onto the insole (B) are movable between a position in which they are withdrawn from the upper (C) and a position where they act on the upper and on the flexible elements (28) when said flexible elements (28) are in the advanced position.

2. Folding rig according to Claim 1, wherein each flexible element comprises a tape (28) supported and tensioned at its ends by two anchoring heads (26,27) connected to a rod (23) of an actuator (22) and said means (10,11) for folding the upper (C) on-

to the insole (B) move to insert between said two anchoring heads (26,27) in order to act on the tape (28) during the folding operation of the upper (C) onto the insole (B).

3. Folding rig according to Claim 2, wherein a first anchoring head (27) of said two anchoring heads (26,27) is fixed to the free end of the rod (23) and moves to and from the last (A) along a direction (X) which is perpendicular to the axis (Y) of the last (A) and lies in the plane of the insole (B) applied on the last (A), so that in the advanced position the first anchoring head (27) presses the flexible element against the upper (C) and thus the upper (C) against the insole (B) .
4. Folding rig according to Claim 2, comprising a substantially "C"-shaped support (24) which lies in a plane transversal to the rod (23) and has a first arm fixed to the rod (23), while the second anchoring head (26) is connected to the other arm of the "C"-shaped support (24).
5. Folding rig according to Claim 4, in which the connection between the second anchoring head (26) and the "C"-shaped support (24) is elastic.
6. Folding rig according to Claim 2, in which the tape (28) is elastic.
7. Folding rig according to Claim 2, in which the means (10,11) for folding are immobilized in an intermediate position before being brought into the folding position, and in which there is provided, for each tape, an arresting device (29-34) which immobilizes the tape (28) in an intermediate position, releasing it before the final movement of the folding means (10, 11) into the folding position.
8. Folding rig according to Claim 7, in which the arresting device comprises a bar (29) with a tooth (30), which bar is parallel to and integral with the rod (23), and a pawl (32) able to interfere with the tooth (30) of the bar (29), actuated between a position of engagement with the tooth (30) and a position of disengagement.
9. Folding rig according to Claim 1, in which there is provided an electronic facility (35) which synchronizes the movements of the folding means (10,11) and of the flexible elements (28).
10. Folding rig according to Claim 7, in which there is provided an electronic facility (35) which synchronizes the movements of the folding means (10,11), of the flexible elements (28) and of the arresting devices (29-34).

11. Folding rig according to Claim 1, in which the position of the flexible elements (28) in a direction parallel to the axis (Y) of the last (A) is adjustable.

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## Patentansprüche

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1. Vorrichtung zum Falten der Kante des Oberleders auf einem Leisten in einer Schuhwerk-Herstellungsmaschine, die zum Tragen des Leistens (A), auf den die Brandsohle (B) gelegt ist und auf dem das Oberleder (C) gespannt wird, zum Greifen und Strecken des Oberleders (C) und zum Festhalten des Leistens (A) ausgestattet ist, welche Vorrichtung umfasst:

- Mittel (10, 11) zum Falten des Oberleders (C) auf die Brandsohle (B) in dem Bereich des Vorderteils des Schuhs, um das Oberleder an der Brandsohle zu befestigen, und
- flexible Elemente (28), die auf entgegengesetzten Seiten des Leistens (A) in der Nähe eines Mittelteils des Schuhs angeordnet sind und zwischen einer zurückgezogenen Position, in der sie von dem Leisten (A) zurückgezogen sind, und einer vorgerückten Position, in der sie die Seiten des Leistens (A) umschließen, bewegbar sind, um dadurch das Oberleder (C) auf die Brandsohle (B) zu falten, **dadurch gekennzeichnet, dass** die Mittel (10, 11) zum Falten des Oberleders (C) auf die Brandsohle (B) zwischen einer Position, in der sie von dem Oberleder (C) zurückgezogen sind, und einer Position bewegbar sind, in der sie auf das Oberleder und auf die flexiblen Elemente (28), wenn sich die flexiblen Elemente (28) in der vorgerückten Position befinden, einwirken.

2. Vorrichtung zum Falten nach Anspruch 1, wobei jedes flexible Element ein Band (28) umfasst, das an seinen Enden durch zwei Verankerungsköpfe (26, 27) gehalten und gespannt ist, die mit einer Stange (23) eines Betätigungsteils (22) verbunden sind, und sich die Mittel (10, 11) zum Falten des Oberleders (C) auf die Brandsohle (B) bewegen, um sich zwischen den zwei Verankerungsköpfen (26, 27) zu erstrecken, um auf das Band (28) während des Vorgangs der Faltung des Oberleders (C) auf die Brandsohle (B) einzuwirken.

3. Vorrichtung zum Falten nach Anspruch 2, wobei ein erster Verankerungskopf (27) der zwei Verankerungsköpfe (26, 27) an dem freien Ende der Stange (23) befestigt ist und sich hin zu dem Leisten (A) und fort von diesem längs einer Richtung (X) bewegt, die senkrecht zu der Achse (Y) des Leistens (A) verläuft, und in der Ebene der Brandsohle (B) liegt, die auf den Leisten (A) gelegt ist, so dass der

erste Verankerungskopf (27) in der vorgerückten Position das flexible Element gegen das Oberleder (C) und demzufolge das Oberleder (C) gegen die Brandsohle (B) drückt.

4. Vorrichtung zum Falten nach Anspruch 2, die einen im wesentlichen C-förmigen Träger (24) umfasst, der in einer Ebene quer zu der Stange (23) liegt und einen ersten Arm hat, der an der Stange (23) befestigt ist, während der zweite Verankerungskopf (26) mit dem anderen Arm des C-förmigen Trägers (24) verbunden ist. 5
5. Vorrichtung zum Falten nach Anspruch 4, bei der die Verbindung zwischen dem zweiten Verankerungskopf (26) und dem C-förmigen Träger (24) elastisch ist. 10
6. Vorrichtung zum Falten nach Anspruch 2, bei der das Band (28) elastisch ist. 15
7. Vorrichtung zum Falten nach Anspruch 2, bei der die Mittel (10, 11) zum Falten in einer zwischenliegenden Position unbeweglich gemacht sind, bevor sie in die Faltungposition gebracht werden, und bei der für jedes Band eine Arretiereinrichtung (29 - 34) vorgesehen ist, die das Band (28) in einer zwischenliegenden Position unbeweglich macht und es vor der Endbewegung der Mittel (10, 11) zum Falten in die Faltungposition freigibt. 20
8. Vorrichtung zum Falten nach Anspruch 7, bei der die Arretiereinrichtung ein Stange (29) mit einem Zahn (30), welche Stange parallel zu der Stange (23) liegt und einstückig mit dieser ausgebildet ist, und eine Sperrklinke (32) umfasst, die in der Lage ist, in Eingriff mit dem Zahn (30) der Stange (29) zu treten, die zum Bewegen zwischen einer Position des Eingriffs mit dem Zahn (30) und einer Position des Nichteingriffs betätigt wird. 25
9. Vorrichtung zum Falten nach Anspruch 1, bei der eine elektronische Einrichtung (35) vorgesehen ist, welche die Bewegungen der Mittel (10, 11) zum Falten und der flexiblen Elemente (28) synchronisiert. 30
10. Vorrichtung zum Falten nach Anspruch 7, bei der eine elektronische Einrichtung (35) vorgesehen ist, welche die Bewegungen der Mittel (10, 11) zum Falten, der flexiblen Elemente (28) und der Arretiereinrichtungen (29 - 34) synchronisiert. 35
11. Vorrichtung zum Falten nach Anspruch 1, bei der die Position der flexiblen Elemente (28) in einer Richtung parallel zu der Achse (Y) des Leistens (A) einstellbar ist. 40

## Revendications

1. Dispositif de pliage du bord de l'empeigne sur une forme, dans une machine de fabrication de chaussures qui prévoit de supporter la forme (A), sur laquelle la semelle intérieure (B) est appliquée, et sur laquelle l'empeigne (C) est tendue, de serrer et étirer l'empeigne (C) et de garder la forme (A) fixée, comprenant :
  - des moyens (10, 11) pour plier l'empeigne (C) sur la semelle intérieure (B) dans la zone de l'avant-pied de la chaussure afin de fixer l'empeigne à la semelle intérieure, et
  - des éléments flexibles (28) agencés sur les côtés opposés de la forme (A) au voisinage d'une partie centrale de la chaussure qui sont mobiles entre une position rétractée dans laquelle ils sont éloignés de la forme (A) et une position avancée dans laquelle ils ensèrent les flancs de la forme (A), de manière à plier l'empeigne (C) sur la semelle intérieure (B),

**caractérisé en ce que** lesdits moyens (10, 11) pour plier l'empeigne (C) sur la semelle intérieure (B) sont mobiles entre une position dans laquelle ils sont éloignés de l'empeigne (C) et une position dans laquelle ils agissent sur l'empeigne et sur les éléments flexibles (28) lorsque lesdits éléments flexibles (28) sont dans la position avancée. 45
2. Dispositif de pliage selon la revendication 1, dans lequel chaque élément flexible comprend une bande (28) supportée et tendue à ses extrémités par deux têtes d'ancrage (26, 27) reliées à une tige (23) d'un organe d'actionnement (22) et lesdits moyens (10, 11) pour plier l'empeigne (C) sur la semelle intérieure (B) se déplacent pour s'insérer entre lesdites deux têtes d'ancrage (26, 27) afin d'agir sur la bande (28) durant l'opération de pliage de l'empeigne (C) sur la semelle intérieure (B). 50
3. Dispositif de pliage selon la revendication 2, dans lequel une première tête d'ancrage (27) desdites deux têtes d'ancrage (26, 27) est fixée à l'extrémité libre de la tige (23) et se déplace vers et depuis la forme (A) le long d'une direction (X) qui est perpendiculaire à l'axe (Y) de la forme (A) et se situe dans le plan de la semelle intérieure (B) appliquée sur la forme (A), de manière que dans la position avancée la première tête d'ancrage (27) presse l'élément flexible contre l'empeigne (C) et donc l'empeigne (C) contre la semelle intérieure (B). 55
4. Dispositif de pliage selon la revendication 2, comprenant un support sensiblement en forme de "C" (24) qui se situe dans un plan transversal à la tige (23) et comporte un premier bras fixé à la tige (23), 5

tandis que la deuxième tête d'ancrage (26) est reliée à l'autre bras de l'élément en forme de "C" (24).

5. Dispositif de pliage selon la revendication 4, dans lequel la connexion entre la deuxième tête d'ancrage (26) et l'élément en forme de "C" (24) est élastique. 5
6. Dispositif de pliage selon la revendication 2, dans lequel la bande (28) est élastique. 10
7. Dispositif de pliage selon la revendication 2, dans lequel les moyens (10, 11) de pliage sont immobilisés dans une position intermédiaire avant d'être amenés dans la position de pliage, et dans lequel est prévu, pour chaque bande, un dispositif d'arrêt (29 à 34) qui immobilise la bande (28) dans une position intermédiaire, la libérant avant le mouvement final des moyens de pliage (10, 11) dans la position de pliage. 15  
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8. Dispositif de pliage selon la revendication 7, dans lequel le dispositif d'arrêt comprend une barre (29) avec une dent (30), laquelle barre est parallèle à, et d'un seul tenant avec, la tige (23), et un cliquet (32) adapté à s'engager avec la dent (30) de la barre (29), actionné entre une position d'engagement avec la dent (30) et une position de désengagement. 25  
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9. Dispositif de pliage selon la revendication 1, dans lequel est prévu un dispositif électronique (35) qui synchronise les mouvements des moyens de pliage (10, 11) et des éléments flexibles (28). 35
10. Dispositif de pliage selon la revendication 7, dans lequel est prévu un dispositif électronique (35) qui synchronise les mouvements des moyens de pliage (10, 11), des éléments flexibles (28) et des dispositifs d'arrêt (29 à 34). 40
11. Dispositif de pliage selon la revendication 1, dans lequel la position des éléments flexibles (28) dans une direction parallèle à l'axe (Y) de la forme (A) est réglable. 45

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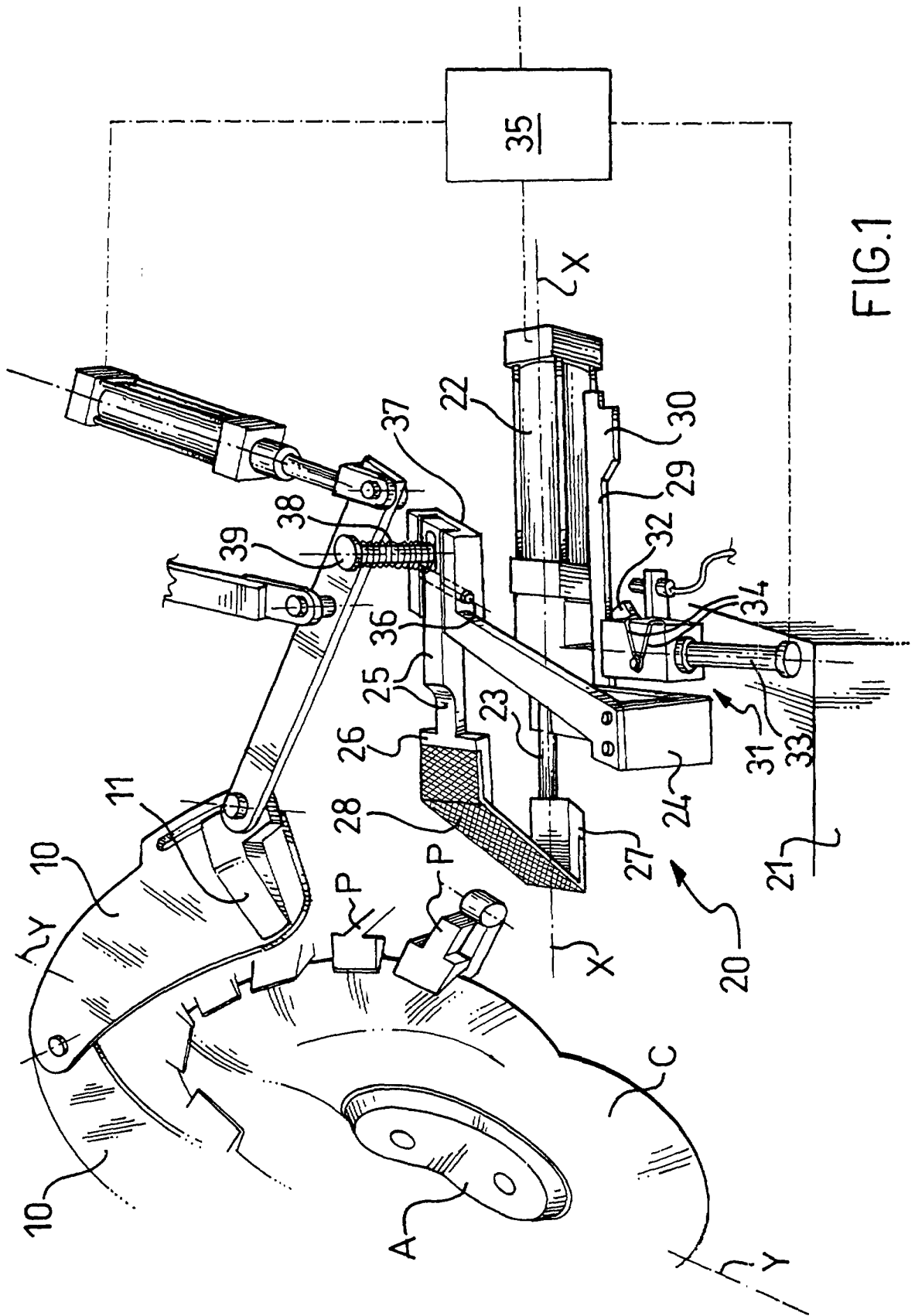
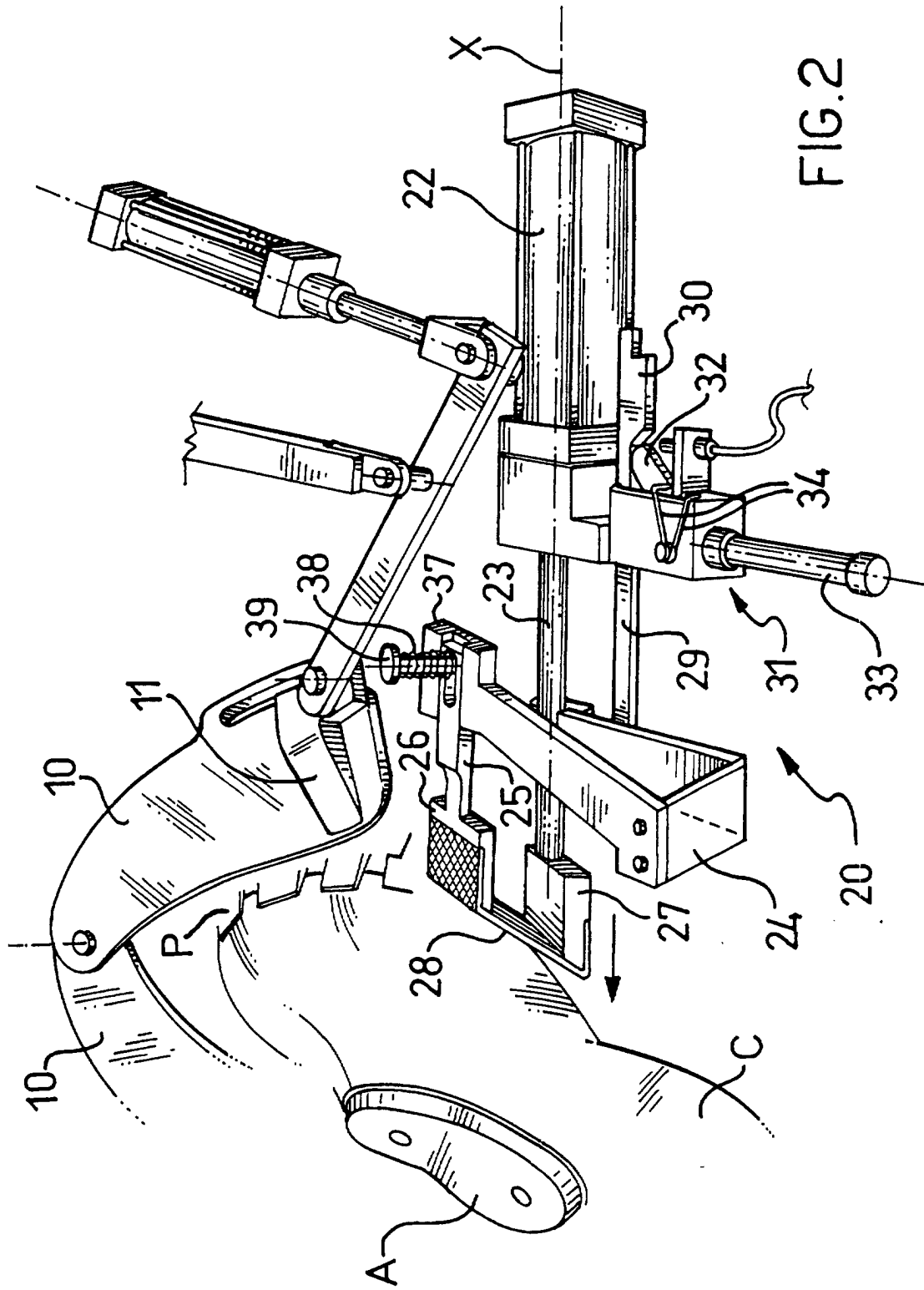
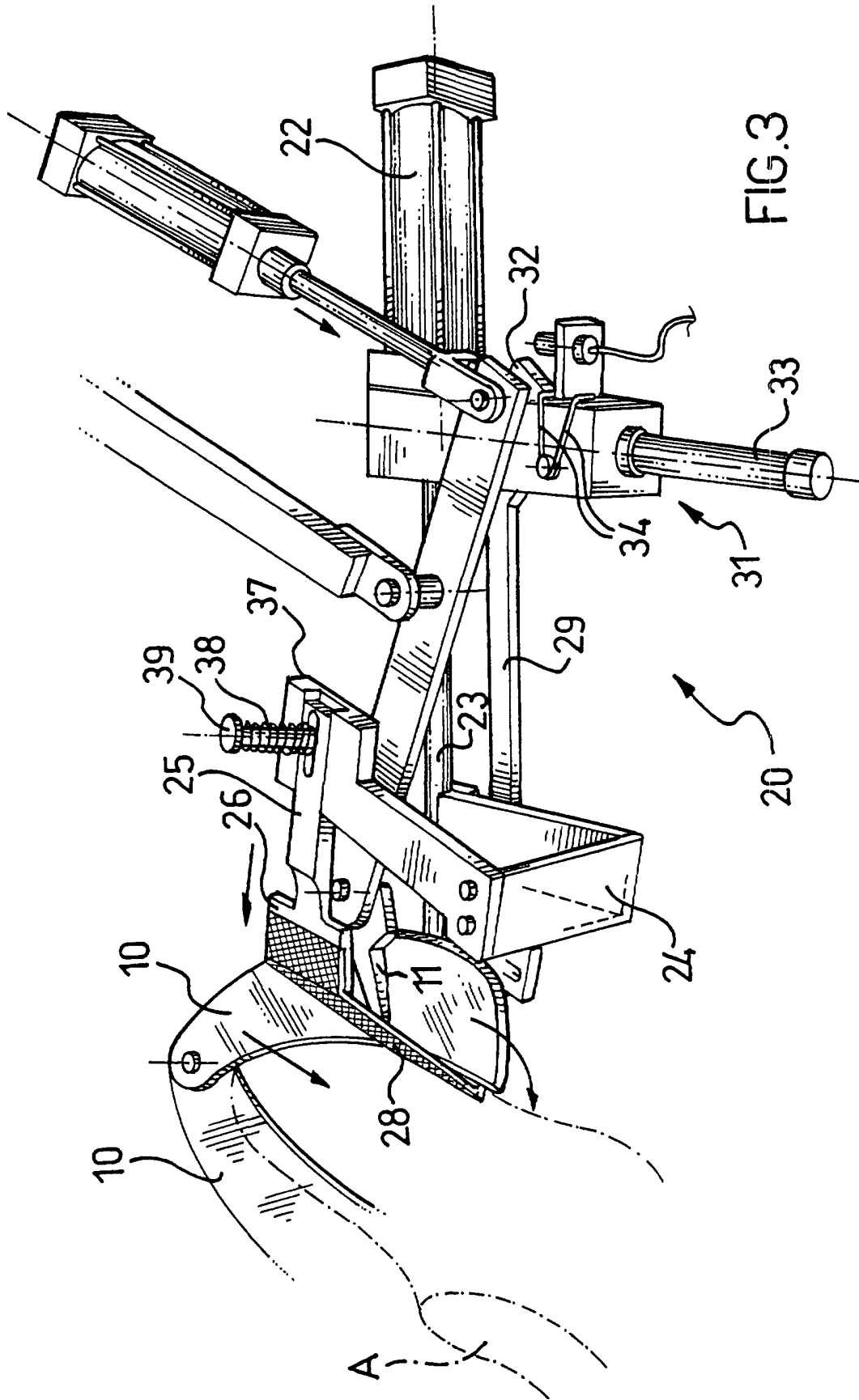


FIG.1





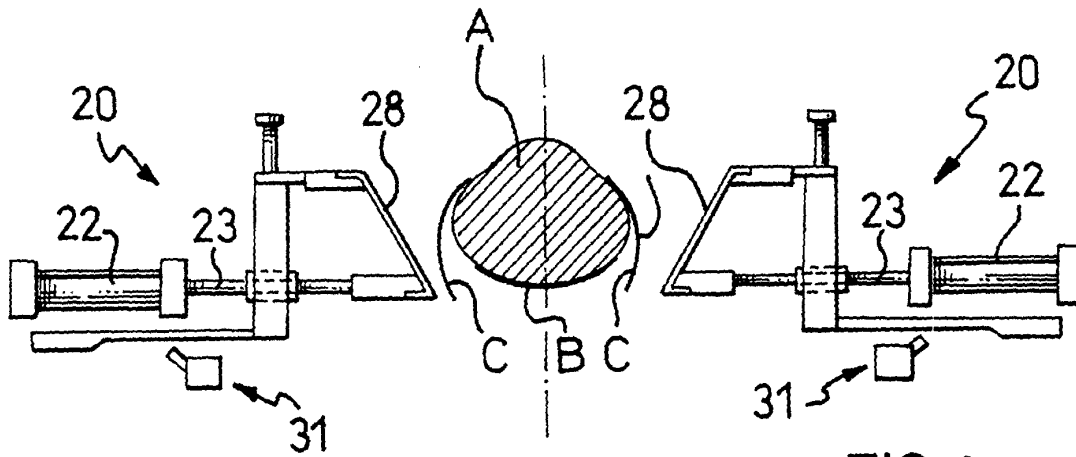


FIG. 4

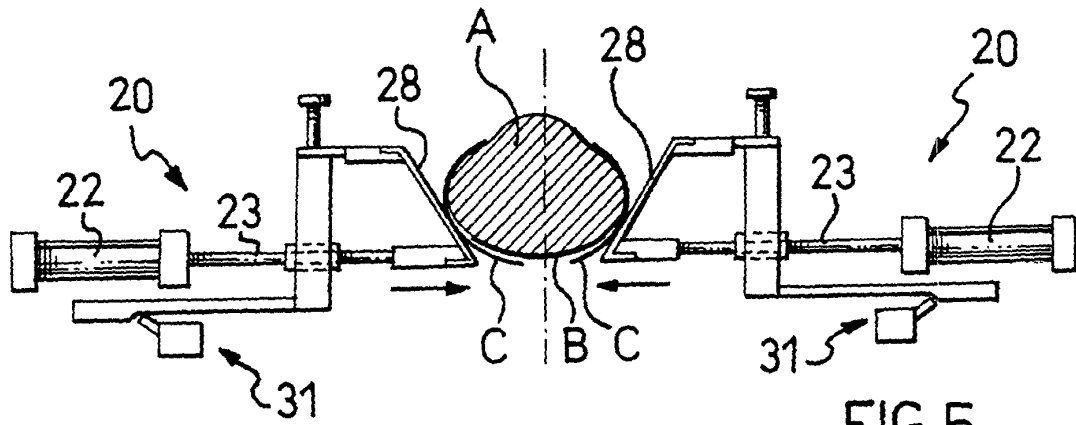


FIG. 5

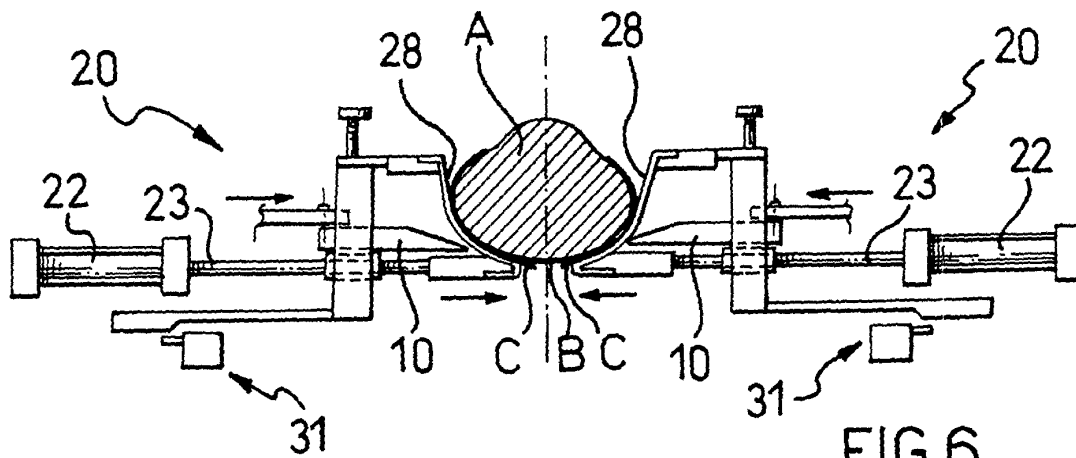


FIG. 6