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

(57) For perfect folding of the edge of the upper over a last, in a footwear manufacturing machine which provides for supporting the last (A), to which the insole (B) is applied, and over which the upper (C) is tautened, for gripping and stretching the upper (C), for keeping the last (A) secured, and for folding the upper (C) over the insole (B) in the area of the forepart of the shoe in order to fix the upper to the insole, there are provided 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last (A) in the vicinity of a middle part of the shoe which are movable between a retracted position in which they are withdrawn from the last (A) and an advanced position in which they embrace the flanks of the last (A), thereby folding the upper (C) under the insole (B) below the level of the folding means.

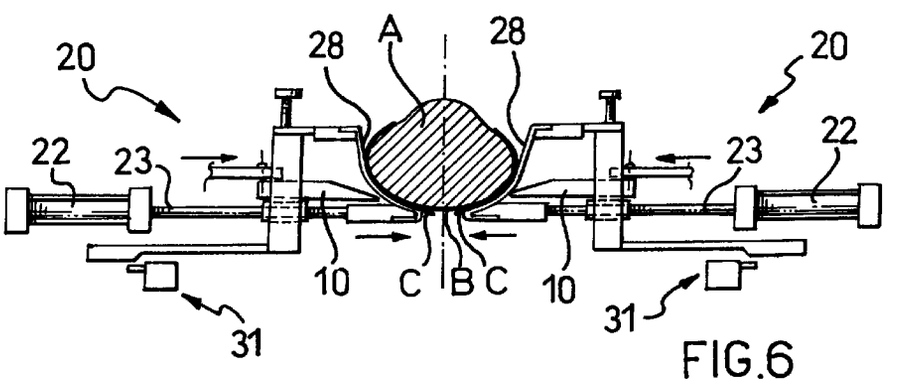

FIG.6

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Description

The present invention relates to a rig for folding the edge of the upper over a last in a footwear manufacturing machine.

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 over 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, over the insole of the shoe for cementing.

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.

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.

The object of the present invention is to overcome the aforesaid drawbacks.

This object is achieved by means of a rig for folding the edge of the upper over a last, in a footwear manufacturing machine which provides for supporting the last, to which the insole is applied, and over which the upper is tautened, for gripping and stretching the upper and for keeping the last secured, comprising means for folding the upper over the insole in the area of the forepart of the shoe in order to fix the upper to the insole, characterized in that it furthermore comprises flexible elements arranged on opposite sides of the last 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 and an advanced position in which they embrace the flanks of the last, thereby folding the upper under the insole, below the level of the folding means.

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:

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;
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.

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 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.

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.

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.

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

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.

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 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.

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.

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

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, over the insole B for cementing, as illustrated in Figs. 3 and 6.

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 under the forepart of the shoe and hence complete cementing under of the upper onto the insole.

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.

The devices 20 are obviously simple and hence highly reliable.

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

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.

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.

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.

Variants and/or additions in respect of what is described and illustrated are obviously possible.

In particular, the tapes can be replaced with flexible elements which fulfil equivalent functions, supported and propelled in any manner.

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.

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

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.

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 over a last, in a footwear manufacturing machine which provides for supporting the last (A), to which the insole (B) is applied, and over 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) over the insole (B) in the area of the forepart of the shoe in order to fix the upper to the insole, characterized in that it furthermore comprises 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) under the insole (B), below the level of the folding means.

2. Folding rig according to Claim 1, in which each flexible element consists of a tape (28) supported and tensioned at its ends.

3. Folding rig according to Claim 2, in which the tape (28) is supported at its ends by two anchoring heads (26,27) connected to a rod (23) of an actuator (22) acting along a direction (X) perpendicular to the axis (Y) of the last (A).

4. Folding rig according to Claim 3, in which an anchoring head (26) is connected to a substantially "C"-shaped support (24) fixed to the rod (23) perpendicularly thereto, while the other anchoring head (27) is fixed directly to the free end of the rod (23).

5. Folding rig according to Claim 4, in which the connection between the first anchoring head (26) and the support (24) is elastic.

6. Folding rig according to Claim 1 or 4, in which the tapes are elastic.

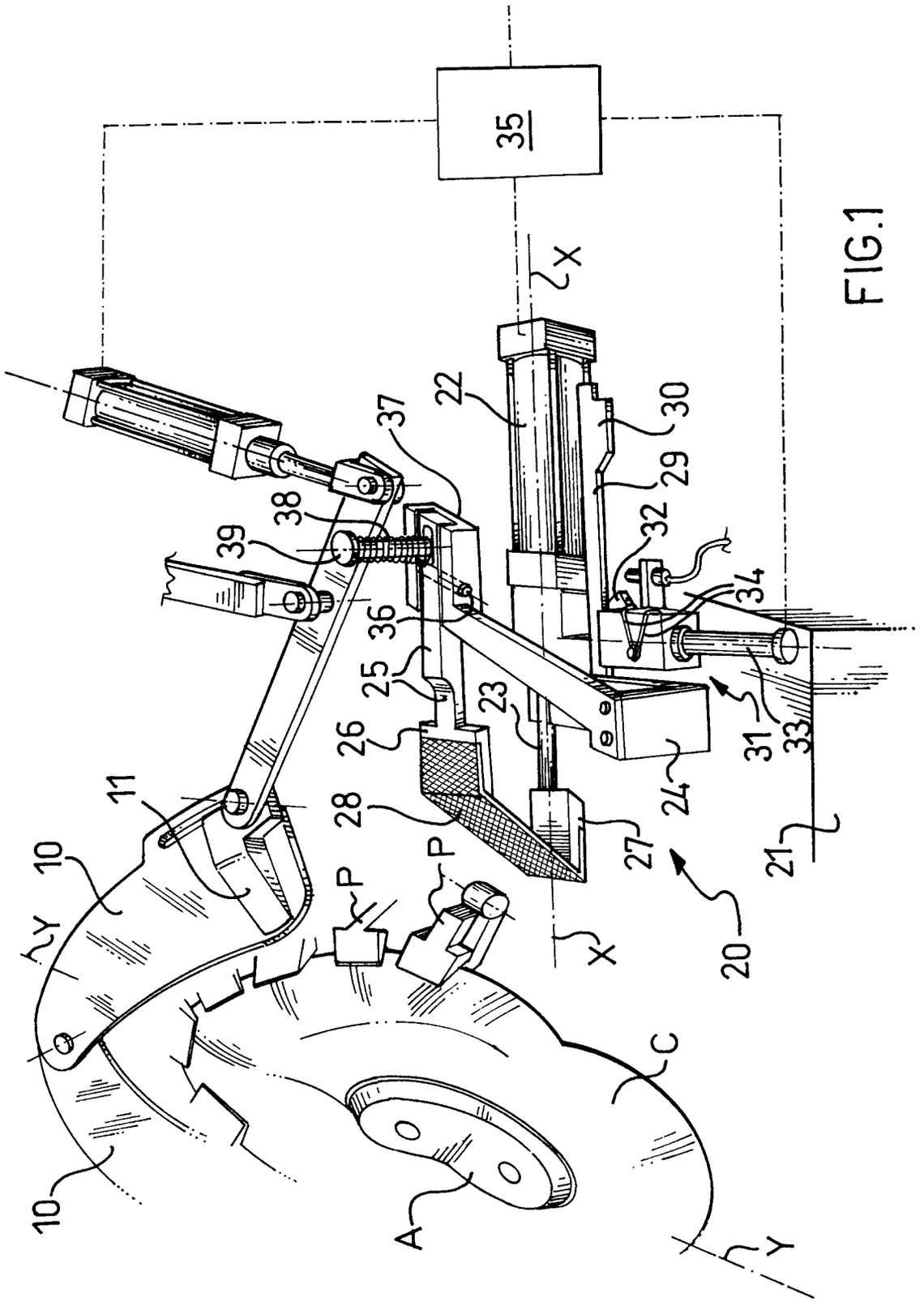
7. Folding rig according to Claim 3, in which the folding means (10,11) are immobilized in an intermediate position before being brought into the folding position, and in which there is provided, for each tape, an arresting device (29-34) which immobilizes the tape (28) in an intermediate position, releasing 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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X
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23
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P
Y
X
20
C
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10
Y

FIG.1

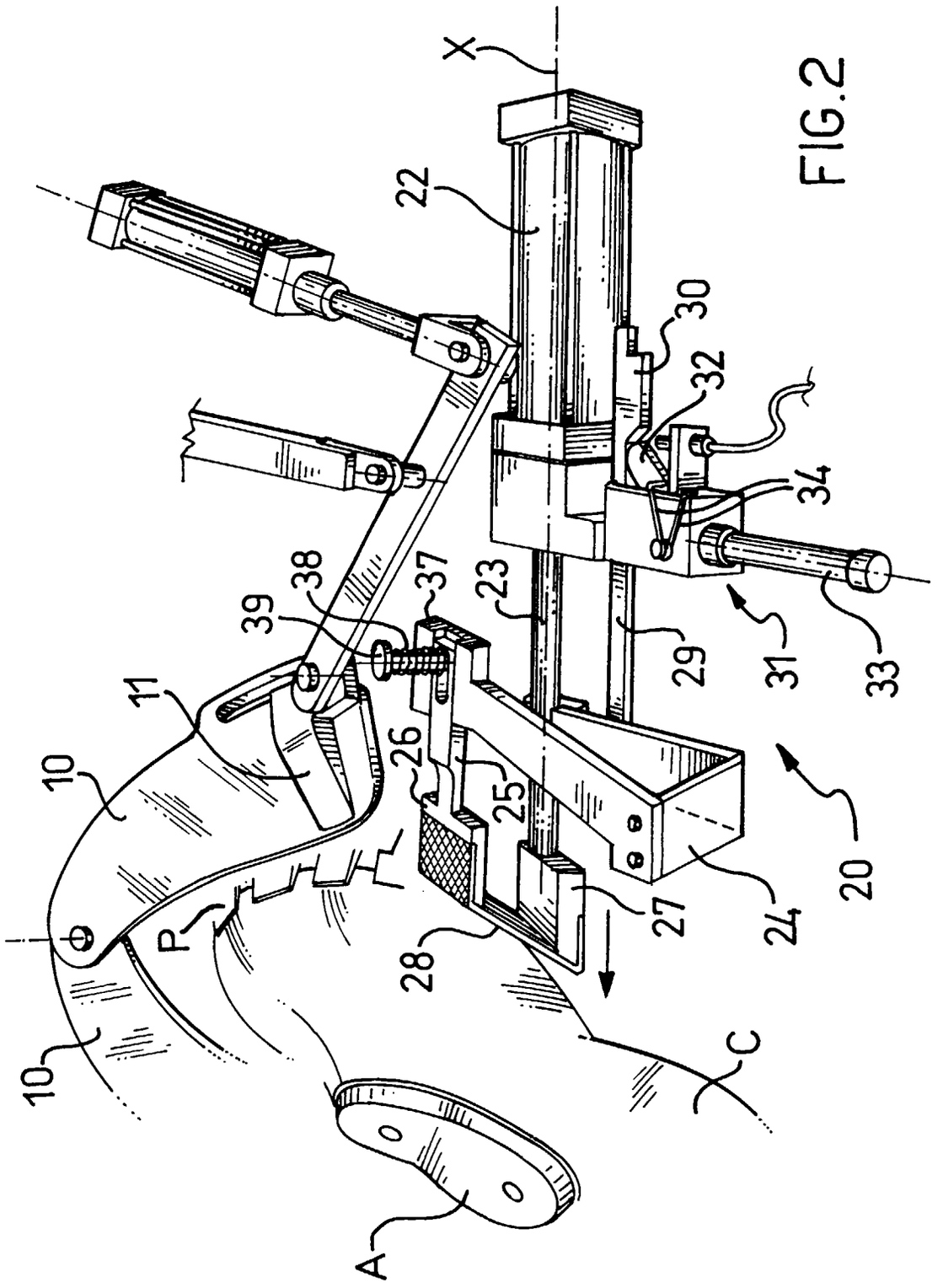

FIG.2

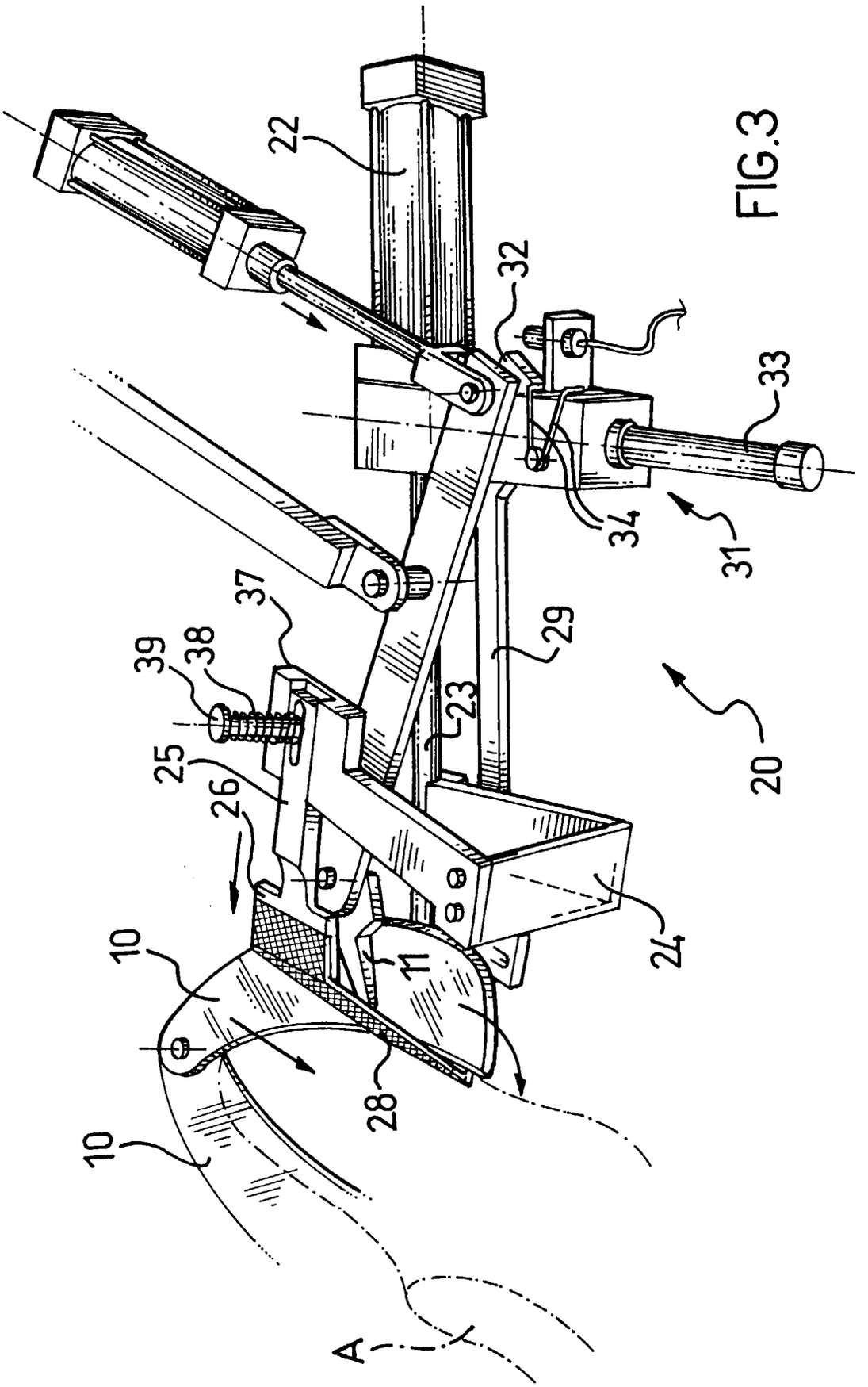

FIG.3

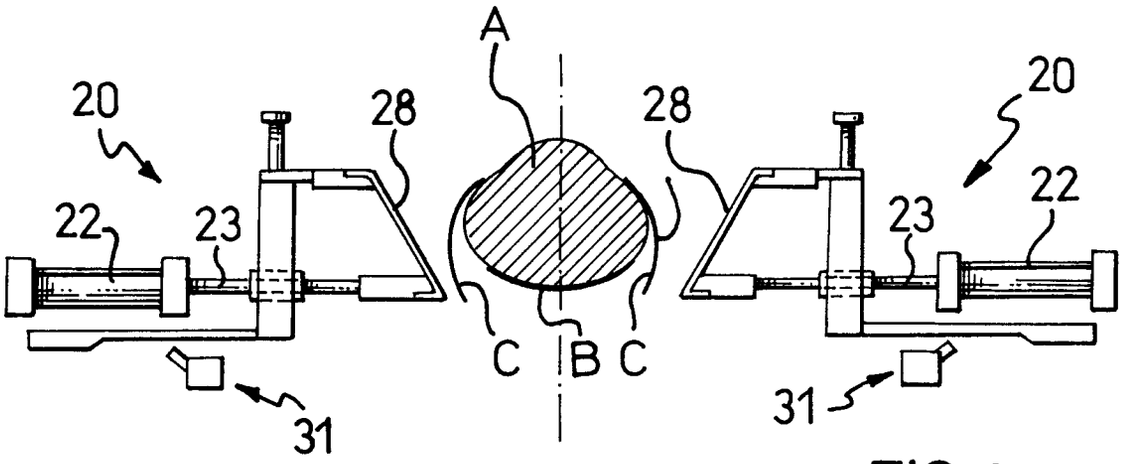

FIG.4

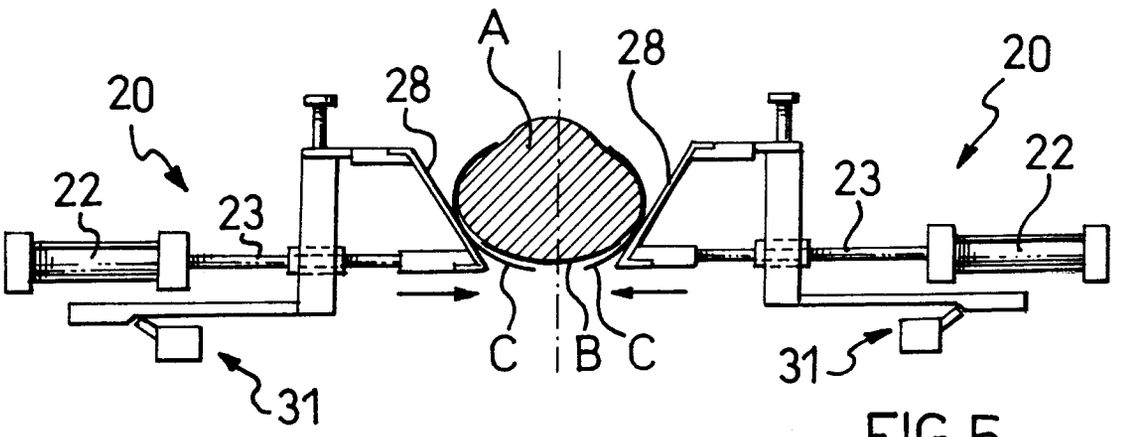

FIG.5

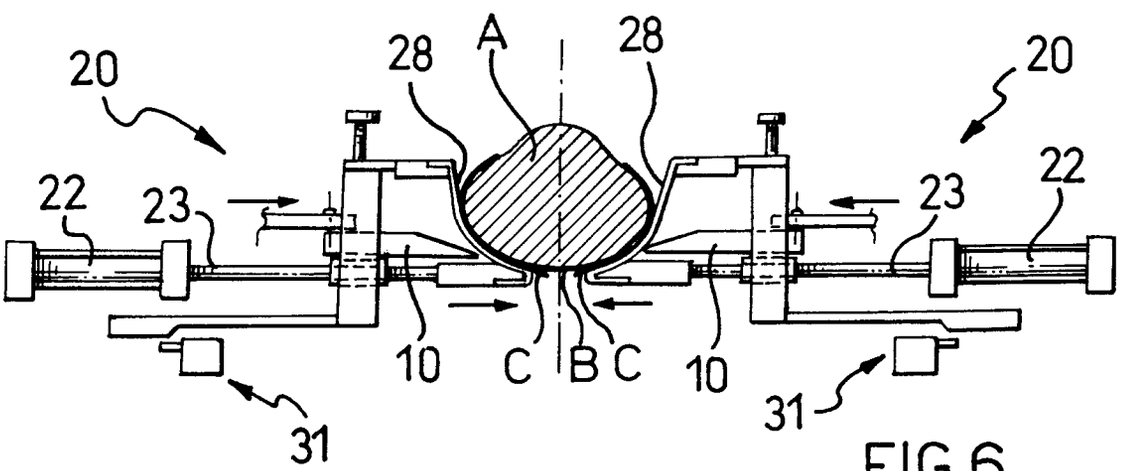

FIG.6

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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0263

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB-A-1 154 871 (THE BRITISH UNITED SHOE MACHINERY CO. LTD.) 11 June 1969 * page 2, left-hand column, line 6 - line 26; claims; figures *	1-11	A43D21/00
X	EP-A-0 123 471 (BRITISH UNITED SHOE MACHINERY ;USM CORP (US)) 31 October 1984 * page 3, line 22 - page 4, line 20; claims; figures *	1-11	
X	DE-A-24 59 101 (VER SCHUHMASCH GMBH) 24 June 1976 * claims; figures *	1-11	
A	EP-A-0 330 982 (BRITISH UNITED SHOE MACHINERY ;USM ESPANA SA (ES)) 6 September 1989		
A	US-A-1 517 297 (LA CHAPELLE) 2 December 1924		
A	US-A-3 940 816 (LEONHARDT HORST M) 2 March 1976		TECHNICAL FIELDS SEARCHED (Int.Cl.6) A43D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 October 1996	Soederberg, J

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